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FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE



FINANCIAL MANAGEMENT I (ACFN2101)

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CHAPTER ONE

INTRODUCTION

Dear reader! Welcome to the course financial management in general and financial management I in particular. The first chapter of this module is to highlight you about the general perspectives of financial management. The first section describes a short review of finance and definition of financial management. The interrelationship of finance with other disciplines is also part of this section. In section two the scope and function of financial management are described. The objectives of financial management and the role of financial managers are also part of the first chapter under the last two sections.

Chapter Outlines

- 1.1 Finance and Financial Management
- 1.2 Basic Assumptions and Principles of financial management
- 1.3 Scope and Functions Financial Management
- 1.4 Objectives of Financial Management
- 1.5 The Role of Financial Managers
- 1.6 Agency problem
- 1.7 Close related field of financial Management
- 1.8 Financial market and corporations

Chapter Summary

Self-Test Activities

Chapter Objectives

After completion of the chapter, you will be able

- To know what finance and financial management is
- To identify the major functions and related decisions under the modern financial management perspectives
- To understand the scope of financial management

- To know the roles and tasks of financial managers

1.1 An overview of financial management

Dear reader, what do recall when you hear about finance? Mention some of your views about finance.

.....
.....
.....

Finance: A Short Overview

According to Brigham (2001), **finance** consists of three interrelated areas particularly in association with the career of graduates.

Money and Capital Market This deals with securities market and financial institutions; professionals with knowledge in finance go to work for financial institutions, including banks, insurance companies, mutual funds and investment banking firms. For success here, one needs knowledge of valuation techniques, the factors that cause interest rate to rise and fall, the regulations to which financial institutions are subject, and the various types of financial instruments. One also needs a general knowledge of all aspects of business administrations, because the management of a financial institution involves accounting, marketing, personnel, computer system as well as financial management.

Investments Investment focuses on the decisions made by both individual and institutional investors as they choose securities for their investment portfolios. Broadly speaking, the investment area deals with financial assets such as stock/share and bonds. Some of the most important issues are determinants of the price of financial assets such as a share; the potential risks and rewards associated with investing in financial assets; and determination of the best mixtures of the different financial assets to be held.

Financial management or business finance which involves decisions within firms. It is the broadest of the three areas.

Ross *et.al* (2001) described finance in four basic areas of emphasis: corporate finance or business finance, investments, financial institutions and international finance. The different emphasis of the authors is the inclusion of international finance where finance professionals

are to be engaged in business finance, investments and financial institutions at international level.

Hence, finance as a field is broader which concerns with how money is raised, where is to be invested, and how it is managed and the respective decisions passed. The emphasis of this module is the financial management stream of finance.



Quick Check

Finance has at least three career development areas. Explain.

Financial Management

Financial management is a recently emerged discipline, which still has no unique body of knowledge of its own, and draws heavily on economics for its theoretical concept even today. It is an area exposed for changes related with the concurrent globalization effect and increase in information technology.

Brigham (2001) described the historical perspective and the evolution of financial management as:

When financial management emerged as a separate field of study in the early 1900s, the emphasis was on the legal aspects of mergers, the formation of new firms, and the various types of securities firms could issue to raise capital. During the depression of the 1930s, the emphasis shifted to bankruptcy and reorganization, corporate liquidity, and the regulation of security markets. During the 1940s and early 1950s, it continued to be taught as a descriptive, institutional subject viewed more from the standpoint of an outsider rather than that of a manager. However, a movement toward theoretical analysis began during the late 1950s and the focus shifted to managerial decisions designed to maximize the value of the firm. The focus on value maximization continues as we begin the 21st century. However, two other trends are becoming increasingly important: (1) the globalization of business and (2) the increased use of information technology. Both of these trends provide companies with exciting new opportunities to increase profitability and reduce risks. However, these trends are also leading to increased competition and new risks.

Setting aside the trends of change in financial management, different scholars define financial management in different technicalities, however, with similar major emphasis.

Pandey (1999) stated financial management in the form of *managerial activity*, which is concerned with the planning and controlling of a firm's financial resources.

According to Solomon (1969) financial management is concerned with the efficient use of important economic resources namely, capital funds.

Phillipatus presented financial management as:

It is concerned with managerial decisions that result in the financing and acquisition of long-term and short-term credits for the firm. As such it deals with the situation that requires selection of specific assets, the selection of specific liability as well as the problem of size and growth of an enterprise. The analysis of this decision is based on the expected inflows and outflows of funds and their effects upon managerial objectives.

Generally, financial management can be simply defined as the decision and process of making optimal use of a firm's financial resources for the purpose of maximizing the owner's or shareholders wealth. Moreover, accounting to Khan and Jain (2000) it is an integral part of management and is not totally independent.

Khan and Jain (2000) while reasoning out the non-independent aspect of financial management and its interrelated features with other streams have identified the following relationships.

Finance and Economics: The relevance of economics to financial management can be seen from the two broader areas of economics: macroeconomics and microeconomics.

Since macroeconomics is concerned with the overall institutional environment and firms operate in the macroeconomics environment, the awareness of this broader economic environment is fundamental for financial management decisions. Specifically, a financial manager has to: i) recognize and understand how monetary policy affects the cost and the availability of funds; ii) be versed in fiscal policy and its effect on the economy; iii) be aware of the various financial institutions; iv) understand the consequences of various levels of economic activity and the changes in economic policy for decision environment.

Because microeconomics is mainly dealt with the economic decisions of individuals and organizations, it defines the actions that will permit firms to achieve their objectives. The

theories of supply and demand relationships and profit maximization strategies; issues related to mix of production factors, optimal sales level and pricing strategies; the concept of measurement of utility preference, risk and determination of value; and the rationale of depreciating assets are among the fundamental features of microeconomics relevant in financial management.

Finance and Accounting: Finance and accounting are closely related and they also have distinctive features. They are closely related because accounting is an important input in financial decision-making. They are different because: i) they treat funds differently, and ii) finance begins when accounting ends. Accounting measurement of funds (income and expenses) is mainly based on *accrual principles* while the viewpoint of finance relating to funds is based on *cash flows*. The purpose of accounting is mainly collection and presentation of financial data while finance is for making decisions based on accounting data.

Marketing and Finance: If you are interested in marketing, you need to know finance because, for example, marketers constantly work with budgets, and they need to understand how to get greatest payoff from marketing expenditures and programs. Analyzing costs and benefits of projects of all types is one of the most important aspects of finance, so the tools you learn in finance are vital in marketing research, the design of marketing and distribution channels, and product pricing among others. The financial manager has also to consider the impact of new product development and promotion plans in marketing areas.

Management and Finance: One of the most important areas in management is strategy.

Thinking about business strategy without simultaneously thinking about financial strategy is an excellent step for disaster, and as a result, management strategists must have a very clear understanding of the financial implications of business plans.

1.2 Basic Assumptions and Principles of financial management

Traditional Approach

In the beginning of the present century, which was the starting point for the scholarly writings

on Corporation Finance, the function of finance was considered to be the task of providing funds needed by the enterprise on terms that are most favorable to the operations of the enterprise. The traditional scholars are of the view that the quantum and pattern of finance requirements and allocation of funds as among different assets, is the concern of non-financial executives. According to them, the finance manager has to undertake the following three functions:

- Arrangement of funds from financial institutions;
- Arrangement of funds through financial instruments Viz. shares, bonds, etc
- Looking after the legal and accounting relationship between a corporation and its sources of funds.

Modern Approach

This systems approach to the study of finance is being termed as 'Financial Management'. The term 'Corporation Finance' that was used in the traditional concept was replaced by the present term 'Financial Management.' The modern approach view the term financial management in a broad sense and provides a conceptual and analytical framework for financial decision-making. According to it, the finance function covers both acquisitions of funds as well as their allocation.

Principles of financial management

There are 10 basic principles in financial management

1. Organize your finance	6. Understand risk
2. Spend less than you earn	7. Diversification is not just for investment
3. Put your money to work	8. Maximize your employment benefit
4. Limit debt to income producing asset	9. Pay attention to taxes
5. Continuously educated your self	10. Plan for the unexpected

1.3 Scope and Functions Financial Management

The scope of financial management has evolved from the traditional to the modern approach. Under the traditional approach, the major emphasis of financial management was considered in a narrower sense. Its emphasis was how corporations raise fund and it was totally has of an

external orientation. The modern approach views financial management in a broader sense and provides a conceptual and analytical framework for financial decision-making. According to this approach, the finance function covers both acquisitions of funds as well as their allocation. In other words, financial management is concerned with the solutions of the three major problems relating to the financial operations of a firm, corresponding to three questions of investment, financing, and dividend decisions. Thus, financial management, in the modern sense can be broken down into three major decisions as functions of finance: i) the investment decisions, ii) the financing decisions, and iii) the dividend policy decision (Khan and Jain, 2000).

i) Investment (Asset-Mix) Decisions: The investment decisions relates to the selection of assets in which funds will be invested by the firm. The assets may long term assets which yield return in the future over longer periods; and short-term assets which are coverable into cash at normal operation of the business without decrease in value, usually within a year. When the investment is made on long-term assets it is considered as *capital budgeting* while the other is *working capital*.

Project proposal is evaluated against a certain established standards. Moreover, it is concerned with judgment of the benefit of the firm with concept of the cost of capital. *Working capital management* is concerned with the management of current assets. It is an important and integral part of financial management as a short-term survival is the prerequisite for the long-term success.

ii) Financing (Capital-Mix) Decisions: Financing decision is the second important function of financial management. It is emphasized when, where and how to acquire funds to meet the firm's investment needs. The central issue, therefore, is to determine the proportion of equity and debt. The mix of debt and equity is known as the firm's capital structure. The financial manager must strive to obtain the best financing mix or the optimum capital structure for the firm. The firm's capital structure is considered to be optimum when the market value of shares is maximized. The use of debt affects the return and risk of shareholders; it may increase the return on equity funds but it always increases risk. A proper balance will have to be struck between return and risk. When the shareholder's return is maximized with minimum risk, the market value per share will be maximized and the firm's capital structure would be considered

optimum. Once the financial manager is able to determine the best combination of debt and equity, he/she must raise the appropriate amount through the best available sources.

iii) Dividend or Profit Allocation Decisions: Dividend decision is the third major financial decision. The emphasis is whether the firm should distribute all profits, or retain them, or distribute a portion and retain the balance. Like the debt-equity policy, the dividend policy should be determined in terms of its impact on the shareholders' value. The optimum dividend policy is one that maximized the market value of firm's shares. Thus, if shareholders are not indifferent to the firm's dividend policy, the financial manager must determine the optimum dividend-payout ratio. The financial manager should also consider the questions of dividend stability, bonus share and cash dividends in practice.



Quick Check

Mention the three major decisions under the modern financial management approach.

1.4 Objectives of Financial Management

Firm's investment and financial decisions are unavoidable and continuous. In order to make these decision rationally, the firm must have a goal or objective (Pandey, 1999). Objectives provide a framework for optimal financial decision-making. Following sections show the profit maximization and wealth maximization objectives of a firm and present the concern for the shareholders' wealth maximization. The wealth maximization is identified as theoretically logical, operationally feasible, and normative framework for guiding the financial decision-making.

A) Profit Maximization

A business firm is profit-seeking organization. Hence, profit maximization is well considered to be an important objective of financial management. Profit maximization means maximizing firm income of firms. Firms produce goods and services. They may function in a market economy, or in a government controlled economy. In market economy, prices of goods and services are determined in competitive markets. Firms in a market economy are expected to produce goods and services desired by society as efficiently as possible. In a market economy, goods and services in great demand command higher prices. This results in higher profit for

firms; more of such goods and services are produced. A higher profit opportunity attracts other firms to produce such goods and services. Ultimately, with intensifying competition an equilibrium price is reached at which demand and supply match. In the case of goods and services, which are not required by society, their prices and profits fall. Producers in favor of more profitable opportunities drop out such goods and services.

In the economic theory, the behavior of firm is analyzed in terms of profit maximization. While maximizing profit, a firm either produces maximum output for a given amount of output, or uses minimum input for producing a given output. Thus, the underlying logic of profit maximization is efficiency. It is assumed to cause the efficient allocation of resources under the competitive market conditions, and profit is considered as the most appropriate measure of the firm's performance. Nevertheless, the profit maximization suffers from the following limitations:

Ambiguity in Definition: The precise meaning of the profit maximization objective is not clear. Definition of the term profit is ambiguous. Does it mean short-or-long-term profit? Does it refer to profit before or after tax? Total profits or profit per share? Does it mean total operating profit or profit accruing to shareholder? These cases are difficult to specify and make the term vague.

Time Value of Money: The profit maximization objective does not make a distinction between returns received at different time periods. It does not consider the time value of money or timing of benefits. It values benefits received today and benefits received after a period as the same.

Quality of Benefits: The streams of benefits may possess different degree of certainty. The term quality refers to the degree of certainty with which benefits are expected. Two firms may have same total expected earnings, but if the earnings of one firm fluctuate considerably as compared to the other, it will be more risky. Possibly, owners of the firm would prefer smaller but assured profits to a potentially larger but less certain stream of benefits.

Generally, profit maximization criterion is inappropriate and unsuitable as an operational objective of investment, financing and dividend decisions of a firm. It is not only vague but it also ignores two important dimensions of financial analysis namely risk and time value of money.

B) Wealth Maximization

Wealth Maximization is also known as value maximization or net present worth maximization. In the current financial literatures, value maximization is almost universally accepted as an appropriate operational decision criterion for financial management decisions. It removes the technical limitations of profit maximization criterion. Its operational features satisfy all the three requirements of a suitable operational objective of financial courses of action, namely, exactness, quality of benefits and the time value of money.

The value of an asset should be viewed in terms of the benefits it can produce. The worth of a course of action can similarly be judged in terms of the value of the benefits it produces less the cost of undertaking it. A significant element in computing the value of a financial course of action is the precise estimation of the benefits associate with it. The wealth maximization criterion is based on the concept of cash flows generated by the decisions rather than accounting profit. Cash flow is precise concept with a definite connotation. Measuring benefits in terms of cash flows avoids the ambiguity associated with accounting profits. This is the first operational feature of the net present worth maximization criterion.

The second important feature of the wealth maximization criterion is that it considers both the quantity and quality of dimensions of benefits. At the same time, it also incorporates the time value of money. The operational implication of the uncertainty and timing dimensions of the benefits originates from a financial decision. Adjustments should be made in the cash flow pattern, firstly, to incorporate risk and, secondly, to make an allowance for differences in the timing of benefits. The value of stream of cash flows is calculated by discounting its element back to the present at a discount rate. The discount rate reflects both time and risk. In applying the value maximization criterion, the time value is used in terms of worth to the owners. The discount rate that is employed is, therefore, the rate that reflects the time and risk preferences of the owners or suppliers of capital. A large discount rate is the result of higher risk and longer time period.

For the above reasons, the net present value maximization is superior to the profit maximization as an operational objective. As a decision criterion, it involves a comparison of value to cost. An action that has discounted value exceeding its cost can be said to create value.

Using Solomon's (1969) symbols and methods, the net present worth can be calculated as shown below:

- a. Net Present Value (W) = Gross Present Value (V) - Investment required to acquire the asset (C)
- b. Gross Present Value (V) = $\frac{\text{Size of future benefits available to the suppliers of the input capital (E)}}{\text{Discount rate reflecting timing and risk (K)}}$

(c)

$$(E) = G - (M + I + T)$$

Where G = Average future flow of gross annual earning expected from the course of action, before maintenance charges, taxes and interest and other

Prior charges like preference dividend

M = Average annual reinvestment required to maintain G

I = Expected annual outflow on account of Interest

T = Expected annual outflow on account of Taxes.

The operational objective of financial management is the maximization of W in equation (a). Alternatively, W can be expressed symbolically by a short-cut method as in the following equation. Net present value or wealth is:

$$NPV (W) = \frac{A_1}{(1+i)^1} + \frac{A_2}{(1+i)^2} + \frac{A_3}{(1+i)^3} + \dots + \frac{A_n}{(1+i)^n} - C$$

$$NPV = \sum_{t=1}^n \frac{A_t}{(1+i)^t} - C$$

$A_1, A_2, \dots, A_t$ are streams of cash flows t (time) = 1, 2, 3, ..., n

i = represents discount rate

C is initial outlay to acquire assets

A financial action that has a positive NPV creates wealth for shareholders and, therefore, is desirable. A financial action resulting in negative NPV should be rejected since it would destroy shareholders' wealth. Between numbers of mutually exclusive projects the one with higher NPV should be adopted. Therefore, the wealth will be maximized if this criterion is followed in making financial decisions.

1.5 The Role of Financial Managers

A financial manager is a person who is responsible in a significant way to carry out the finance functions. A financial manager is responsible for shaping the fortunes of the enterprise, and is involved in the most vital decision of the allocation of capital. A financial manager plays a dynamic role in a modern company's development. Weighted corporate competition, technology changes, volatility in inflation and interest rates, worldwide economic uncertainty and ethical concerns over certain financial dealings must be dealt with almost daily.

The role of a financial manager changes and old ways of doing things are not good enough in a world where old ways become obsolete. Today's financial manager must have the flexibility to adapt to the changing external environment if his or her firm is to survive. The financial manager's ability to adapt to changes, raise fund, invests in asset, and manages wisely will affect the success of a firm.

Hence, a financial manager through efficient acquisition, financing and managing assets contribute to the firm in particular and to the strength and growth of an economy as a whole.

Moreover, the following specific tasks of financial staff can be stated as major responsibilities.

Forecasting and Planning: The financial staff must coordinate the planning process. This means that they must interact with people from other departments as they took ahead and lay the plans that will shape the firm's future.

Major Investment and Financing Decision: A successful firm usually has rapid growth in sales, which requires investments in plant, equipment, and inventory. The financial staff must help determine the optimal sales growth rate, help decide what specific assets to acquire, and then choose the best way to finance these assets. For example, should the firm finance with

debt, equity or some contributions of the two, and if debt is used, how much should be long term and how much short term?

Contribution and Control: The financial staff must interact with other personnel to ensure that the firm is operating as efficiently as possible. All business decisions must have financial implications, and all managers- financial and otherwise- need to take this into account. For example, marketing decisions affect sales growth, which in turn influences investment requirements. Thus, marketing decision makers must take into account of how their actions affect and are affected by such factors as the availability of funds, inventory policies, and plant capacity utilization.

Dealing with the Financial Markets: The financial staff must deal with money and capital markets. Each firm affects and is affected by the general financial markets where funds are raised, where the firm's securities are traded, and where investors either make or lose money.

Risk Management: All business face risk, including natural disasters such as fires and floods, uncertainties in commodity markets, volatile interest rates and fluctuating foreign exchange rates. However, many of these risks can be reduced by purchasing insurance or by hedging in derivatives markets. The financial staff is responsible for the firm's overall risk management program, including identifying the risks that should be managed and then managing them in the most efficient manner.

Quick Check

What is the contribution of a financial manager in firm's wealth maximization?

In this dynamic and complex world, old methods of doing things is difficult. Explain.

1.6 The agency relationship

If you are the sole owner of a business, then you make the decisions that affect your own well-being. However, what if you are a financial manager of a business and you are not the sole owner? In this case, you are making decisions for owners other than yourself; you, the financial manager, are an agent. An **agent** is a person who acts for—and exerts powers of— another person or group of persons. The person (or group of persons) the agent represents is referred

to as the **principal**. The relationship between the agent and his or her principal is an **agency relationship**.

There is an agency relationship between the managers and the shareholders of corporations.

Problems with the Agency Relationship

In an agency relationship, the agent is charged with the responsibility of acting for the principal. Is it possible the agent will not act in the best interest of the principal, but instead act in his or her own self-interest? Yes—because the agent has his or her own objective of maximizing personal wealth.

Conflict of goals between management and owners and agency problem

There is a conflict of goals between managers and owners of a corporation and managers may act to maximize their interest instead of maximizing the wealth of owners. Managers are interested to maximize their personal wealth, job security, life style and fringe benefits.

The natural conflict of interest between stockholders and managerial interest create agency problems. Agency problems are the likelihood that managers may place their personal goals ahead of corporate goals. Theoretically, agency problems are analyzed there as long as managers are agents of owners. Corporations (owners) are aware of these agency problems and they incur some costs because of agency.

These costs are called agency cost and include:

1. **Monitoring expenditures**— are expenditures incurred by corporations to monitor or control the activities of managers. A very good example of a monitoring expenditure is fees paid by corporations to external auditors.
2. **Bonding expenditures** – are cost incurred to protect dishonesty of managers and other employees of a firm. Example: fidelity guarantee insurance premium.
3. **Structuring expenditures** – expenditures made to make managers feel sense of ownership to the corporation. These include stock options, performance shares, cash bonus etc.
4. **Opportunity costs** – unlike the previous three, these costs are not explicit expenditures.

Corporations due to hindrances of decisions assume Opportunity costs by them as a result of their organizational structure and hierarchy.

1.7 Close related field of financial management

1. Financial Management and Economics

Economic concepts like micro and macroeconomics are directly applied with the financial management approaches. Investment decisions, micro and macro environmental factors are closely associated with the functions of financial manager.

Financial management also uses the economic equations like money value discount factor, economic order quantity etc. Financial economics is one of the emerging area, which provides immense opportunities to finance, and economical areas.

2. Financial Management and Accounting

Accounting records includes the financial information of the business concern.

Hence, we can easily understand the relationship between the financial management and accounting. In the olden periods, both financial management and accounting are treated as a same discipline and then it has been merged as Management Accounting because this part is very much helpful to finance manager to take decisions. Now a day's financial management and accounting discipline are separate and interrelated.

3. Financial Management or Mathematics

Modern approaches of the financial management applied large number of mathematical and statistical tools and techniques. They are also called as econometrics. Economic order quantity, discount factor, time value of money, present value of money, cost of capital, capital structure theories, dividend theories, ratio analysis and working capital analysis are used as mathematical and statistical tools and techniques in the field of financial management.

4. Financial Management and Production Management

Production management is the operational part of the business concern, which helps to multiple the money into profit. Profit of the concern depends upon the production performance. Production performance needs finance, because production department requires raw material, machinery, wages, operating expenses etc. These expenditures are decided and estimated by the financial department and the finance manager allocates the appropriate finance to production department.

The financial manager must be aware of the operational process and finance required for each process of production activities.

5. Financial Management and Marketing

Produced goods are sold in the market with innovative and modern approaches. For this, the marketing department needs finance to meet their requirements. The financial manager or finance department is responsible to allocate the adequate finance to the marketing department. Hence, marketing and financial management are interrelated and depends on each other.

6. Financial Management and Human Resource

Financial management is also related with human resource department, which provides labor to all the functional areas of the management. Financial manager should carefully evaluate the requirement of labor to each department and allocate the finance to the human resource department as wages, salary, remuneration, commission, bonus, pension and other monetary benefits to the human resource department. Hence, financial management is directly related with human resource management.

1.8 Financial market and corporations

The primary advantages of the corporate form of organization are that ownership can be transferred more quickly and easily than with other forms and that money can be raised more readily. Both of these advantages are significantly enhanced by the existence of financial markets, and financial markets play an extremely important role in corporate finance.

Primary versus secondary markets

Financial markets function as both primary and secondary markets for debt and equity securities. The term primary market refers to the original sale of securities by governments and corporations. The secondary markets are those in which these securities are bought and sold after the original sale. Equities are, of course, issued solely by corporations. Debt securities are issued by both governments and corporations. In the discussion that follows, we focus on corporate securities only.

Primary Markets: In a primary market transaction, the corporation is the seller, and the transaction raises money for the corporation. Corporations engage in two types of primary market transactions: public offerings and private placements. A public offering, as the name

suggests, involves selling securities to the public, whereas a private placement is a negotiated sale involving a specific buyer.

Secondary Markets: A secondary market transaction involves one owner or creditor selling to another. Therefore, the secondary markets provide the means for transferring ownership of corporate securities. Although a corporation is directly involved only in a primary market transaction (when it sells securities to raise cash), the secondary markets are still critical to large corporations. The reason is that investors are much more willing to purchase securities in a primary market transaction when they know that those securities can later be resold if desired.

Dealer versus Auction Markets: There are two kinds of secondary markets: auction markets and dealer markets. Dealers buy and sell for themselves, at their own risk. A car dealer, for example, buys and sells automobiles. In contrast, brokers and agents match buyers and sellers, but they do not actually own the commodity that is bought or sold. A real estate agent, for example, does not normally buy and sell houses.

Dealer markets in stocks and long-term debt are called over-the-counter (OTC) markets. Most trading in debt securities takes place over the counter. The expression over the counter refers to days of old when securities were literally bought and sold at counters in offices around the country. Today, a significant fraction of the market for stocks and almost all of the market for long-term debt have no central location; the many dealers are connected electronically.

Auction markets differ from dealer markets in two ways. First, an auction market or exchange has a physical location (like Wall Street). Second, in a dealer market, the dealer does most of the buying and selling. The primary purpose of an auction market, on the other hand, is to match those who wish to sell with those who wish to buy. Dealers play a limited role.

Trading in Corporate Securities: The equity shares of most of the large firms in the United States trade in organized auction markets. The largest such market is the New York Stock Exchange (NYSE), which accounts for more than 85 percent of all the shares traded in auction markets. Other auction exchanges include the American Stock Exchange (AMEX) and regional exchanges such as the Pacific Stock Exchange.

Listing Stocks: that trade on an organized exchange are said to be listed on that exchange. To be listed, firms must meet certain minimum criteria concerning, for example, asset size and number of shareholders. These criteria differ from one exchange to another.

Chapter Summary

Finance consists of three interrelated areas. Money and capital market, investments, and financial management are the three interrelated areas of finance. Money and capital market deals with security market and financial institutions. The investment area emphasizes on the financial assets of a firm technically speaking the shares and bonds among others. The financial management is mainly for the decision aspects.

Financial management can be defined as the process of making optimal use of financial resources for the purpose of shareholders wealth maximization. As finance is not totally independent discipline, it has interrelated features with accounting, economics, marketing and management.

The scope of financial management is modified while it passes from the traditional approach to the modern approach. Its scope was original limited to raise funds for corporate form of organizations. However, under the modern approach, financial management deals with the three important decisions: investment decision, financing decision and dividend policy decision.

The investment decision is mainly for the mix of assets, long-term assets and short-term assets. The financing decision concerns about the financing mix decision of firms that is the debt-equity proportions of firms. Firms pass decision on the distribution and retention of net income, which is the concern of the dividend policy decision.

Goals or objectives are required for firms to make rational decisions. The profit maximization and wealth maximization are the basic criteria to make normative decisions. Since profit maximization has limitations on the ambiguity, risk and time value of money grounds, wealth maximization is considered as theoretically logical, operational feasible and provide normative framework for guiding firms' make rationale financial decisions.

Self-Test Activities

I. Write “True” if the statement is correct or “False” if the statement is incorrect

1. Globalization of business and change in information technology make financial management concepts to be modified.
2. Understanding the concepts and theories of economics have nothing to do for a financial manager.
3. Capital budgeting is one of the important financing decisions which concern with short-term assets so that a financial manager to take it into account
4. Profit maximization is the prior objective of firms because it considers quality of benefits.
5. A finance graduate can make career development on money and capital markets.

II. Multiple Choices

1. One of the following is true about finance and finance professionals?
 - A. Professionals in finance have a career opportunity as bankers and mutual fund managers.
 - B. International finance is the least demanded areas of finance.
 - C. Finance concerns with how to raise funds, how to invest them among other
 - D. All
 - E. None
2. Wealth Maximization ignores
 - A. Quality of benefits
 - B. Time value of money
 - C. Accounting profit
 - D. Risk of benefit
 - E. None
3. One of the following is incorrect about capital budgeting decision
 - A. It concerns with selection of long-term assets
 - B. It evaluates investment proposals
 - C. It is concerned with cost of capital
 - D. It is all about the management of current assets

- E. None
- 4. One of the following is mainly concerned with debt- equity mix.
 - A. Capital budgeting
 - B. Financing decision
 - C. Working capital management
 - D. Investment decision
 - E. None
- 5. A finance graduate will not possible engaged in
 - A. Recording and accounting
 - B. Forecasting and planning
 - C. Dealing with financial markets
 - D. Analysis of risk management programs
 - E. None

CHAPTER TWO

FINANCIAL ANALYSES AND PLANNING

Dear reader! You have read the major financial statements in your introductory accounting courses. These financial statements are raw unless they are further processed and analyzed. Users of accounting information can get the detailed insight of financial statements when they are analyzed. Financial analysis can be conducted with the use ratio, common size statement, index, and trend analyses. Moreover, firms make financial plans based on their historical data analyzed. The chapter is, therefore, designed to show the major types of financial statement analyses and how to prepare pro-forma financial statements.

Chapter outline

2.1. Financial Statement Analysis

2.1.1. Vertical and horizontal Analysis

2.1.2. Ratio Analysis

2.1.2.1. Liquidity ratios

2.1.2.2. Asset Management ratios

2.1.2.3. Profitability ratios

2.1.2.4. Debt management ratios

2.1.2.5. Market value ratios

2.2. Financial Forecasting

Chapter Summary

Self-Test Activities

Chapter Objectives

After the completion of the chapter, you will be able to:

- Analysis the performance of organizations with the help of ratio, common size statement, trend and index analyses
- Interpret results of ratio analysis

- Understand the limitations of ratios and cares to be taken
- Use techniques of forecasting financial position and results
- Prepare projected financial statements based on historical accounting data

2.1. Financial analysis

In your introductory accounting courses and previous modules, you have been learned about how to construct financial statements. As you are expected to remember the financial statements include: balance sheet, income statements, cash flow statements and the shareholders' or the owners' equity statements. The management groups, creditors, investors and others to form a kind of judgment about the operating performance and financial position of a firm use the information obtained in these statements. Users of financial statements can get further insight about financial strengths and weaknesses of the firm if they properly analyze information reported in these statements. The management should be particularly interested in knowing financial strengths of a firm to make their best use, to be able to spot out financial weaknesses of the firm and to take suitable corrective actions as needed. The plans of the firm should be laid down in view of the firm's financial strengths and weaknesses. Thus, financial analysis is the starting point for making plans; that is before using any sophisticated forecasting and planning procedures. Moreover, understanding the past with critical and suitable analysis is a prerequisite for anticipating the future. Hence, the discussions here followed are all about the analysis of financial statements particularly of the balance sheet and the income statement. Use the following financial statements as part of illustrations for the sections.

TAYE Company

Income Statement (in'000 Birr)

For the year ended December 31, 2008

Sales	Br.830
Cost of Goods Sold	<u>(539)</u>
Gross Profit on Sales	Br.291
Operating Expenses:	
Marketing Expense	Br. 91
General and Administrative Expense	71
Depreciation	<u>28</u>
Total Operating Expenses	<u>(Br.190)</u>
Operating Income (EBIT)	Br.101
Interest Expense	<u>(20)</u>
Earnings Before tax	Br. 81
Income Tax	<u>(17)</u>
Earnings after Tax	Br.64
Dividends Paid	<u>(15)</u>
Change in Retained Earnings	<u>Br.49</u>

TAYE Company
Balance Sheets (in'000 Birr)
December 31, 2007 and 2008

Assets	<u>2007</u>	<u>2008</u>
Current Assets		
Cash	Br.39	Br.44
Accounts receivable	70	78
Inventories	177	210
Prepaid expenses	<u>14</u>	<u>15</u>
Total current assets	300	347
Fixed assets:		
Gross plant and equipment	Br.759	Br.838
Accumulated depreciation	(355)	(383)
Net plant and equipment	404	455
Land	<u>70</u>	<u>70</u>
Total fixed assets	Br.474	Br.525
Patents	<u>30</u>	<u>55</u>
Total assets	<u>804</u>	<u>927</u>

Liabilities and Equity

Current Liabilities:

Accounts Payable	Br.61	Br.76
Income tax payable	12	17
Accrued wages and salaries	4	4
Interest payable	<u>2</u>	<u>2</u>
Total Current liabilities	Br.79	Br.99
Long-term notes payable	<u>146</u>	<u>200</u>
Total liabilities:	<u>Br.225</u>	<u>Br.299</u>
Common stock	300	300
Retained Earnings	<u>279</u>	<u>328</u>
Total Stockholders' equity	<u>579</u>	<u>628</u>
Total liabilities and equity	Br. <u>804</u>	Br. <u>927</u>

Financial Statements Analysis

Financial analysis is the process of identifying the financial strength and weakness of a firm by properly establishing relationships between the items of financial statements for certain period(s).

Financial analysis can be undertaken by management of the firm, or by parties outside the firm such as owners, creditors, investors and so forth. The nature of analysis will differ depending on the purpose of the analyst.

The target of financial analysis is to produce relationships among financial data and interpret the results. The sources of data for financial analysis are accounting records, particularly balance sheet and income statement.

The methods of analyzing financial statements include ratio analysis, common size statement analysis, index analysis, and trend analysis.

2.1.1 Ratio Analysis

Ratio analysis is a widely used tool of financial analysis. It is the systematic use of ratio to interpret financial statements so that the strength and weakness of a firm as well as its historical performance and current condition can be determined. The term ratio is defined as the numerical or quantitative relationship of two items or variables.

According to Pandey (1999) ratio is defined as the indicated quotient of two mathematical expressions and the relationship between two or more things.

In financial analysis, a ratio is used as a benchmark for evaluating the financial position and performance of a firm. The absolute accounting figures reported in the financial statements do not provide a meaningful understanding of the performance and financial position of a firm. An accounting figure conveys meaning when it is related to some other relevant information (Pandey, 1999).

Moreover, for Mayes and Shank (2004) ratios are an analyst's **microscope** which allows users of information a better view of a firm's financial health than just looking at the raw financial data presented in financial statements. For example, it might be an impressive figure for a firm which report Br. 5,000,000 net profit at a period of time, but it is difficult to say the firm's performance is good or bad unless the net profit figure is related to the firm's investment and the total sales made among other factors.

Similarly, ratios help to summarize large quantities of financial data and to make qualitative judgment about the firm's, financial performance. For example, consider current ratio, which is calculated by dividing current assets by current liabilities; the ratio indicates a relationship in terms of a *quantified* relationship between current assets and current liabilities. This relationship is an index or yardstick, which permits a *qualitative judgment* to be formed about the firm's ability to meet its current obligations. It measures the firm's liquidity. The greater

the ratio, the greater is the firm's liquidity and vice versa. The point that must be noted is a ratio reflecting a quantitative relationship helps to form a qualitative judgment, which is the nature of all financial ratios.

2.1.1.1 Standards for Ratio Comparisons

Ratio analysis is not for the sake of the application of formula to financial data while calculating a given ratio. More important is the interpretation of the value calculated. To arrive at a proper interpretation and to make valuable judgments, a meaningful standard or basis is required and shall to be established.

Standards of comparison may consist of;

Past Ratios: Ratios calculated from the past financial statements of the same firm

i.e., Longitudinal or Trend based standards

Competitors' Ratios: Ratios of some selected firms, especially the most progressive and successful competitor, at the same point in time i.e., **Single period or Cross-section based standards**

Industry Ratios: Ratios of the industry to which the firm belongs i.e., **Industry based standards**

Project Ratios: Ratios developed using the projected, or pro-forma, financial statements of the same firm **i.e., projected (pro-forma) statements based standards**

- A. **Trend Based Standards:** The easiest way to evaluate the performance of a firm is to compare its present ratios with the past ratios. When financial ratios over a period are compared, it is known as the time series (trend) analysis. It gives an indication of the direction of change and reflects whether the firm's financial performance has improved, deteriorated or remained consistent over time. The analyst should not simply determine the change, but, more importantly, should understand why ratios changed.
- B. **Cross-Sectional Based Standards** Another way of comparison is to compare ratios of one firm with some selected firms in the same nature at the same point in time. This kind of comparison is known as the cross-sectional comparison. In most cases, it is more useful to compare the firm's ratios with ratios of a few carefully selected competitors. This kind of a comparison indicates the relative financial position and

performance of the firm. A firm can easily resort to such a comparison, as it is not difficult to get the published financial statements of similar firms.

C. **Industry Based Standards** To determine the financial condition and performance of a firm, its ratios may be compared with average ratios of the industry of which the firm is a member. Industry ratios are important standards in view of the fact that each industry has its characteristics, which influence the financial and operating relationships. But there are certain practical difficulties in using the industry ratios. First, it is difficult to get average ratios for the industry. Second, even if industry ratios are available, they are averages of the ratios of strong and weak firms. Sometimes differences may be so wide that the average may be of little utility. Third, averages will be meaningless and the comparison futile if firms within the same industry widely differ in their accounting policies and practices. If it is possible to standardize the accounting data for companies in the industry and eliminate extremely strong and extremely weak firms, the industry ratios will prove to be very useful in evaluating the relative financial condition and performance of a firm.

D. **Pro-forma Statements based standards:** Sometimes future ratios are used as the standard of comparison. Future ratios can be developed from projected or pro forma financial statements. The comparison of current or past ratios with future ratios shows the firm's relative strengths and weaknesses in the past and the future. If the future ratios indicate weak financial position, corrective actions should be initiated.



Quick Check

1. Mention some reasons for undertaking financial statement analysis.
2. What is the need for standards in ratio analysis?

2.1.1.2.Types of Ratio Analysis

Financial ratios can be grouped into different categories based on the need of analysis to be performed and the tasks to be evaluated. The interest of the users for analyzed information also matter while classifying the types of ratio analysis. User of the information may concentrate on the liquidity position of a firm so that liquidity ratios are in demand; long-term solvency and sustenance of profitability may be in need of long-term creditors so that profitability and leverage ratios are required; similarly, owners may want to know the firm's profitability, stability of the earnings over periods and efficient and effective utilization of assets so that market value, activity and profitability ratios are requested. For the sake of convenience, however, ratios can be grouped into five basic types.

1. Liquidity ratios
2. Activity ratios
3. Debt/leverage ratios
4. Profitability ratios
5. Market value ratios

1. Liquidity Analysis

Liquidity refers to the firm's ability to meet its obligation in the short-run, usually one year. Liquidity ratios are generally based on the relationship between current assets and current liabilities. The most important liquidity ratios are: current ratio, acid-test ratio and cash ratio.

A) Current Ratio: One of the very popular ratio, defined as:

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

Components of current assets are cash, short-term investment, receivables, inventories and pre-paid expenses. Current liabilities are those liabilities that are expected to mature usually in the next twelve months. These comprise account payables, accrued payables, loans secured or unsecured, that are due in the next twelve months, and current other provisions.

The current ratio of TAYE Company for 2008 is:

$$\text{Current ratio} = \frac{\text{Br. } 347}{\text{Br. } 99} = 3.5 \text{ times or } = 3.5:1$$

The general minimum norm for current ratio at international level is 2.0, but the acceptability of a value of current ratio depends on the nature of the industry in which the firm is categorized and standards established for comparisons. Assume, for example, that the industry average for TAYE Company is 4.1 times. TAYE's current ratio is below the average of its industry, so its liquidity position is relatively weak.

As a general norm the higher the current ratio, the greater is the short-term solvency. However, in interpreting current ratio the composition of current assets must not be overlooked. A firm with a high proportion of current assets in the form of cash and receivables is more liquid than a firm with a high proportion of current assets in the form of inventories even though both firms may have the same current ratio.

A very high current ratio may imply that:

- There is excessive cash due to poor cash management
- Receivables are excess due to poor credit management
- The prevalence of excessive inventory due to lack of proper inventory management.

The result of very high current ratio is to have very high liquidity, which is safety of funds for short term creditors thereby reduced risk to creditors. However, the result shows trade-off profitability because current assets are less profitable than long-term assets. On the contrary, conservative management of current assets may cause a very low current ratio, which may be the opposite for very high current ratio.

Very low current ratio can be improved with:

- Long-term borrowing and sell of stocks to increase current assets
- Liquidate current liabilities using long-term assets.

The case where the value of current assets is dropping down without making impossible for the firm to cover its current liabilities is termed as maximum shrinkage. If a current ratio is divided into 1.0 and the resulting quotient is subtracted from 1.0, the difference multiplied by 100 represents the percentage by which the firm's current asset can shrink without making it

impossible for the firm to cover its current liabilities. For example, a current ratio of 3.50 means that the firm can cover its current liabilities even if its current assets shrink by 71 percent.

$$\begin{aligned} \text{Maximum shrink in value of current assets} &= [1 - (1/\text{Current Ratio})] \times 100\% \\ \text{Or} \\ &= \frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Current assets}} \times 100\% \end{aligned}$$

The maximum shrinkage of current assets for TAYE Company in 2008 is computed as

$$[1 - (1/3.5)] \times 100 = 71\%$$

Or

$$\frac{347,000 - 99,000}{347,000} = \frac{248,000}{347,000} \times 100\% = 71\%$$

Br. 347,000 $\times$ 0.71 = Br. 246, 370. This indicates current assets could shrink by about Br. 246, 000 but still the company is able to cover its current liabilities.

The level of net working capital below which creditors become at risk is considered as margin of safety to creditors.

$$\text{Margin of safety to creditor} = \frac{\text{Current assets} - \text{Current liabilities}}{\text{Current liabilities}} \times 100$$

Note that Margin of safety for TAYE's creditors 2.5 or 250%

B) Quick (Decisive Test) Ratio: This is a stringent measure of liquidity. It is based on current assets, which are liquid- excluding inventories and prepaid expenses. Inventories are deemed to be the least liquid components of current assets and prepaid expenses which are not available to pay off current liabilities. Quick assets include cash, marketable securities, and receivables (such as notes receivable and account receivable).

The low liquid nature of inventories is resulted from:

- Many types of inventories could not be sold easily because they are partially completed items, obsolete items, special purpose items, among others, and
- The items may be sold on credit, which means they become an account receivable before being converted into cash.

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

A quick ratio of one or greater is recommended, but as with the current ratio, an acceptable value depend on the industry group and the established standards.

The quick ratio of TAYE Company is:

$$\text{Quick Ratio}_{2008} = \frac{347,000 - 210,000 - 15,000}{99,000} = \frac{122,000}{99,000} = 1.23 \text{ times}$$

C) Cash Ratio: A very short term one for which creditor may be interested in. Cash ratio is defined as:

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

Since cash is the liquid asset, a financial analyst may examine cash ratio and its equivalents to current liabilities. Marketable securities are equivalent to cash; therefore, they may be included in the computation of cash ratio.

The cash ratio of TAYE Company is 0.44 times which is computed as follows:

$$\text{Cash ratio}_{2008} = \frac{44,000}{99,000} = 0.44 \text{ times}$$

The company can be considered as the one with small amount of cash relative to its current obligations. It can only cover 44 percent of its short-term liabilities without liquidating other current assets. The position of comparison as to the strength and weakness of the company depends upon the standards to be employed.

2. Activity Ratios

These ratios are also called efficiency ratio, or asset management ratio, or asset utilization ratios. Utilization ratios compare the level of sales or cost of goods sold with the level of investment in various assets. These ratios are used to measure the speed with which various assets are converted into sales revenue and assets are effectively managed. What these ratios are intended to describe is how efficiently, or intensively, a firm uses its assets to generate sales. The most commonly used activity ratios inventory turnover, account receivable turnover, fixed asset turnover, and total asset turnover ratios.

A) Inventory Turnover Ratio: It measures how quickly inventory of a firm is sold. It indicates the efficiency of the firm in managing and selling inventories. It is calculated by dividing the cost of the goods sold by the inventory amounts. There are arguments as to which is to be used, either sales or cost of goods sold in the numerator. The fact that sales are stated at market prices, while inventories are at cost, the calculated inventory turnover overstates the true turnover in cases when sales are used. Hence, the best argument is cost of goods sold is to be used unless the situation is not conducive to get the cost of goods sold in which case sale is to be implemented. The logic of comparison is ‘apple to apple’ so cost is to be compared with costs not market prices.

There is also debate on the use of inventory. For some average inventory is employed that is the average of ending and beginning inventories, while for the others ending inventory is to be taken in the denominator. For the sake simplicity, inventory at the end of a certain period is assumed.

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

The inventory turnover ratio of TAYE Company is

$$\text{Inventory turnover}_{2008} = \frac{\text{Br. 539,000}}{\text{Br. 210,000}} = 2.55 \text{ times}$$

This implies that TAYE Company replaces its inventories about 2.55 times in a year. The evaluation of performance with regard to inventory turnover of a certain company depends

upon the standards employed. Generally, higher inventory turnover is considered to be good because it means that storage costs are low, but if it is too high the firm may be risking inventory outages and the loss of customers.

B) Average Age of Inventory (AAI): It is the reciprocal of the inventory turnover. It is also called as days of inventory holdings because it is the length of time inventory is held by the firm. When the number of days in a year (say, 360) is divided by inventory turnover, days of inventory holdings derived.

$$\text{Average Age of Inventory} = \frac{\text{Inventory}}{\text{Cost of goods Sold}} \times 360 \text{ days}$$

Or

$$\text{Average Age of Inventory} = \frac{360 \text{ days}}{\text{Inventory turnover}}$$

The average age of inventories in TAYE Company's store is

$$\text{Average Age of Inventory}_{2008} = \frac{210,000}{539,000} \times 360 = \frac{360}{2.55} = 141 \text{ days}$$

TAYE Company held its inventory on average for 141 days. Whether TAYE is efficient in inventory management is a matter of comparison which is actually based on the nature of industry and other standards employed. The general principle, however, is the lower is the better without leaving the firm out of stock.

C) Account Receivable Turnover (ARTO): Firms grant credit at least to increase their sales level. It is, therefore, important to know how well the firm manages its receivables. The account receivable turnover ratio provides information about the management of account receivables. It indicates how many times account receivable is converted into cash during the year. The higher the value of account receivable turnover, the more efficient is the expected credit management. It is calculated by:

$$\text{Account Receivable Turnover} = \frac{\text{Credit sales}}{\text{Account receivable}}$$

For TAYE Company, the 2008 account receivable turnover ratio is (assuming all sales are credit sales):

$$\text{Account Receivable Turnover ratio} = \frac{830,000}{78,000} = 10.64 \text{ times}$$

Whether 10.64 is a good account is receivable account ratio or not is difficult to know at this point. But it is possible to say, higher is generally better. Still too higher figure of account receivable turnover ratio might indicate that the firm is delaying credit to creditworthy customers thereby losing sales. If the ratio is too low, it would suggest that the firm is having difficulty of collecting on its sales. This is particularly true if there finds that account receivables are increasing faster than sales over a prolonged period.

D) Average Collection Period (ACP): The average collection period indicates how many days it takes for a firm to collect its credit sales. It can also be defined as the average number of days for which account receivables remain outstanding. It measures the quality of account receivables since it indicates the speed of collections.

$$\text{Average Collection Period} = \frac{\text{Account Receivable}}{\text{Annual Sales}/360}$$

Note that the denominator is simply credit sales per day with the assumption of 360 days in a year. In 2008, it took TAYE Company an average of 33.83 days to collect credit sales.

$$\text{Average collection period} = \frac{78,0000}{830,000/360} = 33.83 \text{ days}$$

Note that this ratio provides the same information as the account receivable turnover ratio. When depicted algebraically, the relationship between average collection period and account receivable turnover ratio is show as follows.

$$\begin{aligned} \text{Account Receivable Turnover Ratio} &= 360 \div \text{Average Collection Period} \\ \text{or alternatively;} \\ \text{Average Collection period} &= 360 \div \text{Account Receivable Turnover ratio} \end{aligned}$$

Since the average collection period is the inverse of the account receivable turnover ratio, it should be apparent that the inverse criteria apply to judging this ratio. In other words, lower is usually better. The shorter the average collection period, the better is the quality of debtors, since a shorter collection period implies the prompt payment by debtors. It is advisable to compare average collection period against the firm's credit terms and policy to judge its credit and collection efficiency. For example if the credit period granted by the firm is 30 days and its average collection period is 45 days, the comparison reveals that the firm's receivables are outstanding for a longer period than warranted by the credit period of 30 days.

An excessively longer collection period implies a very liberal and inefficient credit and collection performance. This certainly delays the collection of cash and hurts the firm's liquidity. The chances of bad debts are also increased. On the other hand, too low collection period is not necessarily favorable. Rather it may indicate a very restrictive credit and collection policy. A very restrictive credit and collection policy may avoid bad debt losses; but it also severely curtails sales.

The average collection period may help analysts in two respects:

1. In determining the collectability of account receivables and thus the efficiency of collection efforts, and
2. In ascertaining the firm's comparative strength and advantage relative to its credit policy and performance *Vis'-a- Vis'* the competitors' credit policy and performance.

E) Fixed Assets Turnover (FATO): FATO is used to measure the efficiency of a firm to utilize its investment in fixed assets. It is also described as the birr amount of sales that are generated by each birr invested in fixed assets. It is given by:

$$\text{Fixed Asset Turnover} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

The fixed assets turnover ratio for TAYE Company, in 2008 is

$$\text{Fixed assets turnover} = \frac{830,000}{525,000} = 1.58 \text{ times}$$

Therefore, TAYE Company generated Br.1.58 for each birr invested in fixed assets.

The firm's ability to produce a large volume of sales for a given net fixed assets is the most important aspect of its operating performance. Hence, the larger is the better for fixed assets turnover ratio.

F) Total Assets Turnover (TATO): Like other ratios discussed in this section, TATO describes how efficiently a firm is using its assets to generate sales. It is the ability of a firm to generate sales from all financial resources committed to total assets. Higher total asset turnover ratio is better. It is computed as:

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

In 2008, TAYE Company generated 89.5 cents in sales for each birr invested in total assets.

$$\text{Total Asset Turnover} = \frac{830,000}{927,000} = 0.895 \text{ times}$$

You can interpret the total assets turnover ratio as *higher is better*. However, you should be aware that some industries will naturally have lower turnover ratios than others. For example, a consulting firm will have a very low investment in fixed assets, and therefore a high asset turnover ratio with other factors stay constant. On the other hand, an electric service enterprise will have a large investment in fixed assets and probably a low asset turnover ratio. This does not, necessarily, mean that the electric enterprise is more poorly managed than the consulting firm. Rather, each is simply responding to the demands of their industry groups.

3. Leverage Ratios

Leverage from finance perspective refers to multiplication of changes in profitability measures. It used to measure the extent to which non-owner supplied funds have been used to

finance a firm's assets as compared with the funds provided by owners. It also describes the degree to which the firm uses debt in its capital structure. The amount of leverage depends on the amount of debt that a firm uses to finance its operations, so a firm which uses a lot of debt is said to be *highly leveraged*. Leverage ratios provide important information for creditors and investors. Creditors might be concerned that a firm has too much debt and will therefore have difficulty in repaying loans. Investors might be concerned because a larger amount of debt can lead to a larger amount of volatility in the firm's earnings. The most commonly stated leverage ratio types are: Debt Ratio, Debt-Equity Ratio, Time Interest Earned Ratio, Fixed Payment Coverage ratio. The first two ratios are also considered as component ratio while the last two are coverage ratios. They are component because these ratios measure the proportion of the financing sources and they are all about the major balance sheet elements. The others are coverage ratios due to their emphasis on the ability of the firm to cover its interest and other fixed charges.

A) Total Debt Ratio (DR) It measures the proportion of total assets financed by the firm's creditors. The higher this ratio the greater is the amount of other people's money being used in an attempt to generate profit and the higher the financial costs and restrictions from creditors.

$$\text{Debt ratio} = \frac{\text{Total Debt}}{\text{Total Assets}} = \frac{\text{Total Assets} - \text{Total Equity}}{\text{Total assets}} = 1 - \frac{\text{Total Equity}}{\text{Total Assets}}$$

The debt ratio of TAYE Company in 2008 shows that liabilities make up about 32.25 percent of their capital structure.

$$\text{Debt Ratio} = \frac{299,000}{927,000} = 32.25 \%$$

Creditors have supplied for TAYE Company about 32 cents of every birr in assets.

The evaluation of the TAYE's situation with respect to its debt management requires comparison with industry groups and other developed standards. The generally perception, however, is too much higher ratio shows that more of the firm's assets are provided by creditors relative to owners. Under this situation, the firm may face some difficulties in generating

additional finance; further creditors may require higher return; and/or higher risk for existing creditors as there might not be sufficient margin of safety among others.

B) Debt Equity Ratio (DER) The Debt-equity ratio indicates the relationship between the total debts funds provided by creditor and those provided by the owners of the firm. This ratio reflects the relative claim of creditors and shareholders against the assets of the firm. It is computed as:

$$\text{Debt Equity Ratio} = \frac{\text{Total liability}}{\text{Total equity}} = \frac{\text{Total assets} - \text{Total equity}}{\text{Total equity}} = \frac{\text{Total assets}}{\text{Total equity}} - 1$$

The proportion of debt and equity in financing the assets of TAYE Company is

$$\text{Debt- Equity Ratio}_{2008} = \frac{299,000}{628,000} = 47.61 \%$$

Creditors of TAYE Company provided about 48 cents in financing total assets for every birr contributed by the owners.

The same implication as that of debt ratio can be stated for too higher or too lower reported debt equity ratio.

Coverage Ratios Describe the quantity of funds available to cover certain expenses. Unlike the component ratios, higher ratios are desirable in coverage ratios. Too high ratios, however, may indicate that the firm is underutilizing its debt capacity and therefore not maximizing shareholder wealth. The two most used coverage ratios are discussed in the following sections.

C) The Time Interest Earned Ratio (TIER) The interest coverage or the time interest earned ratio measures the ability of the firm to pay its interest obligations by comparing earnings before interest and taxes (EBIT) to interest expense.

$$\text{Time Interest Earned Ratio} = \frac{\text{EBIT}}{\text{Interest expense}}$$

The time interest earned ratio for TAYE Company for 2008 is computed as:

$$\text{Time Interest Earned Ratio} = \frac{101,000}{20,000} = 5.05 \text{ times}$$

TAYE Company can cover its interest 5.05 times using funds that are originally available for the payments of interest expenses.

A high ratio indicates that the firm has sufficient margin of safety to cover its interest charges and the firm's earning could decline without jeopardizing the firm's ability to make interest payments. A very low time interest earned ratio may suggest that creditors are more at risk in receiving interests due; failure to meet interest can bring legal action by creditors possibly resulting in bankruptcy; and the firm may face difficulty in raising additional funds through debt.

D) Fixed Charge Coverage Ratio (FCCR) This ratio reflects the total amount of earning available to meet all fixed payment obligations. Interest, principal payments (PP), lease payments, and preferred stock dividends (PD) are financing related fixed charges. It is computed as:

$$\text{Fixed-Charge Coverage Ratio} = \frac{\text{Earning Before Interest and Tax} + \text{Lease Payment}}{\text{Interest} + \text{Lease payment} + \frac{\text{PD} + \text{PP}}{(1-T)}}$$

Since principal payments and preference dividends are the after tax components, they are adjusted to the before tax amount with $1/(1-T)$ as shown in the computational step above; where 'T' represents the tax rate.

4. Profitability Ratios

Profitability ratios are used to measure the operating efficiency of a company. In other words, they are used to evaluate the overall management effectiveness and efficiency in generating profit on sales, total assets and owners' equity. Besides management of a company, creditors, investors and owners are interested in the profitability of the firm. Creditors want to get interest and repayment of principals regularly. Owners want to get a required rate of return on their investment. Profitability ratios are the easiest of all of the ratios to analyze. Without exception, high ratios are preferred. However, the definition of high depends on the industry in which the firm operates. For example, a 3 percent of profit margin may be quite high for a grocery while it would be abysmal in software businesses. Profitability ratio includes: gross profit margin,

operating profit margin, net profit margin, return on investment, and return on equity. Each of these ratios is described here under.

A) Gross Profit Margin Measures the gross profit relative to sales. It indicates the amount of fund available to pay the firms expenses other than its cost of sales and indicates both the efficiency of the firms operation and pricing policies of the firm. It is calculated by;

$$\text{Gross Profit Margin} = \frac{\text{Gross profit}}{\text{Sales}}$$

For TAYE Company the gross profit margin is

$$\text{Gross profit margin} = \frac{291,000}{830,000} = 35\%$$

TAYE Company maintained 35 cents remained from each birr sales after deducting each cost of goods sold from net sale.

The gross profit margin reflects the efficiency with which management produces each unit of products. It indicates the average spread between the cost of goods sold and the sales margin. If you subtract the gross profit margin from 100 per cent, you obtain the ratio of the cost of the goods sold. A high profit margin relative to the industry average implies that the firm is able to produce or purchase at relatively lower cost.

B) Operating Profit Margin (OPM) Moving down the income statements, you can calculate the profit that remains after the firm has paid all its non- financial expenses. This profit is the operating profit. The operating profit ratio indicates how much is left over after the operating expenses. It serves as an overall measure of operating effectiveness. It is calculated as:

$$\text{Operating Profit Margin} = \frac{\text{Net Operating profit}}{\text{Sales}}$$

TAYE Company has an operating profit margin of about 12.2 per cent.

$$\text{Operating Profit Margin} = \frac{101,000}{830,000} = 12.2 \%$$

TAYE Company generated about 12 cents in operating profit per birr of net sales.

C) Net Profit Margin (NPM) Net profit margin measures the percentage of each sales birr remaining after deducting all cost and expenses. The net profit margin relates net income to sales. Since net income is profit after all expenses, the net profit margin tells you the percentage of sales that remains for the shareholders of the firm.

$$\text{Net Profit Margin} = \frac{\text{Net Profit (income)}}{\text{Sales}}$$

In 2008, TAYE Company has net profit margin of about 8 percent.

$$\text{Net Profit Margin} = \frac{64,000}{830,000} = 8\%$$

A firm with a high net profit margin ratio would be on the advantageous position to survive in the face of falling selling prices, rising costs of production and/or decline in demand for the product.

D) Return on Investment (ROI) The term investment may refer to total assets or net assets. It represents pool of funds supplied by shareholders and lenders. This ratio is particularly useful since it reflects the total earning produced with the use of the total assets of the firm. It measures the overall effectiveness of management in generating profit with its available assets. It is computed as:

$$\text{Return on Total Assets} = \frac{\text{Net Income}}{\text{Total Assets}}$$

For TAYE Company the return on total assets is:

$$\text{Return on Total Assets} = \frac{64,000}{927,000} = 6.9\%$$

This implies that TAYE generates about 7 cents for every birr invested in assets.

E) Return on Equity (ROE) While total asset represents the total investment in the firm, the owners' investment, usually common stock and retained earnings, represents only a portion of the total amount. The other portion is to go for debt. Return on equity is to measure the return earned on the owners' investment. It is computed as:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Total Equity}}$$

The 2008 return on equity of TAYE Company is:

$$\text{Return on Equity} = \frac{64,000}{628,000} = 10\%$$

TAYE Company generates about 10 cents for every birr in shareholders equity. The comparison is left for the established standards and the industry averages. A substantially higher ROE may indicate that a firm is more risky due to high financial leverage. A very low ROE may also indicate a kind of conservative financing policy.

5. Valuation Ratios / Market/Book Value Ratios

These ratios also called Shareholder ratios. The ratios in the previous sections deal with the performance and financial condition of the firm. Those ratios provide information for managers and for creditors with little emphasis on the shareholders valuation aspects. The ratios in this section have a look at on the interest of the owners. These ratios translate the overall results of operations so that they can be compared in terms of a share of stock.

A) Earning Per Share (EPS) EPS is the amount of income earned during a period per share of common stock. It is computed as:

$$\text{Earning per Share} = \frac{\text{Net income available for common shareholders}}{\text{Number of common shares outstanding}}$$

Assume that TAYE Company has a total number of common shares outstanding of 10,000.

The earning per share is therefore computed as:

$$\text{EPS for 2008} = \frac{49,000}{10,000} = 4.9$$

Earning per share does not show how much is retained and how much is distributed as dividend.

B) Dividends per Share (DPS) It is the birr amount of cash dividends paid during a period as per share of common stock. The net profits after taxes and preference dividends belong to common shareholders. But the income which they really receive is the amount of earning distributed as cash dividends. Therefore, a large number of present and potential investors may be interested in dividend per share, rather than earning per share. It is computed as:

$$\text{DPS} = \frac{\text{Earnings paid to common shareholders (dividends)}}{\text{Number of ordinary shares outstanding}}$$

DPS for TAYE Company is $\text{DPS} = \frac{15,000}{10,000} = 1.5$

C) Dividend Payout Ratio The dividend payout ratio (or simply payout ratio) is DPS divided by the EPS. It can also be by dividing cash dividend paid to earning for a period.

$$\text{Dividend Payout Ratio} = \frac{\text{Dividends paid common shareholders}}{\text{Earnings available for common share}} \quad \text{or} \quad = \frac{\text{DPS}}{\text{EPS}}$$

Dividend payout ratio shows the percentage of earnings paid to shareholders.

For TAYE Company the dividend payout ratio for the year 2008 is

Dividend Payout Ratio = $\frac{1.5}{4.9} = 30.6 \%$

The interpretation is that TAYE Company paid 30.6 percent of its earnings in dividends. Whether TAYE paid higher or lower percentage is not to be identified at this point unless standards or industry average is revealed. In general, a very high percentage may imply that the firm is at lower growth opportunities particularly for firms, which pay more than the industry average.

D) Price-Earnings Ratio The price earning ratio is widely used by the security analysts to values the firm's performance as expected by investors. It indicates investors' judgment or expectations about the firm's performance. It indicates the degree of confidence that investors

have in the firm's future performance. The higher the price earning ratio, the greater is the investors' confidence in the firm's future.

E) Market Values to Book Values Ratio This is the ratio of share price to book values per share.

$$\text{Market to Book value ratio} = \frac{\text{Market value per share}}{\text{Book value per share}}$$

Note that book value per share is book value of shareholders' equity divided by the number of shares outstanding.

The Du Pont Identity

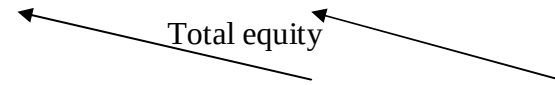
Under the profitability ratio section of the previous analysis, you have been described about the return on assets (ROA) and return on equity (ROE). The difference between these two profitability measures is a reflection of the use of debt financing. More relationship can be created among these ratios with decomposing return on equity (ROE) into its component parts. Recall that ROE is defined as: $\text{ROE} = \frac{\text{Net income}}{\text{Total equity}}$

Total equity

It is possible to multiply this ratio by Assets/Assets without changing anything:

$$\text{ROE} = \frac{\text{Net income}}{\text{Total equity}} \times \frac{\text{Assets}}{\text{Assets}}$$

With some rearrangements ROE can be rewritten as:

$$\text{ROE} = \frac{\text{Net income}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Total equity}}$$


Note that ROE is expressed as a product of two ratios: **ROA** and the **equity multiplier**

$$\text{ROE} = \text{ROA} \times \text{Equity multiplier} = \text{ROA} \times (1 + \text{Debt-equity ratio})$$

It is still possible to extend and decompose ROE by multiplying Sales/Sales

$$\text{Price /Earning Ratio} = \frac{\text{Market values per share}}{\text{Earnings per share}}$$

$$\text{ROE} = \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Net income}}{\text{Total equity}} \times \frac{\text{Assets}}{\text{Sales}}$$
 If you rearrange a little bit, ROE is:

$$\text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Total equity}}$$

ROE = Profit Margin x Total assets turnover x Equity multiplier

Observe also that ROA is partitioned into two components: profit margin and total assets turnover. It is this last expression considered as the **Du Pont Identity**.

You can check this relationship for TAYE Company by taking the net profit margin of 0.08 and total assets turnover of 0.895. ROE should be:

$$\begin{aligned} \text{ROE} &= \text{Profit Margin} \times \text{Total assets turnover} \times \text{Equity multiplier} \\ &= 0.08 \times 0.895 \text{ times} \times (1+0.48) \\ &= 10\%, \text{ with some approximations error.} \end{aligned}$$

You can refer back to ROE section of the profitability sections, the result is same.

The Du Pont identity tells you that ROE is affected by three things:

1. Operating efficiency that is measured by profit margin
2. Asset utilization efficiency that is measured by total assets turnover
3. Financial leverage that is part of the equity multiplier.

Weakness in operating or assets utilization efficiency (or both) will show up in a diminished return on assets, which will translate into a lower ROE.

The decomposition of ROE as discussed above is a convenient way of systematically approaching financial statement analysis. If ROE is unsatisfactory by some measures, then the Du Pont identity tells you where to start looking for the reasons.

**Quick Check**

Define the following terms

- a) Current ratio
- b) Inventory turnover ratio
- c) Return on investment
- d) Price earning ratio
- e) Du Pont identity

2.1.1.3 User of Ratio Analysis

Ratios of financial statements are used based on the interest of different parties. Shareholders, creditors and the management bodies have their own interest on financial performance of a firm so that these bodies develop different views towards ratio analyses.

A) Shareholders Both present and prospective shareholders are interested in the firm's current and future level of risk and return. Future earnings and stability of earnings over a periods; and covariance with earnings of other companies are the interest of the shareholders. The major emphasis for the shareholders, therefore, is the profitability aspect of ratio analysis.

B) Creditors The firm's creditor may be trade creditors and/or bondholders. The trade creditors are primarily interested in the short term liquidity of the company so that liquidity analysis is the basic concern of these parties. The bondholders or long term creditors give emphasis on the ability of the firm to make interest and principal payments. These parties are interested on the capital structure or leverage ratios, major sources of finance and profitability over time to be assured for the sustenance of the business.

C) Management The management of a firm is concerned with aspects of the financial analysis that consider the suppliers of the capital. These bodies also use ratio analysis for the purpose of internal control with particular emphasis on the profitability of investment in various assets of the company and the efficiency of asset management.

2.1.1.4. Advantage of Ratio Analysis

Ratios are easy to compute

- Ratios provide standards of comparison at a point in time and allow comparison to be made with industry average

-
- Ratios can be used to analysis corporation financial time series in order to discover trends, shifts in the trends and data outlays.
 - Ratios are useful to indicate problem areas of the a firm
 - When combined with other tools, ratio analyses make an important contribution to the tasks of evaluating a financial performance of the firm.

2.1.1.5 Limitations and Cautions for Use of Ratio Analysis

Ratios have the following Limitations:

- A single ratio provide little information
- Ratios generally do not identify the cause of the firm's difficulties. They seldom provide answer for questions they raise
- Ratios can easily be misinterpreted. For example, a decrease in the value of ratio does not necessarily mean the something undesirable has happened.
- Very few standards exist that can be used to judge the adequacy of a ratio or set of ratios.

The following 'cautions' are fundamental while using ratios

- A group of ratios should be used for reasonable judgment to be made
- Financial statements being compared should be dated at the same point in time
- It is preferable to use audited financial statements for ratio analysis
- Financial data being compared should have been developed in the same way. The use of different accounting methods, for example the different inventory valuation methods and depreciation methods should be considered while calculating ratios for different firms of probably the same nature. The use of different methods will distort the result of ratios for comparison.
- When ratios of one firm are compared with those of other's or with the ratios of the firm itself over time, distorted interpretation of the analysis may be resulted due to inflation. Inflation at times no adjustments are made, it tends older firms to appear more efficient and profitable than the newer ones.

**Quick Check**

1. Users of ratio analysis do have their own interest from the analysis. Explain.
2. Mention some of the cares that should be taken in use of ratio analysis.

2.1.2 Common Size Statement Analysis

In common-size statements analysis, total assets and all income statements items are divided by the total sales divide all the balance sheet items. Common size statements can also be used to compare firms of different sizes. Example given below is the balance sheets of JHYD Corporation for the year ended December 31, 2006 and 2007

JHYD Corporation**Balance sheet**

December 31, 2006 and 2007 (in millions)

Assets	2006	2007
Current assets:		
Cash	Br. 84	Br. 98
Account receivable	165	188
Inventories	<u>393</u>	<u>422</u>
Subtotal	Br.642	Br. 708
Fixed assets:		
Net plant and Equipment	<u>Br.2,731</u>	<u>Br.2,880</u>
Total assets	<u>Br. 3,373</u>	<u>Br.3,588</u>
Liabilities and owner's Equity		
Current liabilities		
Account payables	Br. 312	Br.344
Note payable	<u>231</u>	<u>196</u>
Sub total	Br.543	Br.540

Long term debts	<u>531</u>	<u>457</u>
Total liabilities	Br. <u>1,074</u>	Br. <u>997</u>
Owner's equity		
Common stock and Paid in Capital	Br.500	Br. 550
Retained earning	<u>1,799</u>	<u>2,041</u>
Total Owner's Equity	<u>Br.2,299</u>	<u>Br.2,591</u>
Total liabilities and owner's equity	<u>Br. 3,373</u>	<u>Br.3,588</u>

JHYD Corporation

Common Size Balance Sheet

December 31, 2006 and 2007 (in millions)

Assets	2006	2007	Change
Current assets			
Cash	2.5%	2.7%	+0.2%
Account receivable	4.9	5.2	+0.3
Inventories	<u>11.7</u>	<u>11.8</u>	<u>+0.1</u>
Subtotal	19.1	19.7	+0.6
Fixed assets			
Net plant and Equipment	<u>80.9</u>	<u>80.3</u>	<u>-0.6</u>
Total assets	<u>100%</u>	<u>100%</u>	<u>0%</u>
Liabilities and owner's Equity			
Current liabilities			
Account payables	9.2 %	9.6 %	+0.4%

Note payable	<u>6.8</u>	<u>5.5</u>	<u>- 1.3</u>
Sub Total	16.1 %	5.1%	-1.0%
Long term debts	<u>15.7</u>	<u>12.7</u>	<u>- 3.0</u>
Total liabilities	<u>31.8%</u>	<u>27.8%</u>	<u>-4.0%</u>
Owner's equity			
Common stock and Paid in Capital	14.8%	15.3%	+0.5%
Retained earning	<u>53.4%</u>	<u>56.9</u>	<u>+3.5</u>
Total Owner's Equity	<u>68.2%</u>	<u>72.2%</u>	<u>+5.0</u>
Total liabilities and owner's equity	<u>1 00%</u>	<u>100%</u>	<u>0%</u>

N.B⁺

Shows increase in percentage from 2006 to 2007

Shows decrease in percentage from 2006 to 2007

JHYD has the following income statement from which the common size income statement is presented.

JHYD Corporation

Income Statement and Common Size Income Statement

For the year ended December 31, 2007 (In millions)

Sale	Br.2311	100%
Cost of Good sold	<u>1344</u>	<u>58.2</u>
Gross Margin	967	41.2%
Depreciation Expense	<u>276</u>	<u>11.9</u>
Income before interest and tax	691	29.9%
Interest expense	<u>141</u>	<u>6.1</u>
Taxable income	550	23.8%
Tax (34%)	<u>187</u>	<u>8.1</u>
Net income	<u>Br.363</u>	<u>15.7%</u>

2.1.3 Index Analysis

Analysis of percentages for financial statements where all financial statement figures for the base year are equated to 100 percent and subsequent year financial statements items are expressed as a percentage of the base year.

Illustration Balance sheet of JHY Corporation for the years 2003, 2004 and 2005 are given below.

JHYD Corporation			
Balance sheet			
December 31, 2003, 2004 and 2005 ('000 Birr)			
Assets	2003	2004	2005
Cash	2,507	11,310	19,648
Account receivable	70,360	85,147	11,815
Inventory	77,380	91,378	118,563
Other current asset	<u>6,316</u>	<u>6,082</u>	<u>5,891</u>
Total current assets	156,563	193,917	262,517
Net fixed assets	79,187	94,652	11,5461
Other long term assets	<u>4,695</u>	<u>5,899</u>	<u>5,491</u>
Total assets	<u>240,445</u>	<u>294,468</u>	<u>383,469</u>
Liabilities and Shareholders' Equity			
Accounts payable	35,661	37,460	62,725
Notes Payable	20,501	14,680	17,298
Other current liabilities	11,054	8,132	15,741

Long term liabilities	<u>888</u>	<u>1,276</u>	<u>4,005</u>
Total Liabilities	<u>68,104</u>	61,548	99,769
Common stock	12,650	20,750	24,150
Additional paid in capital	37,950	70,950	87,730
Retained Earning	<u>121,741</u>	<u>141,820</u>	<u>171,820</u>
Total shareholders Equity	<u>172,341</u>	<u>232,920</u>	<u>233,700</u>
Total liabilities and shareholders' equity	<u>240,445</u>	<u>294,468</u>	<u>383,469</u>

Required: Prepare an index analysis taking items in 2003 as a base year

JHYD Corporation

Indexed Balance sheet

December 31, 2003, 2004 and 2005 ('000)

Assets	2003	2004	2005
Cash	1.0	4.511368	7.837256
Account receivable	1.0	1.210162	0.167922
Inventory	1.0	1.180899	1.532218
Other current asset	<u>1.0</u>	0.962951	0.932711
Total current assets	<u>1.0</u>	<u>1.238588</u>	<u>1.67675</u>
Net fixed assets	1.0	1.195297	1.45808
Other long term assets	<u>1.0</u>	1.256443	1.169542
Total assets	<u>1.0</u>	<u>1.224679</u>	<u>1.59483</u>

Liabilities and shareholders' Equity

Accounts payable	1.0	1.050447	1.758924
Notes Payable	1.0	0.716063	0.843764
Other current liabilities	1.0	0.735661	1.424009
Long term liabilities	<u>1.0</u>	<u>1.436937</u>	<u>4.510135</u>
Total Liabilities	<u>1.0</u>	<u>0.903735</u>	<u>1.464951</u>
Common stock	1.0	1.640316	1.909091
Additional paid in capital	1.0	1.869565	2.311726
Retained Earning	<u>1.0</u>	<u>1.164932</u>	<u>1.411357</u>
Total shareholders Equity	<u>1.0</u>	<u>1.351507</u>	<u>1.356033</u>
Total liabilities and shareholders equity	<u>1.0</u>	<u>1.224679</u>	<u>1.59483</u>

2.1.4 Trend Analysis

Trend analysis is used to analyze financial statements for a number of years and enable firm to project the future. It is analysis for elements of financial statements to know whether there is a tendency of change (increase or decrease) numerically for the elements of financial statements over years.

Illustration

Years	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
Current ratio of a firm	3.2 times	2.1 times	2.0times	1.88times

The current ratio indicates the declining tendency of liquidity position of the firm over the four years period. You can find the trend in ratios of a certain firm by taking ratios over number of periods.

2.2 Financial Planning

The management of every firm always tries to maximize efficiency and through the same process the firm goes for the maximization of wealth of the shareholders. One of the systematic approaches to bring about the intended efficiency is to have a well designed financial planning and budgeting. In the process of financial planning the management tries to identify the required financial gap and assess the need for external financing.

Financial planning indicates a firm's growth, performance, investment and fund requirement during a period of time. It involves the preparation of projected financial statements. It is the process of evaluating the impact of alternative investing and financing decisions; attempts to make optimal decisions, projects the consequence of these decisions for the firm in the form of financial plan and then comparing future performance against the plan.

2.2.1 Planning Process

Planning is the design of future state of an entity and effective ways to achieve stated objectives. The planning process of an enterprise involves many steps and phases. The major steps can be summarized as follows.

Set up Objective: Objectives explain the desired state or position of an enterprise in the future. This represents the purpose for which the firm is organized. The firm must have clearly stated strategic, operational and financial objectives.

Make Assumptions: It explains the expected conditions on which the plan is based.

When one make an objective, there exists some assumptions regarding the economic condition, political situations, and other circumstances in which the firm is working.

Determine Goals: Goals are operational specifications of the broad objectives with time and quantity dimensions. Goals are quantified targets to be attained within a specific period. Example The objective of a nation may be to have an economic growth for which fix a goal that is for example 5.5 percent of rate of growth in the next year.

Determine Strategies: It lays down the foundation or the activities to be followed in attaining the objectives and goals. It specifies the way to achieve the objectives and goals.

Example objective of a firm may be to maximize return for a period of time by increasing sales. The goal may be increase sales by 10 percent at the end of the year. The firm's strategies may include reduction of selling price and/ or liberalizing credit policy among others.

A) Formulate Budget An enterprise must also have idea about the different cash inflows and outflows, the requirement of additional fund, if the plan is to be implemented. Budget is the expression of the company's plan in terms of financial terms. It is a plan explicitly stating the goals in terms of time and expected financial results for each major segments of the firm. Example cash budget, sales budget, capital budget etc

Every firm makes different types of budgets. Firms prepare master budget which is a comprehensive plan of all types of operations. It is a summary budget for the entire firm and embodies figures for the various activities. Firms also prepare functional budgets for individual operations. Dear reader the master budget is will be given in Cost and Management Accounting modules in detail.

Financial budget It is the financial expression of operating budget. It expresses the cash flows, financial positions, and operating results. The most important types of financial budgets are: Cash budget, pro-forma or projected financial statements and Capital budget.

The section herein is all about pro-forma or projected financial statements.



Quick Check

Explain how assumptions are part of the planning process in financial planning.

2.2.2 Financial Statement Forecasting

It is an integral part of planning. It uses past data to estimate future financial requirements. It is future estimate of financial requirements based on some scientific and systematic approaches. It is an important activity for a wide variety of business people. Nearly all of the decisions made by financial managers are made on the basis of forecasts of one kind or another (Mayes and Shank, 2004). There are different methods of forecasting. The percent of sales method, one of the forecasting techniques will be used in this sub section. The percent of sales method is the simplest method of forecasting income statements and balance sheets. The method can be used with relatively little data available.

The fundamental assumption of the percent of sales method is that many (but not all) income statement and balance sheet items maintain a constant relationship to the sales level. Moreover, the method assumes that the forecast level of sales is already known.

Sales forecast: The sales forecast generally starts with a review of sales during the past five to ten years. The development of sales forecast may consider:

- ✓ Product divisions. If firms have product divisions, sales growth is seldom the same for each division. Hence, to begin the forecasting process, divisional projections are to be made on the basis of historical growth, and then divisional forecasts are combined to produce an approximation of the firms overall sales forecast.
- ✓ The level of economic activity in each of the divisions/ branches marketing areas is forecasted. For example the change in population growth
- ✓ The firm's probable market share in each of the divisions/ branches distribution territories. Consideration given is to the firm's production and distribution capacity, the competitors' capacity among others.
- ✓ The exchange rate fluctuations for export oriented firms
- ✓ The planners has to consider the effect of inflation on prices
- ✓ Advertising campaigns, promotional discounts, credit terms and the like also affect sales

Once sales have been forecasted, the forecast for future balance sheet and income statements can be undertaken.

1. Forecasting an Income Statement: The level of detail that you have in an income statement will affect how many items will fluctuate with sales. The general procedure is to proceed through line by line for each component of income statement by asking the question, ***is it likely this item will change directly with sales?*** If the answer is 'yes', then calculate the percentage of sales and multiply the result by the sales forecast for the next period. If the answer is otherwise, you will take one of two actions: leave the item unchanged, or use other information to change the item.

To illustrate take the income statement of TAYE company for the year 2008 and prepare the pro-forma income statement for 2009. Assume that sales increases by 20 percent. The pro forma income statement is shown below with explanations.

TAYE Company

Pro-forma Income Statement (in' Birr)

For the year ended December 31, 2009

Sales		Br.996,000
Cost of Goods Sold		<u>(647,400)</u>
Gross Profit on Sales Operating Expenses:		Br.348,600
Marketing Expense	Br 91,000	
General and Administrative Expense	71,000	
Depreciation	<u>28,000</u>	
Total Operating Expenses		<u>(Br.190,000)</u>
Operating Income (EBIT)		Br.158,600
Interest Expense		<u>(20,000)</u>
Earnings Before tax		Br. 136,600
Income Tax (21%)		<u>(29,106)</u>
Earnings after Tax		Br. 109,496
Dividends Paid (23%)		<u>(25,184)</u>
Change in Retained Earnings		<u>Br.84,310</u>

Forecasted sales is calculated as: $830,000 + (830,000 \times 0.2)$
 $= 830,000 + 166,000 = \text{Br. } 996,000$

Cost of goods sold has a direct relationship to sales.

The cost of goods sold as percentage of sales = $\frac{539,000}{830,000} = 65\%$

Forecasted cost of goods sold = $0.65 \times 996,000 = \text{Br. } 647,400$

For TAYE Company both marketing and general administrative expenses stay constant. These expenses are conglomerates of different expenses for which some may change while the others stay constant. Depreciation expenses are not directly related to sales. The change in depreciation expense on the pro forma income statement depends on the depreciation rate not based on sales. For TAYE Company there is no change in the depreciation rate.

Interest expense is not directly related to sales. It is a function of the amount and maturity structure of debt in the firm's capital structure. TAYE Company assumes no changes in the interest expense for the year 2009 because the same capital structure is expected for the year.

Tax depends directly on the firm's taxable income though indirectly related to sales level. Dividend is not directly related to sales but is dependent on the retention ratio and the dividend policy of the firm.

2. Forecasting a Balance Sheet Balance sheet can be forecasted in exactly the same way as the income statement. The main difference is the common size information is not used in the case of forecasting balance sheet because the common size balance sheet is based on total assets not based on total sales. Under the percentage of sales method, the components of balance sheet are to be determined based on sales depending on their direct relationship to sales.

Like it is done in the income statement, you will move line by line for each balance sheet items to determine which items will vary with sales.

To illustrate take the balance sheet of TAYE company for the year 2008 to prepare the proforma balance sheet for the year 2009. The sales forecast is reported in the pro-forma income statement. The pro-forma balance sheet and explanations for the respective components is as follows.

TAYE Company
Pro-forma Balance Sheets (in Birr)
December 31, 2009

Assets

Current assets

Cash	Br. 49,800
Account Receivables	89,640
Inventories	249,000
Prepaid expenses	<u>15,000</u>
Total current assets	<u>Br. 403,440</u>

Fixed Assets:

Gross plant and Equipment	Br. 838,000
Accumulated Depreciation	(411,000)
Net Plant and Equipment	427,000
Land	<u>70,000</u>
Total fixed assets	Br.497,000
Patent	<u>55,000</u>
Total Assets	<u>Br. 955,440*</u>

Liabilities and Shareholders Equity

Current Liabilities:

Account Payable	Br. 89,640
Income tax payable	29,106
Accrued wages and salaries	4,980

Interest payable	<u>2,000</u>
Total Current Liabilities	Br.125,726
Long-term notes payable	<u>200,000</u>
Total Liabilities	<u>Br.325,726</u>
Common stock	Br.300,000
Retained Earnings	<u>412,310</u>
Total Stockholders' Equity	<u>Br. 712,310</u>
Total liabilities and Equity *	<u>Br. 1,038,036</u>

Cash The amount of cash to support a firm's sales activity will be proportional to sales. This assumption holds for most firms. If the firm sells more goods, it accumulates more cash. But the nature of cash creates some reservations on this assumption. Cash is non-earning or lower return assets so that firms seek to minimize the amount of their cash balance. Due to such reason, even though cash balance will probably change, it probably will not change by the same percentage as sales.

For TAYE company cash is assumed to be changed in the same proportion with sales.

$$\text{Cash to sales percentage} = \frac{44,000}{830,000} = 5\%$$

Hence, the forecasted cash balance:

$$996,000 \times 0.05 = \text{Br. } 49,800$$

Account Receivable Unless the firm changes its credit policy or has changed its types of customers, account receivable will increase proportionally with sales.

For TAYE Company, the forecasted account receivable is:

$$\text{Account receivable to sales percentage} = \frac{78,000}{830,000} = 9\%$$

$$\text{Forecasted account receivable} = 996,000 \times 0.09 = \text{Br. } 89,640$$

Inventory: As sales increase, companies generally need more inventory. Hence, the inventory of TAYE Company increases in the same proportion to sales.

$$\text{Inventory to sales percentage} = \frac{210,000}{830,000} = 25\%$$

Forecasted balance of inventory = $996,000 \times 0.25$ = Br. 249,000

Prepaid Expenses These current assets are generally assumed not to be changed directly with increase in sales. Prepaid expenses are conglomerates of different advance payments.

For TAYE Company Prepaid Expenses are assumed to be the same as the previous year.

Fixed Assets Even though a firm may buy and sell many pieces of fixed assets, there is no reason to believe that these actions are directly related to the level of sales. At least in the short-run plant equipment will not be changed. Furthermore, no firm builds new plants every time sales increases. But in the long-run no firm can continue to increase sale unless it eventually adds capacity. For TAYE Company, plant and equipment, and land stay the same as the year 2008.

Accumulated Depreciation will definitely increase, but not because of the forecasted change in sales. It will be increased by the amount depreciation expense to be reported in the forecasted periods. For TAYE Company accumulated deprecation increases by the amount of deprecation expenses of Br. 28,000.

Patent does not have any relationship with sales level of firms. It is also expected to be the same as the year 2008 for TAYE Company, disregarding the amortization expenses.

After you complete the assets section of the balance sheet, sources of financing the assets is your next part of the pro-forma balance sheet. The financing sources may be spontaneously generated and/or discretionary financing sources.

Spontaneous Sources of Financing These are the sources of financing that arise during the ordinary courses of doing business. For example, account payable, once the credit account is established with suppliers, no additional work is required to obtain credit; it just happens spontaneously when the firm makes purchases. Not all current liabilities are, however, spontaneous sources of financing. For example, short-term notes payable and long-term debts due in one year are not spontaneously emerging sources of financing.

Discretionary Sources of Financing These are financing sources which require a large effort on the part of the firm to obtain. The firm must make a conscious decision to obtain these funds. Furthermore, the firm's top level management will use its discretion to determine the appropriate type of financing. Examples under this group are any types of bank loan, bonds, common and preferred stocks.

Now comeback to the illustration for TAYE Company

Accounts Payable is one of the spontaneous sources of financing for TAYE Company and is directly related to sales.

$$\text{Accounts payable to sales percentage} = \frac{76,000}{830,000} = 9\%$$

$$\text{Forecasted balance of accounts payable} = 996,000 \times 0.09 = \text{Br. } 89,640$$

Tax depends directly on the firm's taxable income though indirectly related to sales level.

Tax payable for TAYE Company is Br. 29,106 taken from the income statement.

Accrued wages and salaries are accrued liabilities representing primarily accrued expenses which are spontaneous sources of financing.

$$\begin{aligned} \text{Accrued wages and salaries to sales percentage} &= \frac{4,000}{830,000} = 0.05\% \\ &= 996,000 \times 0.005 = \text{Br. } 4,980 \end{aligned}$$

Interest Payable is not directly related to sales. It is a function of the amount and maturity structure of debt in the firm's capital structure. TAYE Company assumes no changes in the interest payable for the year 2009 because the same capital structure is expected for the year.

Long Term Notes Payable and Common Stocks are discretionary sources of financing and are not directly related to the level of sales. For TAYE Company the balances of these accounts are left as they are in 2008.

Retained Earnings will increase with increase in sales but not in the same rate as sales. The new balance for retained earning will be the old level plus the addition to retained earnings.

Hence, the balance for retained earning of TAYE Company is:

$$328,000 + 84,310 = \text{Br. } 412,310$$

Additional Funds Needed After you complete forecasting the balance of each balance sheet items, assets must be equal to the sum of liabilities and equity. But the sum of the projected balances will not balance. The difference between total assets and total liabilities and equity is referred to as additional fund required. The additional fund required is financed through discretionary financing sources. The fund is also called discretionary financing fund.

Deficit Discretionary Funds When the firm's forecasted assets shows higher level than liabilities and equities in the pro-forma balance sheet, arrangement are made for more liabilities and/or equities to finance the level of assets needed to support the volume of sales expected. This is referred to as deficit of discretionary funds.

Surplus of Discretionary Funds If the forecast shows that there will be a higher level of liabilities and equities than assets, the firm is said to be have a surplus of discretionary funds.

Generally, the amount required to make the forecasted balance sheet balance is additional fund needed or external financial requirement.

For TAYE Company, the difference between total assets and total liabilities and equity is: $\text{Total assets} - [\text{Total Liabilities} + \text{Equities}] = 955,440 - 1,038,036 = (\text{Br. } 82,596)$. The calculation tells you that TAYE Company expects to have Br. 82,596 more in discretionary funds that are needed to support its forecasted level of assets. In this case, TAYE Company is forecasting a surplus of discretionary funds.

Chapter Summary

Financial analysis is the process of identifying the strength and weakness of a firm by properly establishing relationship between items of financial statements certain period(s).

Ratio analysis is widely used tool of financial analysis. Ratio is a numerical or quantitative expression/ relationship of two items. It helps to summarize large quantities of financial data and to make qualitative judgment about a firm's financial performance.

Ratio analysis is useful when it is compared against established standards. Past ratios, competitors' ratios, industry ratios and projected ratios are useful standards for comparison.

Financial ratios can be grouped into different categories based on need of analysis to be performed and the tasks to be evaluated. The major types of ratios can be categorized as liquidity ratios, activity ratios, leverage ratios, profitability ratios and valuation ratios.

Liquidity ratios are performed related to the firm's ability to meet its obligations in the shortrun. Current ratio, quick ratio and cash ratio are measurements of a firm's short-term liquidity position.

Activity ratios are asset management or utilization ratios. They are used to compare sales or cost of goods sold with the level of investment in various assets. Inventory turnover, account receivable turnover, fixed assets turnover and total asset turnover are the major types of activity ratios.

Leverage ratios are used to measure the extent to which non-owner supplied funds have been used to finance a firm's assets as compared with the funds provided by owners. Leverage ratios include total debt ratio, debt-equity ratio, time interest earned ratio and fixed coverage ratio.

Profitability ratios are used to measure the operating efficiency of a firm. They are used evaluate the overall management effectiveness and efficiency in generating profit of sales, total assets and equity. Gross profit margin, operating profit margin, net profit margin, return on investment and return on equity are part of profitability ratios.

Valuation ratios are shareholder ratios. Included in the valuation ratios are earning per share, dividend per share, dividend payout ratio, price earning ratio, and market to book value ratio.

Ratios of financial statement are used by different parties with their respective interests. Shareholders, creditors (short-term and long-term), and management are the users of ratio analysis.

Ratios have advantages to be fetched by users. But they are with limitations for which cares are to be taken by users and analysts.

Common size statements are used to evaluate change over periods in the components of financial statements and to evaluate firms of different sizes. In common-size statements analysis, all the balance sheet items are divided by total assets and all income statements items are divided by the total sales.

Index analysis is analysis of percentages for financial statements where all financial statement figures for the base year are equated to 100 percent and subsequent year financial statements items are expressed as a percentage of the base year.

Trend analysis is used to analyze financial statements for a number of years and enable a firm to project the future. It is analysis for elements of financial statements to know whether there is a tendency of change numerically for the elements of financial statements over years.

The management of every firm always tries to maximize efficiency and through the same process goes for the maximization of wealth of shareholders. One of the systematic approaches to bring about the intended efficiency is to have a well designed financial planning. In the process of financial planning the management tries to identify the required financial gap and assess the need for external financing. The planning process involves setting up objectives, goals strategies, make assumptions and formulate budgets.

Pro-forma financial statements are prepared based on past data. The forecast can be done with the use of percent of sales method. Under the percent of sales method, items of financial statements which have direct relationship with sales are identified and then expressed as percent of sales. Items with no relationship with sales are either to be calculated or to be left constant over periods.

Self-Test Activities

1. Data for GETWAY Import-Export Enterprise are as follow.

GETWAY Import-Export Enterprise

Balance sheet

Sene 30, 2000

Assets	Liabilities and Shareholders' Equity
Cash.....Br.77, 500	Account payable.....Br. 129,000
Receivable.....336,000	Notes payable..... 84,000
Inventories..... <u>241,500</u>	Other current liabilities..... <u>117,000</u>
Total current Asset.....Br. 655,000	Total current liabilities.....Br. 330,000
Net fixed asset..... <u>292,000</u>	Long-term debt.....256,500
	Common equity..... <u>361,000</u>
Total assets.....Br. <u>947,500</u>	Total liabilities &Equity...Br. <u>947,500</u>

GETWAY Import-Export Enterprise

Income Statement

For the year ended Sene 30, 2000

Sales	Br. 1,607,500
Cost of goods sold:	
Materials.....Br. 717,000	
Labor.....453,000	
Heat, light and power..... 68,000	
Indirect labor.....113,000	
Depreciation..... <u>41,500</u>	<u>1,392,500</u>
Gross profit.....	Br. 215,000

Selling expenses.....	Br. 115,000	
General & administrative expense	<u>30,000</u>	<u>145,000</u>
Earnings before interest and taxes (EBIT).....	Br. 70,000	
Interest expense.....		<u>24,500</u>
Earning before tax.....	Br. 45,000	
Income tax (40%).....		<u>18,200</u>
Net income.....		<u>27,300</u>

Required

Calculate the following ratios from the data given in the financial statements above for GETWAY Import-Export Enterprise.

Current ratio	_____
Inventory turnover	_____
Total asset Turnover	_____
Net Profit Margin	_____
Return on Total assets	_____
Return on Equity	_____
Debt ratio	_____

2. The following hypothetical data is derived from **TATU Company**. Find the balance of the balance sheet accounts and sales information attached.

Debt ratio=50%

Quick ratio=0.80times

Total asset turnover= 1.5times

Receivables

Annual sales/360 = Days sales outstanding =36 days

Gross profit margin on sales = 25%

Inventory turnover ratio =5 times

Cash	_____	Accts payable	_____
Accts Receivable	_____	Long-term debt	60,000
Inventories	_____	Common stock	_____
Fixed assets	_____	Retained earnings	97,500
Total assets	<u>Br. 300,000</u>	Total liabilities &equity	_____
Sales	_____	Cost of goods sold	_____

3. A Junior accountant of ASTEDE Corporation has the following information while preparing financial statements for the fiscal year 2007. The corporation has a constant nature of sales and production throughout the year. Moreover, a 360 days year is applied in the corporation.

Current ratio-----3:1
 Net profit margin-----0.07
 Debt-equity ratio-----1:1
 Average collection period----- 45days
 Inventory turnover-----3times
 Dividend income ratio-----0.35

Suppose that you have taken the assignment for preparing balance sheet and income statement with the following formats; and some accounts filled with their required birr amounts as is done for the junior accountant, complete the financial statements.

ATSEDE Corporation

Balance sheet

Dec. 31, 2007

Assets	Liabilities and shareholders equity
Cash -----Br.175	Account payable-----Br.350
Account Receivable-----?	Short term loans-----200
Inventory-----?	Other Accruals-----?
Current assets -----?	Current liabilities-----?
Net fixed assets-----?	Long term Debt-----?
	Total liabilities-----?
	Common stocks-----1,750
	Retained earnings-----2,000
Total assets-----?	Total debts &Equity-----?

ATSEDE Corporation

Income statement

For the year ended Dec.31, 2007

Sales (credit) -----Br.9, 000
Cost of good sold-----?
Gross profit-----?
Operating expenses-----2,850
Profit before tax-----?
Taxes (40%) -----?
Net income-----?

1. Use your financial statements completed in exercise three and prepare proforma balance sheet for fiscal year to be ended Dec.31, 2008. Assume an increase of 20 percent in sale; fixed assets will be changed with change in sale in addition to several other balance sheet

accounts; and the corporation acquires external financial need, if any, through writing notes payable (non-interest bearing). (Hint! use percentage of sales method to find external financial requirement and to prepare the projected balance sheet).

CHAPTER THREE

THE COST OF CAPITAL

Dear reader!

Suppose you have just become the president of a large company, and the first decision you face is whether to go ahead with a plan to renovate the company's warehouse distribution system. The plan will cost the company \$50 million, and it is expected to save \$12 million per year after taxes over the next six years.

This is a familiar problem in capital budgeting. To address it, you would determine the relevant cash flows, discount them, and, if the net present value is positive, take on the project; if the NPV is negative, you would scrap it. So far, so good; but what should you use as the discount rate?

In particular, the new project will have a positive NPV only if its return exceeds what the financial markets offer on investments of similar risk. We called this minimum required return the cost of capital associated with the project. Thus, to make the right decision as president, you must examine what the capital markets have to offer and use this information to arrive at an estimate of the project's cost of capital.

Our primary purpose in this chapter is to describe how to go about doing this. There are a variety of approaches to this task, and a number of conceptual and practical issues arise.

The chapter, therefore, is designed mainly to provide you the basic issues about cost of capital for the possible components of the capital structure.

Chapter Contents

3.1 The concept of cost of capital and opportunity cost

3.2. Determining Component of Cost of Capital

3.2.1. Cost of Debt

3.2.2. Cost of Preference Capital

3.2.3. Cost of Equity

3.3. The weighted Average

3.4. The Marginal Cost of capital (MCC)

Summary

Self-Test Exercises

Objectives of the Chapter

After completing this unit, students should be able to:

- ✓ Define cost of capital and opportunity cost
- ✓ Differentiate the four major sources of capital to a firm and their cost,
- ✓ Understand the weighted average cost of capital and its use in investment decisions,
- ✓ Know the concept of marginal cost of capital and its use in analyzing raising of more and more capital during a given period,

3.1 The concept of cost of capital and opportunity cost

Cost of capital is vital part of investment decision as it is used to measure the value of investment proposal provided by the business concern. It is used as a discount rate to determine the present value of future cash flows related with capital projects. Cost of capital is also termed as cut-off rate, target rate, hurdle rate and required rate of return. When the companies are using different sources of finance, the finance manager must take vigilant decision with regard to the cost of capital; because it is closely associated with the value of the firm and the earning capacity of the firm.

The cost of capital is the minimum rate of return that a firm must earn in order to satisfy the overall rate of return required by its investors. It is also the minimum rate of return a firm must earn on its invested capital to maintain the value of the firm unchanged. The second definition considers the cost of capital as a break even rate.

If a firm's actual rate of return exceeds its cost of capital, the value of the firm would increase. If, on the other hand, the cost of capital is not earned, the firm's market value will decrease. So the cost of capital is the rate of return that is just sufficient to leave the price of the firm's common stock unchanged.

The cost of capital serves as a discount rate when a firm evaluates an investment proposal.

Suppose a firm is considering investment on a plant. The finance required for this investment is to be raised by selling common stock. Now, after raising capital, the firm is expected to provide required rate of return to those who invest on the common stock. This in effect is the firm's cost of capital. So to decide investment on the plant, the minimum rate of return from the investment at least should be equal to the required rate of return by the common stockholders. If the required rate of return by the firm's common stockholders is 13%, then the firm should earn a minimum of 13% on its investment on the plant. The 13% minimum rate of return that should be earned by the firm is, therefore, its cost of capital.

There is bulk of finance literature to describe this concept. Numerous studies have shown that Cost of capital is the rate of return that a firm must earn on its project investments to maintain its market value and attract funds. It is the required rate of return on its investments which belongs to equity, debt and retained earnings. If a firm fails to earn return at the expected rate, the market value of the shares will fall and it will result in the decrease of overall prosperity of the shareholders. Famous theorist, **John J. Hampton** described cost of capital as "the rate of return the firm required from investment in order to increase the value of the firm in the market place". **Solomon Ezra stated that** "Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditure" According to **James C. Van Horne**, Cost of capital is "A cut-off rate for the allocation of capital to investment of projects. It is the rate of return on a project that will leave unchanged the market price of the stock". **Another theorist, William and Donaldson explained that** "Cost of capital may be defined as the rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due"

Opportunity costs represent the benefits an individual, investor or business *misses* when choosing one alternative over another. While financial reports do not show opportunity cost, business owners can use it to make educated decisions when they have multiple options before them. Bottlenecks are often a cause of opportunity costs.

The opportunity cost of capital is the incremental return on investment that a business foregoes when it elects to use funds for an internal project, rather than investing cash in a marketable security. Thus, if the projected return on the internal project is less than the expected rate of return on a marketable security, one would not invest in the internal project, assuming that this

is the only basis for the decision. The opportunity cost of capital is the difference between the returns on the two projects.

For example, the senior management of a business expects to earn 8% on a long-term \$10,000,000 investment in a new manufacturing facility, or it can invest the cash in stocks for which the expected long-term return is 12%. Barring any other considerations, the better use of the cash is to invest \$10,000,000 in stocks. The opportunity cost of capital of investing in the manufacturing facility is 2%, which is the difference in return on the two investment opportunities.

This concept is not as simple as it may first appear. The person making the decision must estimate the variability of returns on the alternative investments through the period during which the cash is expected to be used. To return to the example, senior management may be certain that the company can generate an 8% return on the new manufacturing facility, whereas there may be considerable uncertainty regarding the variability of returns from an investment in stocks (which could even be negative during the cash usage period). Thus, the variability of returns should also be considered when arriving at the opportunity cost of capital. This uncertainty can be quantified by assigning a probability of occurrence to different return on investment outcomes, and using the weighted average as the most likely return. No matter how the issue is addressed, the main point is that there is uncertainty surrounding the derivation of the opportunity cost of capital, so that a decision is rarely based on completely reliable investment information.

Opportunity Cost can be calculated as:

Opportunity Cost=FO–CO

Where:

FO=Return on best foregone option

CO=Return on chosen option

Assumption of Cost of Capital

It is documented in theoretical studies that cost of capital is based on some assumptions which are directly related while calculating and measuring the cost of capital. There are three basic concepts:

- ✓ It is not a cost as such. It is merely a hurdle rate.
- ✓ It is the minimum rate of return.
- ✓ It consists of three important risks such as zero risk level, business risk and financial risk.

Importance of Cost of Capital

Computation of cost of capital is significant part of the financial management to decide the capital structure of the business concern.

Importance to Capital Budgeting Decision: Capital budget decision mainly depends on the cost of capital of each source. According to net present value method, present value of cash inflow must be more than the present value of cash outflow. Therefore, cost of capital is used for capital budgeting decision.

Importance to Structure Decision: Capital structure is the mix or proportion of the different types of long-term securities. Company uses particular type of sources if the cost of capital is suitable. Therefore, cost of capital supports to take decision regarding structure.

Importance to Evolution of Financial Performance: Cost of capital is imperative to determine which affects the capital budgeting, capital structure and value of the firm. It helps to estimate the financial performance of the firm.

Importance to Other Financial Decisions: Cost of capital is also used in some other areas such as, market value of share, earning capacity of securities etc. hence; it plays a major part in the financial management.

3.2. Determining Component of Cost of Capital

The cost of capital for any particular capital source or security issue is called the specific cost of capital. It is also called individual cost of capital or component cost of capital.

Types of capitals contained in the capital structure of a firm may include:

1. Debt,
2. Preferred stock,
3. Cost of equity

There are two important points you should bear in mind about the component cost of capital. First, it is computed on an after-tax basis. Meaning, if there would be any tax implication on the individual source of capital, it should be considered. In almost all circumstances, the tax implication is only on debt sources of finance. Second, specific cost of capital is expressed as an annual percentage or rate like 6%, 9%, or 10%. The cost of capital is not stated in terms of birr.

3.2.1. The Cost of Debt

This is the minimum rate of return required by suppliers of debt or creditors. The relevant specific cost of debt is the after-tax cost of new debt. Generally, debt is the cheapest source of finance to a firm and, hence, the cost of debt is the lowest specific cost of capital. There are two basic explanations for this. First, debt suppliers, generally, assume the lowest risk among all suppliers of capital. They receive interest payments before preferred and common dividends are paid. Since they assume the smallest risk, their return is the lowest. Their lowest return would be the lowest cost of capital to the firm. Second, raising capital through debt sources entails interest expense. The interest expense in turn reduces the firm's income which ultimately would cause tax payment to be reduced. So raising money in the form of debt results in the smallest tax burden, and finally, the firm's cost of debt would be the lowest.

Debt sources of finance may take several forms like bonds, promissory notes, bank loans. Here, for our convenience we consider bond issue to illustrate the cost of debt.

Computing the cost of new bond issue involves three steps:

- i. Determine the net proceeds from the sale of each bond $NPd = Pd - f$

Where:

NPd = The net proceeds from the sale of each bond

Pd = The market price of the bond

f = Flotation costs

ii. Compute the effective before tax cost of the bond using either:

1. The trial and error method which is a long approach that can be done in the same way as the internal rate of return (IRR) is calculated in the capital budgeting techniques (in chapter four we will see the chapter for capital budgeting techniques)
Or

i. The following approximation formula or **short –cut method**

$$K_d = \frac{I + \frac{P_n - NP_d}{n}}{\frac{P_n + NP_d}{2}}$$

Where:

K_d = The effective before tax cost of debt

I = Annual interest payment

P_n = the par value of the bond

n = Length of the holding period of the bond in years.

ii. Compute the after-tax cost of debt

$$K_{dt} = K_d (1 - t)$$

Where:

K_{dt} = The after-tax cost of debt

t = The marginal tax rate

Example: Currently, A certain firm is planning to sell 15-year, Br. 1,000 par-value bonds that carry a 12% annual coupon interest rate. As a result of lower current interest rates, the bonds can be sold for Br. 1,010 each. Flotation costs of Br. 30 per bond will be incurred in the process of issuing the bonds. The firm's marginal tax rate is 40%.

Required: Calculate the after tax cost of the new bond at issue:

Solution:

Given: P_n = Br. 1,000; I = Br. 120 (Br. 1,000 x 12%); n = 15; P_d = Br. 1,010; f = Br. 30; t = 40%; K_{dt} = ?

Then apply the three steps:

$$i. \text{ NPd} = \text{Br. } 1,010 - \text{Br. } 30 = \text{Br. } 980$$

$$ii. \text{ Kd} = \frac{\text{Br. } 120 \frac{\text{Br. } 1,000 - \text{Br. } 980}{15}}{\frac{\text{Br. } 1,000 + \text{Br. } 980}{2}} = 12.26\%$$

$$iii. \text{ Kdt} = 12.26\% (1 - 40\%) = \underline{7.36\%}$$

Therefore, the after – tax cost of new bond issue is 7.36%. That is, the firm should be able to earn a minimum of 7.36% to satisfy bondholders. Otherwise, the firm's value will decline.

3.2.2. The Cost of Preference capital

The cost of preferred stock is the minimum rate of return a firm must earn in order to satisfy the required rate of return of the firm's preferred stock investors. It is also the minimum rate of return a firm's preferred stock investors require if they are to purchase the firm's preferred stock

When a firm raises capital by issuing new preferred stock, it is expected to pay fixed amount of dividends to the preferred stockholders. So it is the dividend payment that is the cost of the preferred stock to the firm stated as an annual rate.

The cost of a new preferred stock issue can be computed by following two steps:

- i. Determine the net proceeds from the sale of each preferred stock.

$$\text{NPpf} = \text{Ppf} - f$$

Where:

NPpf = Net proceeds from the sale of each preferred stock

Ppf = Market price of the preferred stock

f = Flotation costs

- ii. Compute the cost of preferred stock issue

$$\text{Kps} = \frac{\text{Dps}}{\text{NPpf}}$$

Where:

K_{ps} = The cost of preferred stock

D_{ps} = The per share annual dividend on the preferred stock

Example: Jedid Company has just issued preferred stock. The stock has 12% annual dividend and Br. 100 par value and was sold at 102%. In addition, flotation costs of Br. 2.50 per share must be paid. Calculate the cost of the preferred stock.

Solution:

Given: P_{pf} = Br. 102 (Br. 100 x 102%); D_{ps} = Br. 12 (Br 100 x 12%); f = Br. 2.50;

K_{ps} =?

Then apply the two steps:

i. $N_{Ppf} = \text{Br. } 102 - \text{Br. } 2.50 = \text{Br. } 99.50$

ii. $K_{ps} = \frac{\text{Br. } 12}{\text{Br. } 99.50} = \underline{\underline{12.06\%}}$

Therefore, **Jedid** Company should be able to earn a minimum of 12.06% on any investment financed by the new preferred stock issue. Otherwise, the firm's value will decrease.

3.2.3. Cost of Equity

1. The Cost of Common Stock

The cost of common stock is the minimum rate of return that a firm must earn for its common stockholders in order to maintain the value of the firm. A firm does not make explicit commitment to pay dividends to common stockholders. However, when common stockholders invest their money in a corporation, they expect returns in the form of dividends. Therefore, common stocks implicitly involve a return in terms of the dividends expected by investors and hence, they carry cost.

Generally, common stock dividends are paid after interest and preferred dividends are paid. As a result, common stock investors assume the maximum risk in corporate investment. They compensate the maximum risk by requiring the highest return. This highest return expected by common stockholders make common stock the most expensive source of capital.

The cost of common equity can be computed using:

1. The Dividend Growth Model
2. The Security market Line (SML) Approach

The Dividend Growth Model

The cost of common stock can be computed using the constant growth valuation model.

$$K_s = \frac{D_1}{NPo} + g = \frac{D_0(1+g)}{NPo} + g$$

Where:

K_s = The cost of new common stock issue

D_1 = The expected dividend payment at the end of next year

D_0 = Current dividend payment

NPo = Net proceeds from the sale of each common stock

g = The expected annual dividends growth rate

The net proceeds from the sale of each common stock (NPo) is computed as follows:

$$NPo = P_o - f$$

Where:

P_o = The current market price of the common stock

f = flotation costs

Example: Common stock is sold to investors for Br. 20 per share. The issuing corporation incurs a selling expense of Br. 1 per share. The current dividend is Br. 1.50 per share and it is expected to grow at 6% annual rate. Compute the specific cost of this common stock issue.

Solution

Given: $P_0 = \text{Br. } 20$; $D_0 = \text{Br. } 1.50$; $g = 6\%$; $f = \text{Br. } 1$; $K_s = ?$

Then apply the two steps:

i. $NP_0 = \text{Br. } 20 - \text{Br. } 1 = \text{Br. } 19$

ii. $K_s = \frac{D_1}{NP_0} + g = \frac{\text{Br. } 1.50 (1.06) + 0.06}{\text{Br. } 19} = \underline{\underline{14.37\%}}$

Therefore, the firm should be able to earn a minimum return of 14.37% on investments that are financed by the new common stock issue.

The growth rate (g) is an estimation which can be computed with:

1. Use of historical growth rate
2. Use of analysts' forecast of future growth rate

Analysts' forecasts are available from a variety of sources. Naturally different sources will have different estimates, so one estimate might be obtained by multiple estimates and averaging them.

It might be possible to observe dividends for the previous years, say five years; calculate the year –to- year growth rate and average them. For example the following observations are available for a certain company.

Year	Dividends
1996	Br. 1.10
1997	1.20
1998	1.35
1999	1.40
2000	1.55

You can calculate the percentage in the dividend for each year as follows:

Year	Dividends	Dividend birr change [#]	Percentage Change*
1996	Br. 1.10	-	-
1997	1.20	0.10	9.09% = $0.1/1.1$
1998	1.35	0.15	12.5% = $0.15/1.2$
1999	1.40	0.05	3.70% = $0.05/1.35$
2000	1.55	0.15	10.71% = $0.15/1.4$

Note that # $1.20 - 1.10 = 0.1$; $1.35 - 1.20 = 0.15$; $1.40 - 1.35 = 0.05$ and $1.55 - 1.40 = 0.15$

Note that the year- to –year change in dividends are calculated and expressed as percentage change. If you average the four growth rates, the result is 9% [$(9.09\% + 12.5\% + 3.70\% + 10.71\%) / 4 = 9\%$]

Therefore, 9 percent could be used as an estimate for the expected growth rate (g).

Advantages and Disadvantage of the Dividend Growth model

The primary advantage of the dividend growth model is its simplicity. It is both easy to understand and easy to use. There are a number of associated parasitical problems and disadvantages.

First, the dividend growth model is applicable only for companies that pay dividends. This means that the average approach is useless in many cases. Furthermore, even for companies that do pay dividends, the key underlying assumption is that dividend growth at a constant rate.

The second problem is that the estimated cost of equity is very sensitive to the estimated growth rate. For a given stock price, an upward revision of **g** just by one percentage point, for example, increases the estimated cost of equity by at least a full percentage point. Since D_1 will probably be revised upward as well, the increase will actually be some what larger than that.

Finally this approach really does not explicitly consider risk. The approach does not have direct adjustment for the risk of the investment. For example, there is no allowance for the degree of certainty or uncertainty surrounding the estimated growth rate of dividends. As a result it is difficult to say whether or not the estimated return is commensurate with the level of risk.

I. The Security Market Line (SML) Approach

Security market line is a positively sloped straight line displaying the relationship between expected return and beta. Beta coefficient is the amount of systematic risk present in a particular risky asset relative to that in an average risky asset. Based on the assumption that a required or expected return on a risky investment depends on three things:

- a. The risk-free rate, R_f
- b. The market risk premium, $E(R_m) - R_f$
- c. The systematic risk of the asset relative to average that is beta coefficient, the SML can be expressed as:

$$E(R_e) = R_f + B_e(R_m - R_f)$$

Example: Suppose stock in JURU Company has a beta of 1.2. The Market risk premium is 8 percent and the risk free rate is 6 percent. JURU's last dividend was Br. 2.0 per share and the dividend is expected to grow at 8 percent indefinitely. The stock currently sells at Br. 30. What is Alpha's cost of equity capital under SML Approach?

$$\begin{aligned} E(R_e) &= R_f + B_e(R_m - R_f) \\ &= 6\% + 1.2 * 8\% = 15.6\% \end{aligned}$$

Advantages and Disadvantages of SML Approach Advantages: The SML approach has two primary advantages.

- i. It explicitly adjust for risk
- ii. It is applicable to companies other than just those with steady dividend growth

Disadvantages: The SML approach has the following disadvantages

- i. It requires two things to be estimated, the risk premium and the beta coefficient. To the extent that our estimates are poor, the resulting cost of equity will be inaccurate
- ii. As with the dividend growth model, it relies on the past to predict the future. Economic conditions can be changed very quickly so the past may not be a good guide to the future.

2. The Cost of Retained Earnings

Retained earnings represent profits available for common stockholders that the corporation chooses to reinvest in itself rather than payout as dividends. Retained earnings are not securities like stocks and bonds and hence do not have market price that can be used to compute costs of capital.

The cost of retained earnings is the rate of return a corporation's common stockholders expect the corporation to earn on their reinvested earnings, at least equal to the rate earned on the outstanding common stock. Therefore, the specific cost of capital of retained earnings is equated with the specific cost of common stock. However, flotation costs are not involved in the case of retained earnings.

Computing the cost of retained earnings involves just a single procedure of applying the following formula:

$$K_r = \frac{D_1}{P_0} + g = \frac{D_0(1+g)}{P_0} + g$$

Where:

K_r = The cost of retained earnings

D_1 = The expected dividends payment at the end of next year

P_0 = The current market price of the firm's common stock

g = The expected annual dividend growth rate.

Example: A certain Manufacturing company expects to pay a common stock dividend of Br. 2.50 per share during the next 12 months. The firm's current common stock price is Br. 50 per share and the expected dividend growth rate is 7%. A flotation cost of Br. 3 is involved to sale

a share of common stock.

Required: Compute the cost of retained earnings.

Solution

Given: $P_0 = \text{Br. } 50$; $D_1 = \text{Br. } 2.50$; $g = 7\%$; $K_r = ?$

Then apply the formula:

$$K_r = \frac{D_1 + g}{P_0} = \frac{\text{Br. } 2.50 + 7\%}{\text{Br. } 50} = 12\%$$

QUICK CHECK

1. Define cost of capital.
2. What is the difference between cost of retained earnings and cost of common equity when floatation cost is incurred?
3. What is SML?

3.3. Weighted Average Cost of Capital (WACC)

In the previous section we have seen how to compute the cost of capital for each individual source of capital. The specific cost of capital is used in evaluating an investment proposal to be financed by a particular capital source. Practically, however, investments are financed by two or more sources of capital. In such a situation, you cannot make use of the individual cost of capital. Rather you should use the average cost of capital employed by the firm.

The firm's capital structure is composed of debt, preferred stock, common stock, and retained earnings. Each capital source accounts to some portion of the total finance. But the percentage contribution of one source is usually different from another. So you must compute the weighted average cost of capital rather than the simple average.

The weighted average cost of capital (WACC) is the weighted average of the individual costs of debt, preferred stock and common equity (common stock and retained earnings). It is also called the composite cost of capital.

If the weights of the component capital sources are all given, the weighted average cost of capital can be computed as:

$$WACC = WdKdt + WpsKps + WceKs$$

Where:

WACC = The weighted average cost of capital

Wd = The weight of debt

Wps = The weight of preferred stock

Wce = The weight of common equity

Kdt = The after – tax cost of debt

Kps = The cost of preferred stock

Ks = The cost of common equity

The WACC is found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure. Weights of the individual capital sources can be calculated based on their book value or market value.

To illustrate the computation of the WACC, assume the following data is available.

GG Company's financial manager wants to compute the firm's weighted average cost of capital. The book and market values of the amounts as well as specific after-tax costs are shown in the following table for each source of capital.

Source of capital	Book value	Market value	Specific cost
Debt	Br.1,050,000	Br. 1,000,000	5.3%
Preferred stock	84,000	125,000	12.0
Common equity	966,000	1,375,000	16.0
Total	<u>Br. 2,100,000</u>	<u>Br. 2,500,000</u>	

Required: Calculate the firm's weighted average cost of capital using:

1. book value weights
2. market value weights

Solution:

1. Total book value = Br. 2,100,000

$$W_d = \frac{\text{Br. 1,050,000}}{\text{Br. 2,100,000}} = 0.5; \quad W_{ps} = \frac{\text{Br. 84,000}}{\text{Br. 2,100,000}} = 0.04; \quad W_{ce} = \frac{\text{Br. 966,000}}{\text{Br. 2,100,000}} = 0.46$$

$$\begin{aligned} \text{WACC} &= W_d K_d + W_{ps} K_{ps} + W_{ce} K_s \\ &= 0.5 (5.3\%) + 0.04 (12.0\%) + 0.46 (16.0\%) \\ &= 2.65\% + 0.48\% + 7.36\% \\ &= \underline{\underline{10.49\%}} \end{aligned}$$

The minimum rate of return on all projects should be 10.49%. Meaning, **GG** should accept all projects so long as they earn a return greater than or equal to 10.49%

2. Total Market value = Br. 2,500,000

$$W_d = \frac{\text{Br. 1,000,000}}{\text{Br. 2,500,000}} = 0.4; \quad W_{ps} = \frac{\text{Br. 125,000}}{\text{Br. 2,500,000}} = 0.05; \quad W_{ce} = \frac{\text{Br. 1,375,000}}{\text{Br. 2,500,000}} = 0.55$$

$$\begin{aligned} \text{WACC} &= 0.4 (5.3\%) + 0.05 (12.0\%) + 0.55 (16.0\%) \\ &= 2.12\% + 0.60\% + 8.80\% \\ &= \underline{\underline{11.52\%}} \end{aligned}$$

If the market value weights are used, **GG** should accept all projects with a minimum rate of return of 11.52%.

Determining the Weights

The weight that one uses in the calculation of the WACC will obviously affect the result. Therefore an important question is, 'where do the weights come from?' There are two possible

answers for this question. Perhaps the most obvious answer is to find the weights from the balance sheet.

The balance sheet weights (usually referred to as book-value weights) can be obtained by the following procedure.

- i. Find the total long term debt, total preferred equity, and the total common equity.
- ii. Add together each of these to arrive at the grand total of the long term sources of capital.
- iii. Finally divide each component by the grand total to determine the percentage that each source is of the total capital.

As you can see in the above example, there are weights which are computed as:

Sources of Capital	Total Book Value	Computations	Percentage of the Total
Long-term debt	Br.1,050,000	$\frac{1,050,000}{2,100,000} = 0.5$	50%
Preferred Equity	84,000	$\frac{84,000}{2,100,000} = 0.04$	4%
Common Equity	966,000	$\frac{966,000}{2,100,000} = 0.46$	46 %
Grand Total	Br. 2,100,000		100%

The problem with book-value weights is that they represent the weights as they were when the securities were originally sold. That is, the book value weights represent historical weights. The calculated WACC would better represent current reality if we used the present weights. Since the market constantly re-values the firm's securities, we can find the weights by using the current market values of the securities.

The procedure of determining the market value weights is similar to finding the book- value weights.

- i. First, determine the total market value of each type of security;
- ii. Total(sum) the result;
- iii. Divide the market value of each of sources of capital by the total to determine the weights.

Sources of Capital	Total Book Value	Computations	Percentage of the Total
Long-term debt	Br.1,000,000	$\frac{1,000,000}{2,500,000} = 0.4$	40%
Preferred Equity	125,000	$\frac{125,000}{2,500,000} = 0.05$	5%
Common Equity	1,375,000	$\frac{1,375,000}{2,500,000} = 0.55$	55 %
Grand Total	Br. 2,500,000		100%

3.4. Marginal Cost of Capital (MCC)

As a firm tries to have more new capital, the cost of each birr will rise at some point. Thus, the marginal cost of capital (MCC) is the cost of obtaining additional new capital. Technically speaking, the MCC is the weighted average cost of the last birr of new capital obtained. So the concept of marginal cost of capital is discussed in the context of the weighted average cost of capital.

As a firm raises larger and larger amounts of capital, the weighted average cost of capital also rises. But the question would be at what point the firm's costs of debt, preferred stock, and common equity as well as WACC increase?

The first point, therefore, in computing the MCC is to determine the breaking points where the cost of capital will increase.

The technical aspects of the MCC can be better understood using an example.

Example: The target capital structure of Chala Corporation and other pertinent data are given below.

Long-term debt ----- 40%; cost of preferred stock (K_{pf}) = 12.06%

Preferred stock -----10% cost of retained earnings (K_r) = 14%

Common equity ----- 50% cost of common stock (K_s) = 15%

Chala Corporation has Br. 900,000 available retained earnings. But when the firm fully utilizes its retained earnings, it must use the more expensive new common stock financing to meet its equity needs. In addition, the firm expects that it can borrow up to Br. 1,200,000 of debt at 7.3% after-tax cost. Additional debt will have an after-tax cost of 9.1%.

Required

1. What is the breaking point associated with the
 - a. Exhausting of retained earnings
 - b. Increment of debt between Br. 0 to Br. 1,200,000?
2. Determine the ranges of total new financing where the WACC will rise
3. Calculate the WACC for each range of finance.

Solutions

1. a. Breaking point (BP) common equity = $\frac{\text{Br. 900,000}}{50\%}$

Br. 1,800,000

- b. Breaking point (BP) long-term debt = $\frac{\text{Br. 1,200,000}}{40\%}$

Br. 3,000,000

The breaking points computed above can be interpreted as:

Chala can meet its equity needs using retained earnings until its total finance need is Br. 1,800,000. But when total capital required is more than Br. 1,800,000, its equity needs should be met with common stock. Similarly, until the firm's total finance need reaches Br. 3,000,000, Chala can raise any debt at 7.3% cost. Any further finance need beyond Br. 3,000,000 will cause the cost of debt to rise to 9.1%.

2. There are three ranges of finance that could be identified on the basis of the breaking points:

1st Range : Br. 0 to Br. 1,800,000,

2nd Range : Br. 1,800,000 to Br. 3,000,000, and 3rd Range : Br. 3,000,000 and above

3. WACC (1st range) = 0.40 (7.3%) + 0.10 (12.06%) + 0.50 (14%)

$$= 2.92\% + 1.21\% + 7.00\%$$

$$= \underline{\underline{11.13\%}}$$

WACC (2nd range) = 0.40 (7.3%) + 0.10 (12.06%) + 0.50 (15%)

$$= 2.92\% + 1.21\% + 7.50\%$$

$$= \underline{\underline{11.63\%}}$$

WACC (3rd range) = 0.40 (9.1%) + 0.10 (12.06%) + 0.50 (15%)

$$= 3.64\% + 1.21\% + 7.50\%$$

$$= \underline{\underline{12.35\%}}$$

Why is it used 14% for cost of common equity in the 1st range and 15% in the 2nd and 3rd ranges respectively?

Because until the firm's total new financing amounts to Br. 1,800,000, it can meet its equity needs using retained earnings with its cost is 14%. But in the 2nd and 3rd ranges the total financing is more than Br. 1,800,000 and the firm should use new common stock issue in place of retained earnings; and the cost of common stock is 15%.

Summary

The cost of capital is the minimum rate of return that a firm must earn in order to satisfy the overall rate of return required by its investors. It also serves as a discount rate when a firm evaluates an investment proposal.

Financing projects or investments through debt, common stocks, preferred stocks and retaining earnings has its own cost. The cost of capital for any particular capital source or security issue is called the specific cost of capital. It is also called individual cost of capital or component cost of capital.

Cost of debt is the minimum rate of return required by suppliers of debt. The cost of preferred stock is the minimum rate of return a firm must earn in order to satisfy the required rate of return of the firm's preferred stock investors. The cost of common stock is the minimum rate of return that a firm must earn for its common stockholders in order to maintain the value of the firm. The cost of retained earnings is the rate of return a corporation's common stockholders expect the corporation to earn on their reinvested earnings, at least equal to the rate earned on the outstanding common stock. It is the same as that of cost of common stock except that flotation costs are not involved in the case of retained earnings.

The firm's cost of capital is composed of debt, preferred stock, common stock, and retained earnings. Each capital source accounts to some portion of the total finance. But the percentage contribution of one source is usually different from another. So it becomes essential to compute the weighted average cost of capital rather than the simple average.

The weighted average cost of capital (WACC) is the weighted average of the individual costs of debt, preferred stock and common equity (common stock and retained earnings). It is also called the composite cost of capital. The capital structure for any organization has to be structured in such a way that the internal rate of return is greater than the total cost of all components put together.

Self-Test Exercises

EX1: YIRGU Company's financing plans for next year include the sale of long-term bonds with a 10% coupon. The company believes it can sell the bonds at a price that will provide a yield to maturity of 12% to investors. Marginal tax rate is 35%

Required: what is YIRGU's after-tax cost of debt?

EX2: TATA Company plans to sale preferred stock with par value of Br. 50 per share. The issue is expected to pay quarterly dividends of Br. 1.25 per share and to have flotation costs of 6% of the par value. The preferred stock sells at 95% of its par.

Required: Calculate the cost of preferred stock to **TATA** Company.

EX3: RG Corporation's share of common stock is currently selling at Br 0. 75. The firm's projected dividend per share during the next year is Br. 3.38 and the expected dividend growth rate is 8%. Because of competitive nature of the market a Br. 3 per share under pricing is necessary. In addition, the sale of new common stock involves underwriting fee of Br. 0.60 per share and other flotation costs of Br. 0.90 per share.

Required: Calculate the cost of common stock for **RG** Corporation.

EX4: AMTS Company wishes to measure its cost of retained earnings. The firm's stock is currently selling for Br. 57.50. The firm expects to pay Br. 3.40 dividend at the end of the year. The expected dividend growth rate is 8%.

Required: Determine the cost of retained earnings.

EX5: On January 1, 2002, the total assets of **JU** Share Company were Br. 54 million. There was no short-term debt. The firm's optimal capital structure is given below.

Long-term debt	Br. 27,000,000
Common equity	<u>27,000,000</u>
Total liabilities and equity	<u>Br. 54,000,000</u>

New bonds will have a 10% coupon rate and will be sold at Par. Common stock currently has a market price of Br. 60 and can be sold with a flotation cost of Br. 6 per share. Dividend yield is estimated to be 4% and the expected dividend growth rate is 8%.

Required: Calculate:

- a. The cost of debt assuming 40% marginal corporate tax rate
- b. The cost of common equity (50% common stock and 50% retained earnings)
- c. The weighted average cost of capital

CHAPTER FOUR

CAPITAL BUDGETING/INVESTMENT DECISION

Introduction

Dear reader! This unit is about the issues related to capital expenditure and investment decisions. Investments, long-term assets have a major impact on a firm's future stream of cash flows. As such, the long term investment decisions have a significant impact on the value of the firm.

Capital investment decisions can be viewed as the link between the short run decisions, price/output decision and the long run decisions made by managers of the firm. Throughout the unit, important concepts in investment decision are discussed.

Moreover, one of the important functions of financial management is investment decisions. The success of a business unit depends upon the investment of resource in such a way that it brings benefits or best possible returns. The investment in general means an expenditure in cash or its equivalent during one or more time periods in anticipation of enjoying a net cash inflows or its equivalent in some future time period/s.

The investment in any project will bring desired profits or benefits in future. If the financial resources were in abundance, it would be possible to accept several investment proposals which satisfy the norms of approval or acceptability. Since, the available resources are limited; a choice has to be made among the various investment proposals by evaluating their comparative merit. This would help us to select the relatively superior proposals keeping in view the limited available resources. For this purpose, developing some evaluating techniques for the appraisal of investment proposals is an indispensable endeavor.

Chapter contents

- 4.1. Definition, Importance of capital budgeting
- 4.2. Project classifications
- 4.3. Capital budgeting processes
- 4.4. Capital Budgeting Evaluation Techniques
- 4.5. Capital budgeting under uncertainty

Chapter summary

Self-test Exercises

Objectives of the Chapter

The aim of this unit is to acquaint you with long term investment decision focusing on types of capital expenditures, and processes exist in capital investment decision. It also aims at presenting the meaning, importance, need, types and various methods of project appraisals.

After finishing this unit, you will be able to:

- ✓ Understand how capital investment decision is made
- ✓ Differentiate different types of capital expenditures
- ✓ Examine what type of processes and procedures exist in investment decision
- ✓ Identify different evaluating techniques for decision
- ✓ Understand the meaning of long-term investment
- ✓ Explain the need of capital decision
- ✓ List out the methods of capital budgeting.

4.1. Definition, Importance of capital budgeting

Capital expenditures require careful analysis because they are both costly to make and difficult to reverse without incurring considerable costs. It is, therefore, essential that investment projects are well conceived, evaluated and gainful projects are selected, given the objective of the firm. Capital budgeting focuses on these issues.

Capital budgeting is the process of planning, analyzing evaluating and selecting the most profitable capital expenditures. And it also refers rising of funds, and efficiently allocating those funds to capital projects. Capital budgeting has a great significance. First as we mentioned capital expenditures is generally irreversible. Once an investment is made, it cannot be converted in the cash without a loss. Second the very success of the firm depends on how we planned the capital expenditure.

The process of selecting capital investment projects consists of the following important steps:

1. Generate alternative capital investment project proposals
2. Estimate cash flow for the project proposals
3. Evaluate and choose, from the alternatives available those investment projects to implement

4. Review the investment projects after they have been implemented

1. Generating Capital Investment Projects

Proposals for new capital investments can come from many sources both inside (from tactful workers all the way up to the top management) and outside the firm from customer, suppliers and others. Some large size companies may have staff groups whose responsibilities including searching for and analyzing capital expenditure projects.

2. Estimating Cash Flows

Cash flows will occur in the future, thus varying degree of uncertainty exist about the values of these flows. This situation makes the estimation a difficult step in the selection process. Certain basic guidelines have been found helpful in approaching the analysis of investment alternatives.

3. Evaluating the Capital Project

Once a capital expenditure project has been identified and the cash flows have been estimated, a decision to accept or reject the project is required. The remaining problem is to compare the projected net cash flows that are required so that the proposed project can be accepted or rejected.

In order to maximize the value of the firm, the evaluation technique should be

1. Consider all relevant cash flows
2. Discount cash flows using the firm's opportunity cost of capital
3. Select one project from a set of mutually exclusive projects that maximizes the value of the firm
4. Allow each project to be evaluated independently of all others being considered.

Throughout this unit major discussions focus on these evaluation techniques and estimating of cash flows. A basic framework for capital budgeting can be related to the economic theory of the firm; which is stated as the optimum level of output by a profit maximizing firm is determined where marginal revenue (MR) equals to marginal cost (MC). This principle may be applied to the capital budgeting decision of the firm. In the context of capital budgeting, the MR may be thought of as the rates of return earned on successive investments. MC may be interpreted as the firm's weighted MC of capital that is, the cost of successive increments of capital acquired by the firm, weighted by the proportions in which these funds are expected to be used in the firm's capital structure

Estimating Cash Flow

One of the most important and difficult steps in the selection process is estimating the cash flow associated with the new capital project. Because as we mentioned earlier the cash flows will occur in the future, varying degree of uncertainty exists about the value of these flows. For now, we assume the decision maker is able to estimate cash flows with sufficient accuracy to use these estimate in the deciding whether to undertake the capital investment.

Because of the problem and baseness in estimating the cash flows, there are certain basic guidelines to be considered. Some of them are stated as follow:

1. Cash flow should be measured on an incremental basis
2. Cash flows should be measured on an after tax basis, using the firm's marginal tax rate.
3. When the capital investment changes the revenue or costs of other departments, then such external effect should be incorporated in the cash flow.
4. Sunk costs should not be considered when evaluating the project.
5. The value of resources used in the project should be measured in terms of their opportunity cost.

For a typical investment project, an initial investment is made in year zero generate a series of yearly net cash flows over the life of the project (n).

An initial investment denoted by I is defined as the initial net cash outlay in year zero it includes:

- ✓ acquisition cost of any new assets
- ✓ Installation cost
- ✓ Shipping costs and
- ✓ tax effects

Net cash flow of a project denoted by NCF is equal to cash inflow minus cash outflow NCF may also define as difference in Net income after tax ($\Delta NIAT$) plus the difference in change in depreciation (ΔD). Algebraically,

$$NCF = \Delta NIAT + \Delta D \text{-----} (1)$$

$\Delta NIAT$ is equal to the difference in net income before tax ($\Delta NIBT$) times $(1-t)$, where t is the corporate (marginal) income tax rate:

$$\Delta \text{NIAT} = \Delta \text{NIBT} (1-t) \text{-----} (2)$$

Whereas, ΔNIBT is defined as the difference in revenue (ΔR) minus the differences in operation costs (ΔC) and depreciation (ΔD).

$$\Delta \text{NIBT} = \Delta R - \Delta C - \Delta D \text{-----} (3)$$

Substituting equation 7.3 into equation 7.2 yields the following definition of net cash flow.

$$\text{NCF} = (\Delta R - \Delta C - \Delta D) (1-t) + \Delta D \text{-----} (4)$$

To illustrate the cash flow calculation, consider the following example. Addis Biscuit Factory needs to change one of the existing machines, due to technological advancement in the industry. The new production machine including shipping and installation costs requires 15 million birr. Sale revenues for this product are projected to be 12 million per year, but because the product produced by the new machine has an impact on other firm's existing products, then incremental sale revenue will be only 10 million birr. The management has decided to assume a 5 year life for this machine and it would be depreciated using straight line method with a zero salvage value. The incremental cost associated with the new machine including direct labor, utilities, rent and additional overhead estimated as 4 million birr and the marginal income tax for the firm is expected to be 40%:

Solution: Given

- ✓ Initial investment of the project with 5 year life time = 15 million birr
- ✓ Change in revenue (incremental Revenue) = 10 million per year (recall cash flow calculation considers all indirect effects of the projects as well)
- ✓ Change in cost (incremental cost) = 4 million per year
- ✓ Marginal income tax = 40%
- ✓ Change in depreciation = 3 million per year (the difference in depreciation (ΔD) equal to the initial outlay (15 million) divided by the project life years which is equal to 5), then NCF per year can be calculated using equation (4)

$$\begin{aligned}
\text{NCF} &= (\Delta R - \Delta C - \Delta D) (1-t) + \Delta D \\
&= (10,000,000 - 4,000,000 - 3,000,000) (1-0.4) + 3,000,000 \\
&= (3,000,000) (1-0.4) + (3,000,000) \\
&= (3,000,000 - 1,200,000) + (3,000,000) \\
&= 1,800,000 + 3,000,000
\end{aligned}$$

NCF = 4,800,000 birr per year

Taking NCF of 4,800,000 birr per year (on average), during the lifetime (5 years) the project generates a total of 24 million birr.

The firm must decide whether it wants to invest 15 million birr now to receive 4.8 million birr per year in net cash flows over the next five years.

QUICK CHECK

Differentiate annual cash flow and net cash flow

The Importance of capital budgeting

The terms in financial management like investment decisions, investment projects, and investment proposals are generally associated with application of long-term resources. What is long-term? There is no hard and fast rule to define it, but by common practice and in accordance with the financing policies, practices and regulations of the financial institutions and banks a period of more than a year may be treated as long period. The decisions related to long-term investment is also known as capital budgeting techniques. It is important because of the following reasons:

1. The investment decisions are the vehicles of a company to reach the desired destiny of the company. An **appropriate decision would yield spectacular results** whereas a **wrong decision may upset the whole financial plan and endanger the very survival of the firm**. Even a single mistake may lead the firm into bankruptcy.
2. Capital budgeting involves **huge amounts of funds** and implies permanent commitment. Once you invest in the form of fixed assets it is not easy to reverse the decision unless you incur heavy loss.

3. A capital expenditure decision has its effect over a long period of time span and inevitably affects the company's future cost.

4. Investment decisions are among the firm's most difficult decisions. They are the predictors of future events which are difficult to predict. It is a complex problem investment. The cash flow uncertainty is caused by economic, political, social and technological forces.

4.2. Project classifications

One way of classifying projects is by project life, whether short-term or long-term. We do this because in the case of long-term projects, the time value of money plays an important role in long-term projects. Another way of classifying projects is by their risk. The riskier the project's future cash flows, the greater the role of the cost of capital in decision-making. Still another way of classifying projects is by their dependence on other projects. The relationship between a project's cash flows and the cash flows of some other project of the firm must be incorporated explicitly into the analysis since we want to analyze how a project affects the total cash flows of the firm.

Classification According to Their Economic Life

An investment generally provides benefits over a limited period of time, referred to as its economic life. The economic life or useful life of an asset is determined by:

- ✓ Physical deterioration;
- ✓ Obsolescence; or
- ✓ The degree of competition in the market for a product.

The economic life is an estimate of the length of time that the asset will provide benefits to the firm. After its useful life, the revenues generated by the asset tend to decline rapidly and its expenses tend to increase.

Typically, an investment requires an immediate expenditure and provides benefits in the form of cash flows received in the future. If benefits are received only within the current period within one year of making the investment we refer to the investment as a short-term investment. If these benefits are received beyond the current period, we refer to the investment as a long-term investment and refer to the expenditure as a capital expenditure. An investment project may comprise one or more capital expenditures. For example, a new product may require investment in production equipment, a building, and transportation equipment.

Short-term investment decisions involve, primarily, investments in current assets: cash, marketable securities, accounts receivable, and inventory. The objective of investing in short-term assets is the same as long-term assets: maximizing owners' wealth. Nevertheless, we consider them separately for two practical reasons:

1. Decisions about long-term assets are based on projections of cash flows far into the future and require us to consider the time value of money.
2. Long-term assets do not figure into the daily operating needs of the firm.

Decisions regarding short-term investments, or current assets, are concerned with day-to-day operations. Moreover, a firm needs some level of current assets to act as a cushion in case of unusually poor operating periods when cash flows from operations are less than expected.

Classification According to Their Risk

Suppose you are faced with two investments, A and B, each promising a \$100 cash inflow ten years from today. If A is riskier than B, what are they worth to you today? If you do not like risk, you would consider A less valuable than B because the chance of getting the \$100 in ten years is less for A than for B. Therefore, valuing a project requires considering the risk associated with its future cash flows.

The investment's risk of return can be classified according to the nature of the project represented by the investment:

- ✓ **Replacement projects:** investments in the replacement of existing equipment or facilities.
- ✓ **Expansion projects:** investments in projects that broaden existing product lines and existing markets.
- ✓ **New products and markets:** projects that involve introducing a new product or entering into a new market.
- ✓ **Mandated projects:** projects required by government laws or agency rules.

Replacement projects include the maintenance of existing assets to continue the current level of operating activity. Projects that reduce costs, such as replacing old equipment or improving the efficiency, are also considered replacement projects. To evaluate replacement projects we need to compare the value of the firm with the replacement asset to the value of the firm without that same replacement asset. What we're really doing in this comparison is looking at opportunity costs: what cash flows would have been if the firm had stayed with the old asset.

There's little risk in the cash flows from replacement projects. The firm is simply replacing equipment or buildings already operating and producing cash flows. And the firm typically has experience in managing similar new equipment.

Expansion projects, which are intended to enlarge a firm's established product or market, also involve little risk. However, investment projects that involve introducing new products or entering into new markets are riskier because the firm has little or no management experience in the new product or market.

A firm is forced or coerced into its mandated projects. These are government-mandated projects typically found in "heavy" industries, such as utilities, transportation, and chemicals, all industries requiring a large portion of their assets in production activities. Government agencies, such as the Occupational Health and Safety Agency (OSHA) or the Environmental Protection Agency (EPA), may impose requirements that firms install specific equipment or alter their activities (such as how they dispose of waste).

We can further classify **mandated projects** into two types: **contingent and retroactive**. Suppose, as a steel manufacturer, we are required by law to include pollution control devices on all smoke stacks. If we are considering a new plant, this mandated equipment is really part of our new plant investment decision the investment in pollution control equipment is contingent on our building the new plant.

On the other hand, if we are required by law to place pollution control devices on existing smoke stacks, the law is retroactive. We do not have a choice. We must invest in the equipment whether it increases the value of the firm or not. In this case we either select from among possible equipment that satisfies the mandate, or we weigh the decision whether to halt production in the offending plant.

Classification According to Their Dependence on Other Projects

In addition to considering the future cash flows generated by a project, a firm must consider how it affects the assets already in place the results of previous project decisions as well as other projects that may be undertaken. Projects can be classified as follows according to the degree of dependence with other projects: **independent projects and mutually exclusive project**.

An independent project is one whose cash flows are not related to the cash flows of any other project. Accepting or rejecting an independent project does not affect the acceptance or rejection of other projects.

Projects are mutually exclusive if the acceptance of one precludes the acceptance of other projects. For example, suppose a manufacturer is considering whether to replace its production facilities with more modern equipment. The firm may solicit bids among the different manufacturers of this equipment. The decision consists of comparing two choices, either keeping its existing production facilities or replacing the facilities with the modern equipment of one manufacturer. Because the firm cannot use more than one production facility, it must evaluate each bid and choose the most attractive one. The alternative production facilities are mutually exclusive projects: the firm can accept only one bid.

Contingent projects are dependent on the acceptance of another project. Suppose a greeting card company develops a new character, Pippy, and is considering starting a line of Pippy cards. If Pippy catches on, the firm will consider producing a line of Pippy T-shirts but only if the Pippy character becomes popular. The T-shirt project is a contingent project.

Another form of dependence is found in **complementary projects**, where the investment in one enhances the cash flows of one or more other projects. Consider a manufacturer of personal computer equipment and software. If it develops new software that enhances the abilities of a computer mouse, the introduction of this new software may enhance its mouse sales as well..

Information Required For Investment Decision

Initial Investment: The total amount of cash required for purchasing various assets like land, buildings, plant, machinery, equipment, etc and there installation expenses have to be estimated. In addition to fixed cost, the cost of maintaining stocks, contingency reserves to cover the cost of supporting the additional receivables. Benefit of credit from suppliers will have the effect of reducing the quantum of additional working capital required.

Subsequent Investment: The cost of maintenance, replacement and updating are to be treated as outflows during the period in which they are expected to be incurred.

Economic Life of the project: The economic life of a project is to be distinguished from the life of an individual asset. The building may have life of fifty years, plants ten years, and some

equipment five years only. The economic life of the project is determined by the duration of the “earnings flow” generated by the project.

The economic life may end when at least one of the following conditions occur.

- a. The cost of replacement becomes uneconomical in relation to the likely benefits.
- b. When the viability is adversely affected due to obsolescence.
- c. When maintenance costs exceed the disposable value, and/or
- d. When the development of new technology necessitates new investment

Salvage Values: Sometimes the plant assets may have value for the enterprise at the end of the life of the project or there may be some anticipated sales value of the plant. Such amount is to be treated as an inflow at the end of the life of the project.

Annual Cash Flows (ACF): The calculation of annual cash flows in investment appraisal plays a key role. The computation of cash flows is a simple task. The following areas are to be considered.

Sales revenue: This is going to be the function of sales. Any wrong calculation in this regard will bear impact on the investment opportunity. Care has to be taken to forecast accurately and the additional revenue generated by the investment should be taken into account. The investment must also result into the reduction of operating cost either by modernization or replacement models where the savings benefit or cash flows will increase. In simple terms annual cash flow is equivalent to net profit after tax plus depreciation. Procedurally,

$$ACF = \text{Sales} - (\text{Operating expenses} + \text{Non-operating expense} + \text{Tax}) + \text{Depreciation}$$

Illustration: The following is information related to ABC Ltd. Company. The Company has been asked to compute the annual cash flows.

Description	Machine A	Machine B
	(Birr)	(Birr)
Cost of machine	15, 000	24, 000
Estimated life in years	5 years	6 years
Estimated income	1, 000	1, 500
Estimated material cost	800	900
Estimated supervision cost	1, 200	1, 600
Estimated maintenance cost	500	1, 000
Estimated savings in wages	9, 000	12, 000

Additional Information

1. Depreciation may be charged on straight line method
2. The tax rate may be assumed 50% and
3. Calculate Annual cash flows.

Solution

Particulars	Machine A	Machine B
	(Birr)	(Birr)
Income:	1, 000	1, 500
Savings in wages	<u>9, 000</u>	<u>12, 000</u>
Total income / sales	<u>10, 000</u>	<u>13, 000</u>
Cost: material costs	800	900
Maintenance	500	1, 000
Supervision	<u>1, 200</u>	<u>1, 600</u>
	<u>2, 500</u>	<u>3, 500</u>
Profit before Depreciation & Tax	7, 500	10, 000
Depreciation	<u>3, 000</u>	<u>4, 000</u>
Profit Before tax	4, 500	6, 000
Tax @ 50%	<u>2, 250</u>	<u>3, 000</u>
Profit after tax (Net profit)	2, 250	3, 000
Add back depreciation	<u>3, 000</u>	<u>4, 000</u>
Annual cash flow	5250	7000

4.3. Capital budgeting processes

Capital budgeting is a difficult process to the investment of available funds. The benefit will be attained only in the near future but the future is uncertain. However, the following steps followed for capital budgeting, then the process may be easier are.

1. Identification of various investments proposals: The capital budgeting may have various investment proposals. The proposal for the investment opportunities may be defined from the top management or may be even from the lower rank. The heads of various departments analyses the various investment decisions, and will select proposals submitted to the planning committee of competent authority.

2. Screening or matching the proposals: The planning committee will analyze the various proposals and screenings. The selected proposals are considered with the available resources of the concern. Here resources referred as the financial part of the proposal. This reduces the gap between the resources and the investment cost.

3. Evaluation: After screening, the proposals are evaluated with the help of various methods, such as payback period proposal, net discovered present value method, accounting rate of return and risk analysis. Each method of evaluation used in detail in the later part of this chapter. The proposals are evaluated by.

- (a) Independent proposals (c) Mutually exclusive proposal
- (b) Contingent of dependent proposals

Independent proposals are not compared with other proposals and the same may be accepted or rejected. Whereas higher proposal acceptance depends upon the other one or more proposals. For example, the expansion of plant machinery leads to constructing of new building, additional labor etc. Mutually exclusive projects are those, which competed with other proposals and to implement the proposals after considering the risk and return, market demand etc.

4. Fixing property: After the evolution, the planning committee will predict which proposals will give more profit or economic consideration. If the projects or proposals are not suitable for the concern's financial condition, the projects are rejected without considering other nature of the proposals.

5. Final approval: The planning committee approves the final proposals, with the help of the following:

- ✓ Profitability
- ✓ Financial viability
- ✓ Market conditions
- ✓ Economic constituents

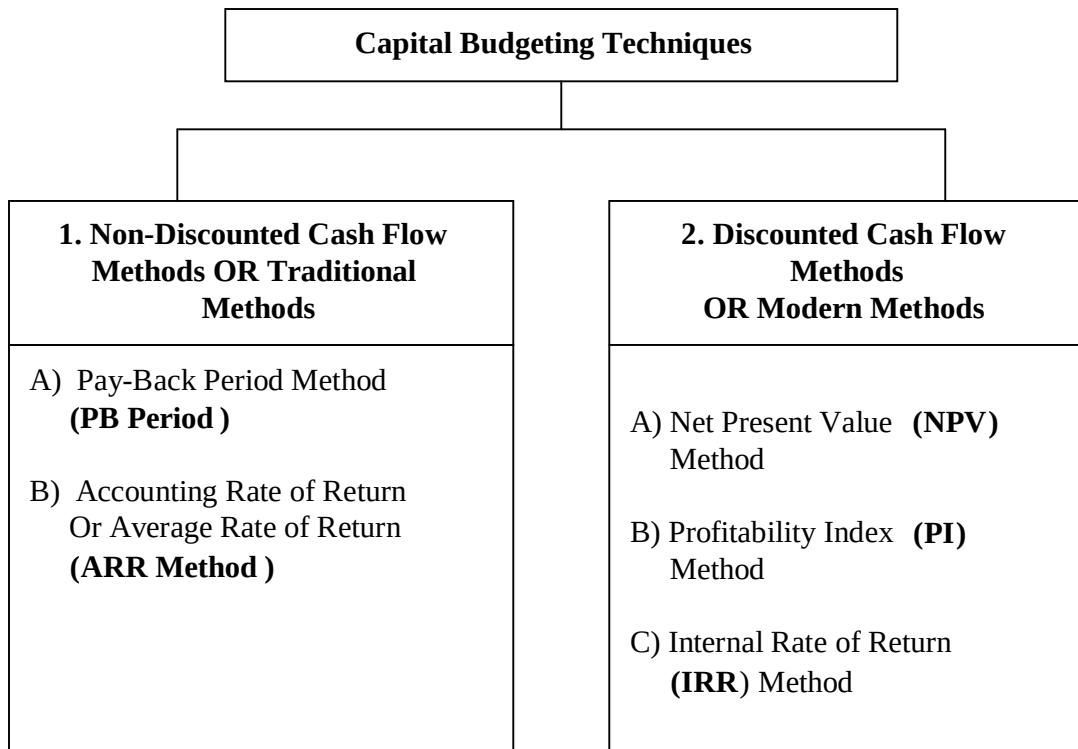
The planning committee prepares the cost estimation and submits to the management.

6. Implementing: The competent authority spends the money and implements the proposals. While implementing the proposals, assign responsibilities to the proposals, assign responsibilities for completing it, within the time allotted and reduce the cost for this purpose.

7. Performance review of feedback: The final stage of capital budgeting is actual results compared with the standard results. The adverse or unfavorable results identified and removing the various difficulties of the project. This is helpful for the future of the proposals.

4.4. Capital Budgeting Evaluation Techniques

Once the annual cash flow over periods is identified, the other issue is to properly evaluate and appraise using different appraisal methods. There are two important methods of evaluating investment proposals for which their annual cash flow is determined.



1. Traditional Methods or Non-Discounted Cash Flow Method

A) Pay Back Period (PBP)

This is one of the widely used methods for evaluating the investment proposals. Under this method the focus is on the recovery of original investment at the earliest possible. It determines the number of years to get back the original cash out flow, disregarding the salvage value and interest. This method does not take into account the cash inflows that are received after the pay back period. There are two methods in use to calculate the pay back period.

1. Where annual cash flows are not consistent rather vary from year to year and
2. Where the annual cash flows are uniform

1. Unequal cash flows

$$P = E + \frac{B}{C}$$

Where, P is payback period.

E is number of years immediately preceding the year of final recovery.

B is the balance amount still to be recovered.

C is cash flow during the year of final recovery.

Illustration I: The following is the information related to a company

Project A		Project B	
<u>Year</u>	<u>Cash flow \$</u>	<u>Year</u>	<u>Cash flow \$</u>
0	-700	0	-700
1	100	1	400
2	200	2	300
3	300	3	200
4	400	4	100
5	500	5	0

Note that cash flow at year zero represents initial investment

Required: Calculate payback period for project A and B

Solution

PBPA = 3.25 year PBPB = 2 years

2. Uniform cash flows:

Where the annual cash flows are uniform

$$PBP = \frac{\text{Original Investment}}{\text{Annual cash flows}}$$

The decision rule is the Shorter is the payback period, the better the project is.

Illustration II: A project requires an investment of \$ 100, 000; it will generate annual cash flow of \$25,000 per year. Calculate the pay back period. **Required:** Calculate pay back period for the project

$$\begin{aligned}
 PBP &= \frac{\text{Original Investment}}{\text{Annual cash flows}} \\
 &= \frac{100,000}{25,000} \\
 &= 4 \text{ years}
 \end{aligned}$$

Merits and Demerits of Pay-Back Period method:

Merits	Demerits
Easy to understand and compute and inexpensive to use.	Ignores the time value of money.
Emphasizes liquidity.	Ignores cash flows occurring after the payback period.
Easy and crude way to cope with risk.	Not a measure of profitability.
Uses cash flows information.	No objective way to determine the standard payback.
	No relation with the wealth maximization principle.

B) Accounting Rate of Return

This method is based on the financial accounting practices of the company working out the annual profits. Here, instead of taking the annual cash flows, we take the annual profits into account. The net annual profits are calculated after deducting depreciation and taxes. The average of annual profits thus derived is worked out on the basis of the period

$$ARR = \frac{\text{Average annual profits after taxes}}{\text{Average investment over the life of project}} \times 100$$

Average investment = Net working capital (WC) + Salvage value (Sal.V) + $\frac{1}{2}$ (Initial cost of plant – salvage value)

Net working capital = current assets – current liabilities

$$\text{Average profits} = \frac{\text{Total of annual profits}}{\text{Number of years}}$$

To illustrate use the following information

Initial investments of plant \$ 10, 000

Installation costs \$ 1, 000

Salvage value \$ 2, 000

Working capital \$ 1, 000

Life of plant 5 years

Annual profit per year \$ 2, 500

Required: Calculate ARR

$$\text{Average profit} = \frac{2,500 \times 5}{5} = \underline{2,500}$$

$$\text{Average investment} = \text{WC} + \text{Sal.V.} + \frac{1}{2} (\text{Cost} + \text{Installation Charges} - \text{Salvage Value})$$

$$= 2,000 + 1,000 + \frac{1}{2} (10,000 + 1,000 - 1,000)$$

$$= 3,000 + \frac{1}{2} (10,000)$$

$$= 3,000 + 5,000$$

$$= 8,000$$

$$\text{ARR} = \frac{2,500}{8,000} \times 100$$

$$\text{ARR} = \underline{\underline{31.25\%}}$$

The ARR is compared to the predetermined rate. The project will be accepted if the actual ARR is higher than the desired ARR. Otherwise it will be rejected.

Merits and Demerits of Accounting Rate of Return:

Merits	Demerits
1. Uses accounting data with which executive are familiar. 2. Easy to understand and calculate. 3. Gives more weight to future receipts.	1. Ignores the time value of money. 2. Does not use cash flows. 3. No objective way to determine the minimum acceptable rate of return.

2. Discounted Cash Flow Techniques

This concept is based on the time value of money. The flow of income is spread over a few years. The real value of Birr in your hand today is better than value of birr you earn after a year. The future income, therefore, has to be discounted in order to be associated with the current outflow of funds in the investment. Two methods of appraisal of investment project are based on this concept. These are net present value and internal rate of return method.

A) Net Present Value

Net present value may be defined as the total of present value of the cash proceeds in each year minus the total of present values of cash outflows in the beginning year.

$$\mathbf{NPV = PV - I} \quad \text{OR} \quad \mathbf{NPV = \sum_{t=0}^N \frac{CF_t}{(1+r)^t}}$$

Where: NPV = Net present value

CF_t = Cash inflows at different periods

W_n = Working capital adjustments

Co = Cash outflow in the beginning

K = Cost of capital

Sn = Salvage value at the end

NPV Decision Rules

The decision rule here is to accept a project if the NPV is positive and reject if it is negative.

Independent projects: - are those projects whose cash flows are not affected by other projects.

If NPV exceeds zero, accept the project. Mutually exclusive projects: - are two different ways of accomplishing the same result, so if one project is accepted then the other must be rejected.

Accept the project with the highest positive NPV. If no project has a positive NPV, then reject them all. Note that a positive NPV also means that the IRR is greater than the WACC

If...	this means that...	and you...
NPV > 0	the investment is expected to increase shareholder wealth	should accept the project.
NPV < 0	the investment is expected to decrease shareholder wealth	should reject the project.
NPV = 0	the investment is expected not to change shareholder wealth	should be indifferent between accepting or rejecting the project.

Illustration: ABC Plc. is considering investing in a cement project. It has on hand \$180, 000. It is expected that the project may work for seven years and likely to generate the following annual cash flows.

Year	ACF
1	\$30,000
2	50,000
3	60,000
4	65,000
5	40,000
6	30,000
7	16,000

The cost of capital is 8%

Required: Calculate the Net present value.

Solution

From Table Annexed

Year	ACF	PV factor	Present value
1.	\$30, 000	0.926	\$27, 780
2.	50, 000	0.857	42, 850
3.	60, 000	0.794	47, 640
4.	65, 000	0.735	47, 775
5.	40, 000	0.681	27, 240
6.	30, 000	0.630	18, 900
7.	16, 000	0.583	<u>9, 328</u>
			221, 513
Less: Original investment			<u>180, 000</u>
Net present value			<u>41, 513</u>

Interpretation: In the above problem the NPV is greater than zero. Hence, it may be accepted. You have already read in Financial Management I to calculate the time value of money and the usage of present value tables. Hence, you may directly use the present value factors from tables.

Merits and Demerits of NPV

Merits	Demerits
1. Considers all cash flows.	Requires estimates of cash flows which is tedious task.
2. True measure of profitability. Based on the concept of the time value of money.	
3. Satisfies the value-added principle.	Requires computation opportunity, cost of capital which poses practical difficulties.
4. Consistent with wealth maximization.	Sensitive to discount rates.
5.	

B) Profitability Index Method / Benefit Cost Ratio B/C Ratio

Profitability index method is the relationship between the present values of net cash inflows and the present value of cash outflows. It can be worked out either in unitary or in percentage terms.

The formula is

$$\text{Profitability Index} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$$

PI > 1 Accept

PI = 1 Indifference

PI < 1 Reject

Higher the profitability index more is the project preferred.

From the above example we can calculate the profitability index as below

Present value of cash out flows \$ 180, 000

Present value of cash inflows \$ 221, 513

$$\text{Therefore, PI} = \frac{221,513}{180,000} = 1.23$$

Merits and Demerits of PI

Merits	Demerits
1. Considers all cash flows.	Requires estimates of the cash flows which is a tedious task.
2. Recognizes the time value of money.	
3. Relative measure of profitability.	At times fails to indicate correct choice between mutually exclusive projects.
4. Generally consistent with the wealth maximization principle.	

C) Internal Rate of Return (IRR)

The internal rate of return is also known as yield on investment, marginal efficiency of capital, marginal productivity of capital, rate of return time adjusted rate of return and so on. Internal rate of return is nothing but the rate of interest which equates the present value of future earnings with the present value of present investment. Therefore, IRR depends entirely on the initial outlay and the cash proceeds of the project which is being evaluated for acceptance or rejection. The computation of IRR is difficult one; you have to start equating the two values i.e., present value of future earnings and present value of investment. It is possible through trial and error method.

IRR can be calculated basing on the pay back period where annual cash flows are uniform, in case the annual cash inflows are different for the periods, the pay back period is calculate then adopt trial and error procedure.

$$IRR = r - \frac{PBP - DFr}{DFrL - DFrH}$$

Where: PBP = Pay back period

DFr = Discount Factor for interest

DFrL = Discount Factor for lower interest rate

DFrH = Discount Factor for higher interest rate r = interest rates used

OR

$$IRR = LRD + \frac{NPVL}{PV} \times R$$

Where: IRR = Internal Rate of Return

LRD = Lower Rate of Discount

NPVL = Net present value at lower rate of discount

(i.e., difference between present values of cash)

PV = The difference in present values at lower and higher discount values.

R = The difference between two discount rates.

Illustration: RURADIN Plc. has \$100, 000 on hand. This amount is invested in a project, where the annual benefits after taxes are as below. It would like to know the rate of return earned by the company at the end of the life of the project.

<i>Year</i>	<i>ACFS</i>
1	\$ 40, 000
2	35, 000
3	30, 000
4	25, 000
5	20, 000

Solution

Year	ACFS	<u>At Discount Factor 20%</u>		<u>At Discount Factor 10%</u>	
		PV Factor	PV	PV Factor	PV
1	40, 000	0.833	\$33, 300	0.909	\$36, 400
2	35, 000	0.694	24, 300	0.826	28, 900
3	30, 000	0.579	17, 400	0.751	22, 500
4	25, 000	0.482	12, 100	0.683	17, 100
5	20, 000	0.402	<u>8, 000</u>	0.621	<u>12, 400</u>
			95, 100		117, 300

$$\begin{aligned}
 \text{IRR} &= \text{LRD} + \frac{\text{NPVL}}{\text{PV}} \times R \\
 &= 10 + \frac{17,300}{22,200} \times 10 \\
 &= \underline{\underline{17.8\%}}
 \end{aligned}$$

Merits and Demerits of IRR

Merits	Demerits
1. Considers all cash flows, 2. True measure of profitability. 3. Based on the concept of time value of money. 4. Generally, consistent with wealth maximization principle.	1. Requires estimates of cash flows which are a tedious task. 2. Does not hold the value-add principle (i.e. IRRs of two or more projects do not add) 3. At times fails to indicate correct choice between mutually exclusive projects. 4. At times yields multiple rates. 5. Relatively difficult to compute.

QUICK CHECK

1. Mention the disadvantages of payback period?
2. What is the best advantage of NPV method?

4.5. Capital budgeting Techniques under uncertainty

Risk can be defined as the chance that the actual outcome will differ from the expected outcome. Uncertainty relates to the situation where a range of differing outcome is possible, but it is not possible to assign probabilities to this range of outcomes. The two terms are generally used interchangeably in finance literature. In investment appraisal, managers are concerned with evaluating the riskiness of a project's future cash flows. Here, they evaluate the chance that the cash flows will differ from expected cash flows, NPV will be negative or the IRR will be less than the cost of capital. In the context of risk assessment, the decision-maker does not know exactly what the outcome will be but it is possible to assign probability weight age to the various potential outcomes. The most common measures of risk are standard deviation and coefficient of variations. There are three different types of project risk to be considered:

1. **Stand-alone risk:** This is the risk of the project itself as measured in isolation from any effect it may have on the firm's overall corporate risk.

2. Corporate or within-firm risk: This is the total or overall risk of the firm when it is viewed as a collection or portfolio of investment projects.

3. Market or systematic risk: This defines the view taken from a well-diversified shareholders and investors. Market risk is essentially the stock market's assessment of a firm's risk, its beta, and this will affect its share price.

Due to practical difficulties of measuring corporate and market risk, the stand-alone risk has been accepted as a suitable substitute for corporate and market risk. There are following techniques one can use to deal with risk in investment appraisal.

Measuring Stand-Alone Risk

Three techniques are used in practice to assess stand-alone risk: (1) Sensitivity analysis, (2) Scenario analysis, and (3) Monte Carlo simulation.

a) What is sensitivity analysis? Shows how changes in a variable such as unit sales affect NPV or IRR. Each variable is fixed except one. Change this one variable to see the effect on NPV or IRR. Answers “what if” questions, e.g., “What if sales decline by 30%?”

Merit:

The sensitivity analysis has the following advantages:

- ✓ It compels the decision maker to identify the variables affecting the cash flow forecasts, which helps in understanding the investment project in totality.
- ✓ It identifies the critical variables for which special actions can be taken.
- ✓ It guides the decision maker to concentrate on relevant variables for the project.

Demerits:

The sensitivity analysis suffers from following limitations:

- ✓ The range of values suggested by the technique may not be consistent. The terms ‘optimistic’ and ‘pessimistic’ could mean different things to different people.
- ✓ It fails to focus on the interrelationship between variables. The study of variability of one factor at a time, keeping other variables constant may not much sense. For example, sales volume may be related to price and cost. One cannot study the effect of change in price keeping quantity constant.

- ✓ Does not reflect diversification
- ✓ Says nothing about the likelihood of change in a variable, i.e. a steep sales line is not a problem if sales will not fall.

(b) Scenario Analysis: In sensitivity analysis, typically one variable is varied at a time. If variables are interrelated, as they are most likely to be, it is helpful to look at some plausible scenarios, each scenario representing a consistent combination of variables.

Evaluation:

- Scenario analysis may be regarded as an improvement over sensitivity analysis because it considers variations in several variables together.
- It is based on the assumption that there are few well-delineated scenarios. This may not be true in many cases. For example, the economy does not necessarily lie in three discrete states, viz., recession, stability, and boom. It can in fact be anywhere on the continuum between the extremes. When a continuum is converted into three discrete states, some information is lost.
- Scenario analysis expands the concept of estimating the expected values. Thus in a case where there are 10 inputs the analyst has to estimate 30 expected values (3×10) to do the scenario analysis.

Are there any problems with scenario analysis?

- ✓ Only considers a few possible out-comes.
- ✓ Assumes that inputs are perfectly correlated--all “bad” values occur together and all “good” values occur together.
- ✓ Focuses on stand-alone risk, although subjective adjustments can be made.

(c) Break-even Analysis: In sensitivity analysis one may ask what will happen to the project if sales decline or costs increase or something else happens. A financial manager will also be interested in knowing how much should be produced and sold at a minimum to ensure that the project does not 'lose money'. Such an exercise is called break-even analysis and the minimum quantity at which loss is avoided is called the break-even point.

(d) Simulation analysis: Sensitivity analysis and Scenario analysis are quite useful to understand the uncertainty of the investment projects. But both the methods do not consider the

interactions between variables and also, they do not reflect on the probability of the change in variables. The power of the computer can help to incorporate risk into capital budgeting through a technique called Monte Carlo simulation. The term “Monte Carlo” implies that the approach involves the use of numbers drawn randomly from probability distributions.³⁷ It is statistically based approach which makes use of random numbers and pre assigned probabilities to simulate a project’s outcome or return. It requires a sophisticated computing package to operate effectively. It differs from sensitivity analysis in the sense that instead of estimating a specific value for a key variable, a distribution of possible values for each variable is used.

Merits:

An increasingly popular tool of risk analysis, simulation offers certain advantages:

- ✓ It facilitates the analysis and appraisal of highly complex, multivariate investment proposals with the help of sophisticated computer packages.
- ✓ It can cope up with both independence and dependence amongst variables. It forces decision-makers to examine the relationship between variables

Demerits:

- ✓ Simulation is not always appropriate or feasible for risk evaluation.
- ✓ The model requires accurate probability assessments of the key variables. For example, it may be known that there is a correlation between sales price and volume sold, but specifying with mathematical accuracy the nature of the relationship for model purposes may be difficult
- ✓ Constructing simulated financial models can be time-consuming, costly and requires specialized skills, therefore. It is likely to be used to analyze very important, complex, and large-scale projects.
- ✓ It focuses on a project’s standalone risk. It ignores the impact of diversification, i.e., how a project’s stand-alone risk will correlate with that of other projects within the firm and affect the firm’s overall corporate risk.
- ✓ Simulation is inherently imprecise. It provides a rough approximation of the probability distribution of net present value (or any other criterion of merit).

Summary

Capital expenditure decision is one of the most important tasks of business management. Because it needs more managerial skill, experience, intuition and foresight than in any other aspect of business management.

Capital expenditures are made to reduce costs, increase output or to expand into new products or markets.

Capital expenditure is irreversible. Once an investment is made it cannot be converted into cash without a loss. The capital expenditure decision process should consist of the following steps: generating alternative investment proposals, estimating cash flows, evaluating and choosing the projects to undertake, and reviewing the projects after implementations.

Payback period, NPV and IRR are the most commonly used criteria under certainty to evaluate and choose the projects to be undertaken.

Because the pay-back period fails to account all cash flows basically subsequent returns after the pay back period. It is considered as an inferior evaluation technique.

Using the NPV method, a capital project is determined to be profitable, if the present value of all future cash flows exceeds the initial cost of the project. In contrast an investment should be made if the IRR exceeds the firm's cost of capital.

Generally, the NPV and IRR methods yield consistent accept or reject signals for proposed capital projects. However, in case of mutually exclusive projects the two methods may yield contradictory results. In such conditions NPV approach is normally superior to the IRR.

The management will achieve wealth maximization by using the long-term investment effectively. Decision effecting investments in long-term capital projects or assets have a major impact on the future well-being of the organization. Apart from being uncertain such decisions typically, involve large commitments of funds. The capital analysis will enable the management to rank and choose intelligently among the proposals competing for essentially scarce long-term funds.

The commonly used appraisal methods are payback, accounting rate of return which are known as traditional methods. The major drawback of these methods is time value of money is not considered. To overcome those defects modern methods namely net present value, profitability index and internal rate of return have become popular and most commonly acceptable.

Self-Test Activities and Exercises

Part I: Discussion Questions

1. What is meant by capital expenditure?
2. State the steps that exist in capital expenditure decision process.
3. Define the term capital budgeting? What is its importance in long-term investment decision?

Part II: Exercises

1. A manufacturer of household appliance decided to add new product line. The new equipment that helps to produce this new product line needs an initial investment of 1 million birr. The equipment would be depreciated using the straight line method over five years with zero estimated salvage value. Based on the analysis of marketing and financial departments the incremental revenue estimated as 800,000 birr and the difference in operating costs suggested as half of the incremental revenue the firms marginal income tax rate is 40 %. Estimate the NCF of the equipment per year and during the life of the project.
2. The expected cash flows of a project are as followed

<i>Year</i>	<i>Cash flows</i>
1	\$ 100, 000
2	20, 000
3	30, 000
4	40, 000
5	50, 000
6	30, 000

The cost of capital is 12 percent

Required: calculate the following

- A. Pay back period
- B. Discounted pay back period
- C. Net present value
- D. Profitability index

E. Internal rate of return

3. Equipment A has cost of \$75, 000 and cash inflow of \$20, 000 a year for six years. A substitute equipment B would cost \$ 50, 000 and cash flow \$ 14, 000 per year for six years. The required rate of return for both projects is 11%.

Required: Calculate NPV and IRR for each equipment and show which equipment should be accepted?

4. A company is faced with the problem of choosing between two mutually exclusive projects. Project A requires a cash outlay of \$100, 000 and cash running expenses of \$35, 000 per year. On the other hand project B will cost \$150, 000 and requires cash running expenses of \$20,000 per annum. Both the machines have eight years life. Project A has \$4, 000 salvage value and project B has \$14, 000 salvage value. The company's tax rate is 50 percent and has 10 percent required rate of return. Assume depreciation straight-line basis and no tax on salvage value of assets. **Required:** Evaluate for which project to be accepted
5. **REAL** Company has recorded the following data related to two alternatives: A and B. Both require an investment of \$56, 125

	A	B
Year	ACF after Dep. & Tax	ACF after Dep. &Tax
1	\$ 3, 375	11, 375
2	5, 373	9, 375
3	7, 375	7, 375
4	9, 375	5, 375
5	11, 375	3, 375
6	36, 875	36, 875

Cost of Capital 10%

Estimated life	5 years	5 years
Estimated salvage value	\$ 3, 000	\$ 3, 000
Tax rate	55%	55%

Depreciation has been charged on straight line basis.

Required: Calculate

1) ARR

2) Pay back period

3) Net present value

4) Profitability Index

5) Internal Rate of Return

6. ABC Plc. Has got \$20, 000 to invest. The following proposals are under consideration

Project	Initial outlay	Annual cash flow	Life Year
A	\$ 10, 000	\$ 2, 500	5
B	8, 000	2, 600	7
C	4, 000	1, 000	15
D	10, 000	2, 400	20
E	5, 000	1, 125	15
F	6, 000	2, 400	6
G	2, 000	1, 000	2

Required: a) Rank the projects in order of desirability under pay back period.

j) Rank these projects under net present value method assuming cost of capital 10%.

CHAPTER FIVE

FINANCING DECISION

Introduction

Dear reader! Given the objectives of a firm to maximize the value of equity shares, the firm should select a financing mix, which will help in achieving the objective of financial management. As a corollary, the capital structure should be examined from the viewpoint of its impact on the value of the firm. It can be legitimately expected that if the capital structure decision affects the total value of the firm, the firm should select such a financing-mix as will maximize the shareholders' wealth. Such a capital structure is referred to as the optimal capital structure. The optimal capital structure may be defined as the capital structure or combination of debt and equity that leads to the maximum of the value of the firm.

Theoretically, capital structure can affect the value of a company by affecting either its expected earnings or the cost of capital, or both. While it is true that financing-mix cannot affect the total operating earnings of a firm, as they are determined by the investment decisions, it can affect the share of earnings belonging to the ordinary shareholders. The capital structure decision influence the value of the firm through the earnings available to the shareholders.

Firms may employ assets or use sources of funds for their activities. The employment of assets or sources of funds require payment of fixed cost or fixed return. The existence of these fixed costs brings the concept of leverage. As a result of these costs, the earnings and risk available to the shareholders are affected. If earning deducted by variable costs is greater than the fixed costs, or earnings before interest and tax are greater than the fixed return requirement, the leverage is called favorable. Unfavorable or risk result may occur when the opposite conditions happens. Generally, increase in leverage results in increase for return and risk; and decrease in leverage results in decrease in returns and risk.

There are two types of leverage – operating leverage and financing leverage. The leverage associated with investment or acquisition of assets is referred to as operating leverage. The leverage associated with financing activities is the financing leverage. While the concern of financing decision is with respect to financing leverage, the operating leverage is also become

an area of discussion for the chapter. Operating leverage is used as a background to the understanding of financial leverage and the two types of leverage are closely related. The close relationship between the types of leverage comes from the use of earning before interest and tax (EBIT) as a pivotal point. Operating leverage is determined by the relationship between the firm's sales revenue and its EBIT. Financing leverage represents the relationship between EBIT and the earning available for the ordinary shareholders or earning per ordinary share (EPS). Moreover, these two types of leverage represent the two stages in the process of determining the earnings available to the ordinary (common) shareholders. The sections under the chapter cover these two types of leverage analysis and finally cover the combination of them to see the overall effect of a firm's operating and financing activities.

Chapter Contents

5.1. The concept of capital structure

5.2. Leverage

5.2.1. Overview of breakeven point

5.2.2. Operating advantage

5.2.3. Financial advantage

5.2.4. Total advantage

5.3. Method of financing

Summary

Self – Test exercise

Objectives of the Chapter

After completing this unit, students should be able to:

- ✓ Be introduced about basic principles of capital structure,
- ✓ Know theories of capital structure,
- ✓ Identify factors in capital structure theories,
- ✓ Understand the basic concepts of leverage
- ✓ Know the classification of leverage

- ✓ Apply leverage analysis to decide on different financing sources and financial plans

5.1. The concept of capital structure

Two parties are involved in a financial asset under normal circumstances. One is the party issuing the financial asset. Another is the one that buys or invests on the financial asset. While discussing about valuation, the emphasis was from the investor side. That is, how much is the maximum price the investor would pay for the financial asset? To decide on this, the investor would discount the expected future cash flows. The discounting is done based on the investor's required rate of return.

Some other party should definitely provide the rate of return required by the investor. The party, which should provide the investor its required rate of return, is the issuing party. For example, if the required rate of return by an investor on a given bond is 8%, the issuing company should provide this 8% to the investor. This required rate of return that should be met by the issuing company becomes **its cost**. This is a cost on the capital the issuing company wants to raise.

Therefore, the required rate of return on investments in financial assets by the investor is the **cost of capital** for the company issued the financial assets. But, generally, the cost of capital for the issuing company is higher than the required rate of return by the investor. This is because when the issuing company issues a financial asset, it may incur some costs. These costs incurred by the issuer in relation to issuance of financial assets are called **flotation costs**. Examples include advertising costs, commissions paid to those selling the financial assets, cost of printing documents, costs of registration with government agencies, discounts to encourage the sale of securities, and so on.

The management of an enterprise has the responsibility to maximize the wealth of shareholders and minimize the cost of capital. Whether it is own capital or borrowed one, capital has costs. The financial manager has to design the capital structure in such a way that the composition of capital should minimize the cost and maximize the value of company's shares. So as to achieve this objective, every company has to define the proportion of various components of sources of finances, which is known as capital structure. Capital structure is a mix or composition of common stock, preference and bond capital, which gives highest return to shareholders and

keeps the cost of capital at low level. The mix of these components where the profit is optimal is known as **optimal capital structure**.

The capital can be financed through

- ✓ common shares,
- ✓ common shares and preference shares,
- ✓ debts,
- ✓ common shares, preference shares and debts

Capital structure is concerned with the choice to make amongst the above components.

Theories of Capital Structure

The major capital structure theory can be categorized under the

1. Net income approach
2. Net operating income approach
3. Miller- Modigliani Approach
4. The traditional approach

1. The Net Income Approach

According to the net income approach, the capital structure decision is relevant to the valuation of a firm. In other words, a change in the financial leverage will lead to the corresponding change in the cost of capital as well as the value of the firm. If, therefore the degree of financial leverage as measured by the ratio of debt to equity is increased, the weighted average cost of capital will decline, though the value of the firm as well as the market value of the ordinary shares will increase. Conversely, a decrease in the leverage will cause an increase in the overall cost of capital and a decline both in the value of a firm as well as the market price of equity shares.

The net income approach is based on three assumptions:

- ✓ There is no tax
- ✓ The cost of debt is less than the equity-capitalization rate or the cost of equity
- ✓ The value of debt does not change the risk perception of investors

The implication of the three assumptions underlying the net income approach is that as degree of leverage increases, the proportion of cheaper source of funds, that is, debt in the capital structure increases. As a result the weighted average of capital tends to decline, leading to an increase in the value of the firm. Thus the cost of debt and cost of equity being constant, the increased use of debt (increase in leverage), will magnify the shareholders' earnings, thereby, the market value of the ordinary shares.

The financial leverage is, according to the net income approach, an important variable to the capital structure of a firm. With a judicious mixture of debt and equity, a firm can evolve an optimal capital structure; the structure at which the value of the firm is the highest and the overall cost is the lowest.

If the firm uses no debt or if the financial leverage is zero, the overall cost of capital will be equal to the equity-capitalization rate. The weighted average cost of capital will decline and approach the cost of debt as the degree of leverage reaches one.

2. The Net Operating Income Approach

This approach is diametrically opposite to the net income approach. The essence of this approach is that the capital structure decision of a firm is irrelevant. Any change in leverage will not lead to any change in the total value of the firm and the market price of shares. According to this approach, the overall cost of capital is independent of the degree of leverage.

The approach is based on the following assumptions:

- a. **Overall cost of capital or capitalization rate is constant:** The net operating income approach argues that the overall capitalization rate of the firm remains constant. It is the market to evaluate the firm as a whole. The split of capitalization between debt and equity is no significant.
 - b. **Residual value of Equity:** The value of equity is a residual value which is determined by deducting the total value of debt from the value of the firm.
- 3. Change in the cost of equity capital:** The cost of equity-capitalization rate or cost of equity capital increases with degree of leverage. The increase in the proportion of debt in the capital structure relative to equity shares would lead to an increase in the financial risk to the ordinary shareholders. To compensate the increased risk, the shareholders would

expect a higher rate of return on their investment. The increase in the capitalization rate would match the increase in the debt –equity ratio.

4. **Cost of Debt:** The cost of debt has two parts; i) **Explicit cost** represented by the rate of interest irrespective of the degree leverage, the firm is assumed to be able to borrow at a given rate of interest. This implies that the increase in the proportion of debt in the financial structure does not affect the financial risk of lenders and they do not penalize the firm by charging higher interest; and ii) **implicit or hidden cost**. As shown in the assumption relating to the changes in the cost of equity capital, increase in the degree of leverage or the proportion of debt to equity causes an increase in the cost of equity capital. This increase in the cost of equity capital, being attributable to the increase in debt, is the implicit part of the cost of debt.

Thus, the advantage associated with the use of debt, supposed to be a cheaper source of funds in terms of the explicit cost, is exactly neutralized by the implicit cost represented the increase in the cost of equity capital. As a result, **the real cost of debt and the real cost of equity**, according to the net of operating income approach, are the same and equal to the overall cost of capital

5. **Optimum capital structure:** The total value of the firm is not affected by its capital structure. No matter what the degree of leverage is, the total value of the firm remains constant. The market price of shares will also not change with the change in the debt – equity ratio. There is nothing such as an optimum capital structure. Any capital structure is optimum, according to the net operating income approach.
6. **Market price of shares:** There is no change in the market price per share due to change in leverage.

3) Miller- Modigliani (MM) Approach

The MM thesis relating to the relationship between the capital structure, the cost of capital and valuation is akin to the Net operating Income Approach. The net operating approach as explained above is definitional or conceptual and lacks behavioral significance. The net operating income approach in other words, does not provide operational justification for the irrelevance of the capital structure. The MM approach supports the relating to the independence of the cost of capital of the degree of the leverage at any level of debt-equity

ratio. The significance of their hypothesis lies in the fact that it provides behavioral justification for constant overall cost of capital and, therefore, the total value of the firm. In other words, the MM approach maintains that the weighted average cost of capital does not change with change in proportion of debt to equity in the capital structure. They offer operational justification for this and are not content with merely stating the proposition.

There are three propositions of the MM approach:

- ✓ The overall cost of capital and the value of the firm are independent of its capital structure
- ✓ The cost of equity capital is equal to the capitalization rate of a pure equity stream plus a premium for financial risk.
- ✓ The cut-off rate for investment purpose is completely independent of the way in which an investment is financed.

Moreover, the MM approach assumes the following assumption particularly for the first proposition.

- a. Perfect capital market
- b. All investors have the same expectation of firm's net operating income with which to evaluate the value of a firm.
- c. Business risk is equal among all firms within similar operating environment. That means all firms can be divided into equivalent risk class or homogenous risk class. The homogeneity risk class implies that the expected earnings have identical risk characteristics.
- d. The dividend payout ratio is 100 percent.
- e. There are no taxes.

4) Traditional Approach

The traditional approach is midway between the net income and net operating income approaches. It partakes of some features of both these approaches. It is known as the intermediate approach. It resembles the net income approach in arguing that cost of capital and total value of a firm are not independent of the capital structure. But it does not subscribe to the view that value of a firm will necessarily increase for all degrees of leverage. In one respect it shares a feature with net operating income approach is that beyond a certain degree of

leverage, the overall cost increases leading to a decrease in the total value of the firm. But it differs from the net operating approach in that it does not argue that the weighted average cost of capital is constant for all degree of leverage.

The crux of the traditional argument is that with a sensible use of debt-equity proportions, a firm can increase its total value and thereby reduce its overall cost of capital. The rationale behind this view is that debt is relatively cheaper source funds as compared to ordinary shares.

Factors in Capital Structure Decisions

Theoretically one can speak of an optimal capital structure, but in practice, it is very difficult to design one. There are significant variations among industries as also individual companies within the same industry in respect of capital structure. This is so because there are a host of factors. These factors are highly complex cannot fit entirely into a theoretical framework. From the operational view point what should be attempted is an **appropriate** capital structure, given the facts in a particular case.

Firms generally should consider the following factors which influence capital structure decisions.

Sales stability: A firm whose sales are relatively stable can safely take more debt and incur higher fixed charges than a company with unstable sales.

Asset structure: Firms whose assets are suitable as security for loans tend to use rather heavily. General purpose assets which can be used by many businesses make good collateral, whereas special-purpose assets do not. Thus, real state companies are usually highly leveraged, whereas companies involved in technological research employ less debt.

Operating leverage: Other things the same, a firm with less operating leverage is better able to employ financial leverage because, as we saw, the interaction of operating and financial leverage determines the overall effect of a decline in sales on operating income and net cash flow.

Growth rate: Other things assumed to be the same, faster-growing firms must rely more heavily on external capital.

Profitability: One often observes that firms with very high rates of return on investment use relatively little debt. Although there is no theoretical justification

for this fact, one practical explanation is that very profitable firms simply do not need to do much debt financing. Their higher rates of return enable them to do most of their financing with retained earnings.

Taxes: Interest is a deductible expense, and deductions are most valuable to firms with high tax rates. Hence, the higher a firm's corporate tax, the greater the advantage of debt.

Control: The effect of debt versus stock on management's control position can influence capital structure. If management currently has voting control (over 50 percent of the stock), but is not in a position to buy any more stock, it may choose debt for new financing. On the other hand, management may decide to use equity if the firm's financial situation is so weak that the use of debt might subject it to serious risk of default because, if the firm goes into default, the managers will almost surely lose their jobs.

Management attitudes: Since no one can provide that one capital structure will lead to higher stock prices than another will, management can exercise its own judgment about the proper capital structure. Some management tends to be more conservative than others, and thus use less debt than the average firm in their industry, whereas aggressive management use more debt in the quest for higher profits.

Lender and rating agency attitude: Regardless of managers own analyses of this proper leverage factors for their firms, lenders and rating agencies attitudes frequently influence financial structure decisions. In the majority of the cases, the corporation discusses its capital structure with lenders and rating agencies and gives much weight to their advice.

Market conditions: Conditions in the stock and bond market undergo both long and short-run changes that can have an important bearing on a firm's optimal capital structure.

The firm's internal conditions: A firm's own internal condition can also have a bearing on its target capital structure.

Financial flexibility: Maintaining financial flexibility, which from an operational view point, means maintaining adequate reserve borrowing capacity. Determining an "adequate" reserve borrowing capacity is judgmental, but it clearly depends on the factors mentioned previously

in the unit, including the firm forecasted need for funds, predicted capital market conditions, management's confidence in its forecasts, and the consequences on a capital shortage

QUICK CHECK

What the difference between net income and net operating income approaches?

Sales stability and profitability affect capital structure decision. Explain

5.2.Leverage

The dictionary definition of leverage is “an increased means of accomplishing some purpose”. For example, leverage helps to lifting heavy objects, which may not be otherwise possible. It can also be defined as the measure of relationships between two variables whereby the change in one variable results in a change in another variable. The affecting variable is an independent variable while the affected variable is the dependent one.

According to this definition leverage can rewritten as:

$$\text{Leverage} = \frac{\text{Percentage in dependent variable}}{\text{Percentage change in the independent variable}}$$

In finance, leverage is used to describe the ability of fixed cost (i.e., both fixed operating costs and fixed financing costs) to magnify returns to owners. For example, change in sales (independent variable) is to magnify a change in returns (dependent variable).

Before you directly rush to the major classification of leverage, try to familiarize yourself with the elements for the measurement of leverage. These elements, in one way or another, are the components of leverage.

Total Sale Revenue	PQ
Less: Variable operating costs	VQ
Fixed operating costs	F
Equals: EBIT	Q (P-V)-F
Less Interest Payment on debt	I

Equals: EBT	EBIT – I
Less Income taxes	(EBIT – I) (t)
Equals: Profit after taxes (Net Income)	(EBIT – I) (1 – t)
Less: Preferred stock dividends	D _p
Equals: Earnings available to common stockholders	(EBIT – I) (1 – t) – D _p
Number of common shares Outstanding	N
Equals: EPS	$\frac{(EBIT - I)(1 - t) - D_p}{N}$

It is shown in the above box that EBIT is total sales revenue deducted by total variable operating costs and fixed operating costs. That is

$$EBIT = PQ - VQ - F$$

$EBIT = Q(P - V) - F$ Shows that EBIT depends upon the number of units produced and sold.

$$EPS = \frac{(EBIT - I)(1 - t) - D_p}{N} \quad \text{Shows EPS depends upon the level of EBIT}$$

$$EPS = \frac{[Q(P - V) - F - I](1 - t) - D_p}{N} \quad \text{Shows EPS depends upon the number of units produced and sold}$$

Where: Q is quantity of items sold

P is selling price per unit of items

V is variable cost per unit of items

EBIT is earnings before interest and tax or operating profit

EBT is earning before tax

t is the tax rate

EPS is earning per share.

5.2.1. Operating leverage and its breakeven point

Operating leverage results from the existence of fixed operating expenses in the firm's income stream. Operating costs of a firm may be under the category of fixed, variable or semi-fixed/variable costs. The fixed costs are those costs which do not change with change in volume of production or volume of sales. They are a function of time and are typically contractual. They must be paid regardless of the amount of revenue available. Variable costs, on the contrary, are varying with change in volume of production or volume of sales. Costs which are partly fixed and partly variable are semi-fixed or semi-variable costs. They are fixed over a certain range of sales and increase to higher levels for higher sales or production volume.

The operating leverage may be defined as the firm's ability to use fixed operating costs to magnify the effect of changes in sales on its earnings before interest and taxes. Operating leverage occurs any time the firm has fixed operating costs. In other words, operating leverage is the presence of fixed operating costs in the firm's cost structure. Firms employ assets with fixed costs in the hope that sales volume will result in revenue more than sufficient to cover all fixed and variable costs. It is to imply that for a firm with fixed costs, the percentage change in profits as a result of a change in sales volume is greater than the percentage change in the volume of sale. It is this effect that you can call operating leverage.

Furthermore, you can explain operating leverage as a measure of relationship between output or sales volume and EBIT. Specifically, it measures the effect of changing levels of output or sales volume on EBIT. The relationship can be depicted as:

EBIT = <i>function</i> (Quantity), with Components of operating leverage as:
--

Sales Revenue (PQ)

Less: Variable Operating Costs (VQ)

Less: <u>Fixed operating Costs (F)</u>
--

EBIT = Operating profits

For illustrative purpose assume that GYB Trading sells merchandizing items for Br. 200 per unit. The variable cost per unit is Br.100. The firm's annual fixed cost is Br. 100,000. It is observed that the current level of sales volume is 4,000 units. Assume further that the firm's sales volume (a) decreases to 3,000 units and (b) increases to 5,000 units. Show the various EBIT levels and observe the change in EBIT for the changes in volume of sale; take 4,000 units as base level of sales.

EBIT for Various Levels of Sales

	(a)	Base	(b)
	-25%*		+25% [^]
Sales in unit	3,000	4,000	5,000
Sales Revenue	Br.60,000	Br.80,000	Br.100,000
Less Variable operating cost	<u>30,000</u>	<u>40,000</u>	<u>50,000</u>
Contribution margin	Br.30,000	Br. 40,000	Br. 50,000
Less Fixed operating cost	<u>30,000</u>	<u>30,000</u>	<u>30,000</u>
EBIT (Operating profit)	<u>0</u>	<u>Br.10,000</u>	<u>Br.20,000</u>
	-100%#		+100% [@]

*, [^], #, [@]The computation is done as follows:

$$* \frac{Q_a - Q_{base}}{Q_{base}} \times 100\% = \frac{3000 - 4000}{4000} \times 100\% = -25\%$$

$$^{\wedge} \frac{Q_b - Q_{base}}{Q_{base}} \times 100\% = \frac{5000 - 4000}{4000} \times 100\% = +25\%$$

$$\# \frac{EBIT_a - EBIT_{base}}{EBIT_{base}} \times 100\% = \frac{0 - 10,000}{10,000} \times 100\% = -100\%$$

$$@ \frac{EBIT_b - EBIT_{base}}{EBIT_{base}} \times 100\% = \frac{20,000 - 10,000}{10,000} \times 100\% = +100\%$$

From the above computations, you can observe that

1. In case (a), a 25 per cent decrease in sales volume (i.e., from 4,000 units to 3,000 units) results in a 100 per cent decrease in EBIT (i.e., from 10,000 to zero)
2. In case (b), a 25 per cent increase in sales volume (i.e., from 4,000 units to 5,000 units) results in a 100 per cent increase in EBIT (i.e., from Br.10,000 to Br.20,000)
3. The illustration clearly shows that when a firm has fixed operating costs, an increase in sales volume results in more than a proportionate increase in EBIT. Similarly, a decrease in the level of sales has the same but opposite effect. It is such effects that you can call operating leverage. The increasing effect is to be considered as favorable while the opposite is unfavorable for firms.

Degree of Operating Leverage

The above illustration does not tell the extent of magnification or the fulcrum of change in one variable as a result of change in the other. It simply shows that there exists an operating leverage because the change is not of the same proportion. The degree of operating leverage (DOL) measures in quantitative terms the extent or the degree of magnification in the dependent variable (EBIT) as a result of change in the independent variable (Sales volume).

$$\begin{aligned} \text{DOL} &= \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}} = \frac{\Delta \text{EBIT} / \text{EBIT}}{\Delta \text{Sales} / \text{Sales}} \\ \text{Or} \\ \text{DOL} &= \frac{\text{Percentage change in EBIT}}{\text{Percentage change Quantity}} = \frac{\Delta \text{EBIT} / \text{EBIT}}{\Delta Q / Q} \end{aligned}$$

Use the illustration above to calculate the DOL for case (a) quantity level

Using total sales

$$\begin{aligned} \frac{\text{EBIT}_a - \text{EBIT}_{\text{base}}}{\text{EBIT}_{\text{base}}} \times 100\% &= \frac{0 - 10,000}{10,000} \times 100\% = \frac{-100\%}{-25\%} = 4 \\ \frac{\text{Sales}_a - \text{Sales}_{\text{base}}}{\text{Sales}_{\text{base}}} &= \frac{60,000 - 80,000}{80,000} \end{aligned}$$

Or using quantity sold

$$\frac{\text{EBIT}_a - \text{EBIT}_{\text{base}}}{\text{EBIT}_{\text{base}}} \times 100\% = \frac{0 - 10,000}{10,000} \times 100\% = -100\% = -25\% = 4$$

$$\frac{Q_a - Q_{\text{base}}}{Q_{\text{base}}} = \frac{3000 - 4000}{4000}$$

A more direct formula for calculating the DOL at the base level “Q” is the concept of contribution margin at base level of EBIT as shown below.

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F} = \frac{\text{Contribution margin at base level of quantity}}{\text{EBIT at base level}}$$

The above formula is derived from the following steps and computation.

It is indicated that $\text{EBIT} = PQ - VQ - F$ which can be rewritten as:

$$\text{EBIT} = Q(P - V) - F$$

The change in EBIT is $\text{EBIT} = \Delta Q(P - V)$ Selling Price, Variable cost and Fixed cost don't change and the fixed cost is cancelled at the time of subtraction. Hence, the percentage change is:

$$\frac{\Delta \text{EBIT}}{\text{EBIT}} = \frac{\Delta Q(P - V)}{Q(P - V) - F}$$

$$\text{EBIT} = Q(P - V) - F$$

Moreover, it is known that DOL in terms of change in units or Q is:

$$\frac{\Delta \text{EBIT} \div \text{EBIT}}{\Delta Q \div Q} = \frac{\Delta Q(P - V) \div (Q(P - V) - F)}{(\Delta Q \div Q)}$$

$$\Delta Q \div Q = (\Delta Q \div Q)$$

$$= \frac{\Delta Q(P - V)}{Q(P - V) - F} \times Q$$

$$= \frac{Q[\Delta Q(P - V)]}{\Delta Q[Q(P - V) - F]}$$

$$\Delta Q[Q(P - V) - F]$$

$$= \frac{Q(P - V)}{Q(P - V) - F} = \frac{\text{Contribution margin at base level}}{\text{EBIT at base level}}$$

As an illustration use the calculated contribution margin and EBIT for the quantity level of 4,000 units above.

$$\text{Contribution at base level} = \frac{\text{Br. 40,000}}{4} = 4$$

$$\text{EBIT at base level} = \frac{\text{Br. 10,000}}{10,000}$$

The result is the same as it is computed in the illustration for DOL above.

Each 1 percent change in sales volume results in 4 percent change in EBIT. It may also imply that a 6 percent increase in sales produces a 24 percent increase in EBIT.

When total sales in birr instead of in units are available the above formula can be used at base birr sales as shown below

$$\text{DOL at base birr sales level} = \frac{\text{TR} - \text{TVC}}{\text{TR} - \text{TVC} - \text{F}}$$

Where: TR is total revenue
TVC is total variable cost
F is total fixed cost

Illustration: If the only available data is total sales of Br. 80,000, total variable cost of Br. 40,000 and total fixed cost of Br. 30,000, the DOL is:

$$\text{DOL} = \frac{\text{Br. 80,000} - \text{Br. 40,000}}{\text{Br. 80,000} - \text{Br. 40,000} - 30,000} = \frac{\text{Br. 40,000}}{10,000} = 4$$

Operating leverage exists only when there are operating fixed costs. If there are no fixed operating costs, there is no operating leverage. For example, a firm has 1,000 units sold at the current level. The selling price is Br.10 per unit; the variable cost per unit is Br.6. The firm does not have any fixed cost. Assume further that a firm has made a new sales level of 1,100 units with the same selling price and variable cost per unit.

EBIT at the two levels of sales is shown as follows.

	Base level	New level
Sales revenue	Br. 10,000	Br.11,000
Less variable cost	<u>6,000</u>	<u>6,600</u>
Contribution margin	Br.4000	Br.4400
Less fixed cost	<u>-</u>	<u>-</u>
EBIT	<u>Br.4000</u>	<u>Br.4000</u>

Using equation $DOL = \frac{\Delta EBIT / EBIT}{\Delta Q / Q}$

$$= \frac{(4,400 - 4,000) / 4000}{(11,000 - 10,000) / 10,000} = \frac{400 / 4000}{1000 / 10,000} = \frac{0.1}{0.1} = 1$$

When the DOL is equal to one, there is no operating leverage. For the existence of operating leverage, DOL should be different from one.



Quick Check

Define the following terms.

Contribution margin

EBIT

Operating leverage

Break Even Analysis and Properties of Operating Leverage

The operating breakeven point is the level of sales where neither operating profits nor operating losses are incurred by the firm. It is sales equal to fixed costs and variable costs. At this level of sales EBIT or operating profit is zero.

Breakeven point at quantity 'Q' can be calculated as:

$$Q = \frac{F}{(P - V)}$$

Where: Q is quantity at break even

F is the fixed cost

P is the selling price per unit of item

V is the variable cost per unit of item

Degree of operating leverage changes when measured at different base sales levels. That is there is a unique DOL for each level of output with the presence of fixed operating costs.

Degree of operating leverage is negative below and positive above the operating breakeven point. A positive degree of operating leverage indicates a percentage increase in EBIT that occurs from a 1 percent increase in output. A negative degree of operating leverage indicates the percentage decrease in operating losses that result from a 1 percent increase in output.

Degree of operating leverage is undefined at the operating breakeven point. For extreme cases where fixed costs equal zero, the degree of operating leverage equals one for all level of output greater than zero.

Management is able to influence its operating leverage by determining the composition of its assets. For example, the use of labor-saving machines will increase DOL because it results in: high fixed operating cost such as depreciation and low variable operating costs such as direct labor cost. This implies that firms can alter the DOL by changing the relationship between fixed and variable operating costs. The DOL is affected by the cost structure of the firm.

The greater the likelihood of high sales, the more attractive will be the shift to a higher DOL method of production; that is higher fixed operating costs with lower variable operating costs.

As sales increases, the EBIT of a firm with higher operating leverage increases more rapidly than the EBIT of a firm with lower operating leverage. Conversely, as sales decreases, a firm with higher operating leverage will have larger operating losses or smaller EBIT than a firm with lower operating leverage.

Business or Operating Risk

This is the risk of being unable to cover fixed operating costs. It refers to the uncertainty or variability of the firm's EBIT. A firm with a highly unpredictable EBIT has high business risk while a firm with a highly predictable EBIT has low business risk.

A higher degree of operating leverage means larger EBIT if sales are great; and large operating losses if sales are depressed. Therefore, it is true that the greater is the DOL, the more sensitive is EBIT to a given change in unit sales. Everything else being equal, a higher degree of operating leverage may imply a higher business risk.

Factors influencing the uncertainty of EBIT include uncertainties or variations in sales volume, selling price, variable cost, and level of fixed cost relative to sales.

Generally, the higher the variability of each of these factors, the higher the business risk. The business risk may result in a probability that a firm will go out of business because it may be unable to earn a positive level of EBIT.

5.2.2. Financial leverage and its breakeven point

As it is discussed in the introduction section of the course, one of the broad decisions for a financial manager is financing decision. The financing decision is all about the financing mix which technical is termed as capital structure.

Sources of financing can be categorized as those with fixed financing costs and those with no fixed financing charges. Long term debt and preference share are financing sources with fixed financing costs. Long term debts such as bonds and debentures are fixed rate of interest which is contractual obligation for the firm. Although dividend on preference share is not a contractual obligation, it is a fixed charge and must be paid before anything is paid to the ordinary shareholders. The equity shareholders, though sources of finance are entitled to the remaining profit of the firm after all the obligations are met.

Financial leverage is caused by the presence of fixed financing costs such as interest payment and preferred stock dividends in the firms cost structure. When a firm incurs fixed financing costs, a change in EBIT is magnified into a larger change in EPS. Since fixed financing costs are contractual obligations that a firm undertakes in financing its operations, using funds with a fixed cost in operations results in financial leverage. Hence, financial leverage is determined by how a firm finances its assets. A firm with no fixed financing costs has no financial leverage. Financial leverage measures the relationship between EBIT and EPS and specifically reflects the effects of changing levels of EBIT on EPS. The relationship can be depicted as:

EPS = *function* (EBIT), with the following components

Operating profits (EBIT)

Less: Interest expense (fixed financing cost) (I)

Equals: Earning Before Taxes (EBT)

Less: Income taxes (T)

Equals: Net Income (EAT or NI)

Less: Preferred Stock Dividend (fixed financing cost) (Dp)

Equals: Earnings available to common stockholders (EAC)

Divided by: Number of common shares outstanding (N)

Equals: Earning Per share (EPS)

To illustrate, assume GYB Trading above has 5 percent bonds aggregating Br.40,000 and a 10 per cent preference shares of total balance of Br.20,000. The firm is under a 10 per cent tax bracket and has 10,000 numbers of ordinary shares outstanding. The earning per share (EPS) for the base EBIT and case (b) can be computed as follows. Observe the magnification effect and presence of the financing leverage.

	Base	(b) +100% [@]
EBIT (Operating profit)	Br.10,000	Br. 20,000
Less interest on bonds	<u>2,000</u>	<u>2,000</u>
Earning before taxes	Br. 8,000	Br. 18,000
Less Taxes (10%)	<u>800</u>	<u>1,800</u>
Earning after taxes	Br. 7,200	Br.16, 200
Less preference dividend	<u>2,000</u>	<u>2,000</u>
Earning available for common shareholders (i)	Br. 5,200	Br. 14,200
Number of shares outstanding (ii)	10,000	10,000
Earning per share (EPS) (i)/ (ii)	<u>0.52</u>	<u>1.42</u>
		+173% ^{\$}

$$^{\textcircled{a}} \frac{\text{EBIT}_b - \text{EBIT}_{\text{base}}}{\text{EBIT}_{\text{base}}} \times 100\% = \frac{20,000 - 10,000}{10,000} \times 100\% = +100\%$$

$$^{\textcircled{s}} \frac{\text{EPS}_b - \text{EPS}_{\text{base}}}{\text{EPS}_{\text{base}}} \times 100\% = \frac{1.42 - 0.52}{0.52} \times 100\% = +173\%$$

Observation a 100 percent increase in EBIT, from Br.10, 000 to Br. 20,000 results in 173 percent increase in EPS which is from 0.52 to 1.42. There is financing leverage because the percentage change in EPS is more than a proportionate change in EBIT.

Degree of Financial Leverage

The above computation on financial leverage is to show the presence or absence of the leverage. Financial leverage can be more precisely expressed in terms of the degree of financial leverage (DFL). The degree of financial Leverage (DFL), also called the coefficient of financial leverage is the percentage change in EPS that result from a given percentage change in EBIT.

$$\text{DFL} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}} = \frac{\Delta \text{EPS}/\text{EPS}}{\Delta \text{EBIT}/\text{EBIT}}$$

Where, ΔEPS = Change in EPS (i.e., $\text{EPS}_b - \text{EPS}_{\text{base}}$)

ΔEBIT = Change in EBIT (i.e., $\text{EBIT}_b - \text{EBIT}_{\text{base}}$)

The degree of financing for GYB Trading is:

$$\text{DFL} = \frac{\frac{\text{EPS}_b - \text{EPS}_{\text{base}}}{\text{EPS}_{\text{base}}}}{\frac{\text{EBIT}_b - \text{EBIT}_{\text{base}}}{\text{EBIT}_{\text{base}}}} = \frac{\frac{1.42 - 0.52}{0.52}}{\frac{20,000 - 10,000}{10,000}} = 1.73$$

Each 1 percent change in EBIT results in 1.73 percent change in EPS. A 10 percent change in EBIT results in 17.3 percent change in EPS.

Furthermore, you can develop a more direct formula for calculating DFL at base level of EBIT as follows:

$$\text{DFL} = \frac{\text{EBIT at base level}}{\text{EBIT} - \text{Fixed financing Costs}} = \frac{\text{EBIT}}{\text{EBIT} - I - \frac{D_p}{1-t}}$$

For GYB Trading the DFL with the use of the EBIT at base level can be computed as follows:

$$\text{DFL} = \frac{10,000}{10,000 - 2000 - \frac{2000}{(1 - 0.10)}} = 1.73$$

Financial leverage breakeven point and Its Properties

Financial breakeven is the value of EBIT that makes EPS equal to zero. At financial breakeven, the firm's EBIT is just sufficient to cover fixed financing costs on a before tax basis leaving no earnings for common shareholders. Refer back to a box in the section concepts of leverage above that EPS can be depicted as:

$$EPS = \frac{(EBIT - I)(1 - t) - DP}{N}$$

Therefore, you can arrive at a formula to calculate the breakeven level of EBIT as follows:

$$\begin{aligned} \text{At financial breakeven, EPS is zero. Thus, } \frac{(EBIT - I)(1 - t) - DP}{N} &= 0 \\ (EBIT - I)(1 - t) - DP &= 0 \\ (EBIT - I)(1 - t) &= DP \\ EBIT - I &= \frac{DP}{1 - t} \\ EBIT &= I + \frac{DP}{1 - t} \end{aligned}$$

Below the financial breakeven amount of EBIT, profits available to common shareholders and EPS are both negative. Above the financial breakeven amount of EBIT, the firm produces a positive level of earnings available to common shareholders and a positive EPS.

But be aware that it is possible for a firm to earn a positive level of EBIT even though its EPS is negative. This happens when the firm's EBIT is positive but less than its financial breakeven level.

For GYB Trading the breakeven level of EBIT is:

$$EBIT = 2,000 + \frac{2,000}{1 - 0.1} = 2,000 + \frac{2,000}{0.9} = 2,000 + 2,222 = 4,222$$

Properties of Financial Leverage

Like that of the operating leverage, degree of financial leverage has its peculiar characteristics.

1. Degree of financial leverage changes when measured at different base of EBIT levels with the existence of fixed financing costs.

2. Degree of financial leverage is undefined at financial breakeven.
3. Degree of financial leverage is positive for a value of EBIT that is greater than financial breakeven.
4. Degree of financial leverage is negative for a value of EBIT that is below financial breakeven.
5. In a special case where fixed financing costs equal zero, DFL equals one for all values of EBIT greater than zero.

Firms may alter the degree of financial leverage by changing the mix of permanent sources of capital. For instance, increasing the proportion of debt and preferred stock dividend in a firm's capital structure also increases its fixed financing costs. This change in capital structure increases the firm's DFL which results in: i) a large increase in EPS when EBIT is high, and ii) a large decrease in EPS when EBIT is low.

Financial Risk

Financial risk is the risk of being unable to cover fixed financing costs. A substantially unpredictable earning per share indicates high financial risk while highly predictable earning per share indicates low financial risk. Other things being equal, the greater the degree of financial leverage the greater is the degree of financial risk. Moreover, the firm's degree of financial risk changes whenever the firm changes its fixed financing costs.

Increasing the financial breakeven increases a firm's degree of financial risk and decreasing the firm's financial breakeven decreases the degree of financial risk.



Quick Check

1. How do you define operating risk?
2. Define operating breakeven and financing breakeven.
3. State the components of financing leverage.

5.2.3. Total/combined Leverage

Most firms make use of both the operating and financial leverages. Since they are using the two kinds of leverages, it is useful to understand the combined effect. The combined leverage is a combination of operating and financial leverage and measures of the relationship between output

or sales and earnings per share. It is the variability of earning per share for a given change in sales amount or in quantity sold.

$$\text{EPS} = \text{function} (Q)$$

Combined leverage measures total leverage due to both fixed operating costs and fixed financing costs. The sum total of the components of operating leverage and financial leverage are the components of combined leverage.

Degree of combined Leverage

The degree of combined leverage (DCL) also called the coefficient of combined leverage is the percentage change in EPS that results from a given percentage change in sales or output.

$$\text{Degree of combined leverage (DCL)} = \frac{\% \text{ Change in EPS}}{\% \text{ Change in Sales}}$$

Or

$$\text{Degree of combined leverage (DCL)} = \text{DOL} \times \text{DFL}$$

Or

$$\text{Degree of combined leverage (DCL)} = \frac{(\Delta \text{EPS} / \text{EPS})}{(\Delta \text{Sales} / \text{Sales})}$$

$$\text{Or} \quad \text{DCL} = \text{DOL} \times \text{DFL}$$

Or

$$\begin{aligned} \text{DCL} &= \frac{Q(P-V)}{Q(P-V) - F - I - \frac{DP}{1-t}} \\ &= \frac{\text{Contribution Margin at base level}}{\text{EBIT} - I - \frac{Dp}{1-t}} \end{aligned}$$

Degree of combined leverage for GYB Trading is:

$$\text{DCL} = \text{DOL} \times \text{DFL} = 4 \times 1.73 = 6.92$$

Each 1 percent change in sales volume results in 6.92 percent change in EPS.

Properties of Combined Leverage and the Breakeven Analysis

1. At the overall breakeven level of output, the amount of earning per share equals zero.
2. Degree of combined leverage is undefined at the overall breakeven level of output
3. DCL is positive above and negative below the overall breakeven level of output.

4. In the special case where fixed financing and operating costs are all zero, DCL is equal to 1 for all levels of output greater than zero.

Overall Risk or Ultimate Risk

Overall risk is the variability or uncertainty of EPS resulting from both business and financial risk. It is the risk of being unable to cover total costs. A firm's risk is affected by its level of fixed operating and fixed financing costs. As fixed costs rise, the risk associated with covering these costs also increases. The ultimate risk of being unable to meet these costs is bankruptcy. As a firm's overall risk increases, investors require higher rate of return to compensate for the higher risk. Thus, the cost of debt and preferred stock increases as risk increases, which tend to offset the gains achieved from using leverage.

Overall risk is the possibility that: i) a firm will go out of business, ii) a firm's shareholders' investment will become worthless, and iii) a firm's share price will go to zero.

Other things being equal, the larger the DCL, the greater is the overall risk faced by the corporation and its shareholders

5.3. Method of financing

5.3.1. Debt financing

A. Long term debt financing

Sources of long-term debt include mortgages and bonds.

I. MORTGAGES

Mortgages represent notes payable that have as collateral real assets and require periodic payments. Mortgages can be issued to finance the acquisition of assets, construction of plant, and modernization of facilities. The bank will require that the value of the property exceed the mortgage on that property.

Most mortgage loans are for between 70 percent and **90** percent of the value of the collateral. Mortgages may be obtained from a bank, life insurance Company, or other financial institution. It is easier to obtain mortgage loans for multiple-use real assets than for single-use real assets.

There are two kinds of mortgages: a **senior** mortgage, which has first claim on assets and earnings, and a **junior** mortgage, which has a subordinate lien.

A mortgage may have a closed-end provision that prevents the firm from issuing additional debt of the same priority against the same property. If the mortgage is open-ended, the company can issue additional first-mortgage bonds against the property.

Mortgages have a number of advantages, including favorable interest rates, less financing restrictions, and extended maturity date for loan repayment.

II. BONDS PAYABLE

Long-term debt principally takes the form of bonds payable and loans payable. A bond is a certificate indicating that the company has borrowed a given **sum** of money that it agrees to repay at a future date. A written agreement, called an **indenture**, describes the features of the particular bond issue. The indenture is a contract between the company, the bondholder, and the trustee. The trustee makes sure that the company is meeting the terms of the bond contract. In many cases, the trustee is the trust department of a commercial bank.

Bond is a long term contract under which a borrower agrees to make payments of interest and principal on specific dates to the holder of the bond. And also bond is a long-term debt instrument or security issued by businesses and governmental units to raise large sums of money. Investment in a bond provides two types of cash flows.

- ✓ *The periodic interest payment by the issuing party and*
- ✓ *The price paid to the investor upon maturity*

The first, i.e., the interest payment is based on the par value of the bond and the coupon interest rate. The par value is the face value of the bond which will be paid to the investor upon maturity. Par value is also called maturity value.

In order to value a bond you must understand the following.

Par value: It is the amount or value stated on the face of the bond. It represent the amount of the firm borrows and promises to repay at the time of maturity. It can be any denomination.

Coupon Rate of Interest: A bond carries a specific interest rate, which is called the coupon rate. The interest payable to the bondholder is simply par value of bond multiplied by the coupon rate.

Maturity period: Every bond will have maturity period. On completion of the maturity period the principal amount has to be repaid as per the agreed terms while issuing such bonds call provision. Sometimes bonds may be issued under a provision that the business unit will have an option to pay back the bond amount before the maturity period. These are known as ***callable bonds***.

The intrinsic value of a bond is equal to the present value of its expected cash flows. The coupon interest payments and principal payments are known and the present value is determined by discounting these future payments from the issuer at an appropriate discount rate or market yield.

Investors have many choices when investing in Bonds, but bonds are classified into four main types: treasury, corporate, municipal, and foreign.

1. **Treasury Bonds:** sometimes referred to as government bonds, are issued by the federal government. It is reasonable to assume that the federal government will make good on its promised payments, so these bonds have no default risk. However, Treasury bond prices decline when interest rates rise, so they are not free of risks.
2. **Corporate Bonds:** as the name implies, are issued by corporations. Unlike Treasury bonds, corporate bonds are exposed to default risk- if the issuing company gets into trouble, it may be unable to make the promised interest and principal payments. Different corporate bonds have different levels of default risk, depending on the issuing company's characteristics and on the terms of the specific bond. Default risk is often referred to as "credit risk". The larger the default or the credit risk, the higher the interest rate the issuer must pay
3. **Municipal Bonds:** or state and local governments issue "munis,". Like corporate bonds, munis have default risk. However, munis offer one major advantage over all other bonds. The interest earned on most municipal bonds is exempted for federal taxes, and also from state taxes if the holder is the resident of the issuing state. Consequently, municipal bonds carry interest rates that are considerably lower than those on corporate bonds with the same default risk.
4. **Foreign Bonds:** are issued by foreign governments or foreign corporations. Foreign corporate bonds are, of course, exposed of default risk, and so are sometimes foreign

government bonds. An additional risk exists if the bonds are denominated in a currency other than that of the investor's home currency.

Advantages and Disadvantages of Long-Term Debt Financing

Advantages of Long-Term Debt Financing

From the issuing firm's perspective, the major advantages of long-term debt financing are as follows:

1. Debt is least costly source of long-term financing. It is the least costly because:
 - a. Interest on debt is tax-deductible,
 - b. Bondholders or creditors consider debt as a relatively less risky investment and require lower return.
2. Debt financing provides sufficient flexibility in the financial/capital structure of the company. Flexibility in capital structure of the company can be increased by inserting call provision in the bond indenture. In case of over capitalization, the company can redeem the debt to balance its capitalization.
3. Bondholders are creditors and have no interference in business operations because they are not entitled to vote
4. The company can enjoy tax saving on interest on debt.

Disadvantages of Long-Term Debt Financing

Long-term debt financing has some disadvantages from firm's viewpoint as follows:

1. Interest on debt is permanent burden to the company. Company has to pay the interest to bondholders or creditors at fixed rate whether it earns profit or not. It is legally liable to pay interest on debt.
2. Debt usually has a fixed maturity date. Therefore, the financial officer must make provision for repayment of debt.
3. Debt is the most risky source of long-term financing. Company must pay interest and principal at specified time. Non-payment of interest and principal on time take the company into bankruptcy.
4. Debenture indentures may contain restrictive covenants which may limit the company's operating flexibility in future.

5. Only large scale, creditworthy firm, whose assets are good for collateral can raise capital from long-term debt.

From the investor's point of view, in general, debt securities offer stable returns. Further, if the company is liquidated then debenture holders are paid before preferred stockholders and common stockholders. Bondholders are creditors, however, they do not participate in any increased earnings the firm may experience. Similarly, they do not get right to vote.

Short term financing

Meaning and nature of short-term financing:

Short Term financing is that form of financing which embraces borrowing or lending of funds for a short period of time. It refers to the finance obtained on short term basis, usually one year or less in duration. Short term finance is secured for financing the current assets, for example, inventories. Short term finance is also known as working capital which is the excess of current assets over current liabilities. Current liabilities become due within one year and indicate the amount of short-term credit being utilized by the business.

Practically all enterprises use the short-term credit as sources of finance. We find in the balance sheets of almost all the companies some kinds of current liabilities which are the indicator of the uses of short term finance in business. It has been found in the developed countries especially in USA that even the largest business establishment makes use of short term finance.

The size of business has an important bearing on the use of short term finance. There is variation in the use of short term finance between the large and small sized business establishments. In practically all types of business, there is lesser use of short term credit among larger concerns. The small concerns make more use of short term financing on account of lower average credit standing and impermanent nature of business.

Sources of Short Term Financing

1. **Trade Creditors:** Trade creditors are probably the most important single source of short term credit. Trade creditors are those business establishments which sell goods to others on credit. That is, they do not require payment on the spot; rather they are to be paid after some days from the date of sale.

2. **Customers Advances:** Customers often finance the seller through advance payment for the goods. The prices of the goods to be purchased are paid in advance, i.e. before the receipt of the goods. This practice is prevalent where the seller does not wish to sell goods without prepayment and the buyer also cannot purchase goods from other sources. The seller might require advance if the quantity of goods ordered is so large that he cannot afford to tie up more fund in raw materials or in good-in-process. Special type machine manufactures often demand advance payment in order to protect them from the loss caused by cancellation of contract at a time when the machine has been built up or is in work in process.
3. **Commercial Banks:** The commercial banks of a country generally supply funds to the business concerns on a short-term basis, either with security or without security if the customer is financially established. The banks, collecting scattered savings of the people, invest a portion of the deposits in the business for a short period of time.
4. **Finance Companies:** Finance companies usually lend money to business. They are specialized financial institutions and their primary function is to advance funds to the business
5. **Commercial Paper House:** They are specialized financial agencies and they are created to purchase promissory notes and to sell them, in turn, to other investors who desire to have some shot of short-term liquid assets. The firm having high credit standing can use this source for obtaining short-term funds.
6. **Personal Loan Companies:** These companies make small loans to individual generally for consumption purposes. The small business undertakings can procure fund from such companies
7. **Governmental Institutions:** There are some governmental and semi-governmental corporations which are authorized to advance short term funds to business concerns. Their importance is of course not so much less than other sources.
8. **Factors or Brokers:** In one basic respect, factoring is different from other forms of financing. In other forms funds are granted to one individual largely on the basis of his property. Factoring is based on a different philosophy. In considering a company's request for funds we are more interested in the men behind the company their ability, their hopes and aspirations for the future.

9. **Miscellaneous Sources:** There are many more sources from which can secure funds for short period. They are—friend and relatives, public deposits, loan from officer and the company directors and foreign exchange banks

Advantages of Short-Term Financing:

1. **Easier to Obtain:** Short –term credit can be more easily obtained than long term credit. A firm which poor credit standing may be unable to obtain long term funds but it can procure, at least some trade credit from sellers who are anxious to increase their sales. The short-term creditors, by granting loans, assume less risk than long term creditors because there is less chance of substantial change in the financial soundness of the creditor within a few week's or months' time.
2. **Lower cost:** Short term credit may be obtained with lower cost than the long term finance because of priority of creditors in general. Because of the prior position given creditors in the matter of claim to income and to assets in dissolution they generally will accept a relatively low interest.
3. **Flexibility:** Due to seasonal nature of business many firms have a temporary demand for short-term funds to carry heavier inventories. Most enterprises are in constant need of short term funds. Short-term financing is flexible in the sense that the firm is able to secure funds as they are needed and repay then as soon as the need vanishes. Funds may be needed to meet the daily, weekly or monthly requirements. Such funds can be advantageously supplied by short term credit. If long term credit is secured to finance the daily or weekly or seasonal variations, it would become inflexible because long term funds cannot be repaid as soon as the need for funds vanishes.
4. **No Sharing of control:** Obtaining funds from short term creditors prevents the inclusion of more owners through the procurement of owner's funds. This results in maintaining the position of control by the existing owners. Because the creditors have no voice in the operations of the business.
5. **Availability:** In many cases, particularly for small enterprises short term credit is the only source available. It may not be possible for a small firm to obtain long term funds because of poor credit standing. Long-term credit is not generally granted without adequate margin of protection which the small firms may not be able to provide with. The small business has then recourse to short term funds.

6. **Tax Savings:** The cost of short term funds are deductible for income tax purposes while the dividend paid to the owners is not deductible. Thus a substantial tax-savings may result from the use of short-term funds.
7. **Convenience:** Short Term credit can be more conveniently secured than the other types of funds. It is more convenient to pay labor weekly or employees monthly than every day
8. **Extension of credit:** Many enterprises purchase equipment's, supplies and good by ordering from a supplier with the intent of paying after delivery has been made. If subsequently the bills are met promptly, the firm acquires a good credit standing. Then , if any emergency arises for the purchase of any goods the firm

Disadvantages of Short-Term Financing:

1. **Frequent Maturity:** Short-Term credit is disadvantageous in the sense that it matures frequently. The principal must be repaid when due, otherwise the creditors may close the business. The use of such credit is also a risk to the owners' investment from the inability to meet the creditor's claims when due. There may be danger of either meeting the principal payment at maturity of the loan or meeting the principal payment at maturity of the loan or meeting any periodic interest payment or both. The shorter the credits the greater the potential risk to the owners because of the problem of prompter repayment.
2. **High Cost:** The rate of interest paid on short-term is usually higher than that on long-term credit is usually higher than that on long-term credit. The rate of interest usually depends on the risk involved, size of loan, collateral protection, etc. The lenders may demand a high interest if the credit involves large amount and the potential credit risk is also high or the debtor may not give suitable security. A high interest may also be demanded when the firm cannot procure funds from other sources on suitable terms and conditions.

Purpose/Goals of Short-Term Financing:

1. Lowering of cost (Low cost financing)

2. Raising Funds according to necessity.
3. Facilitating prosecution of business with other's money
4. Secure additional fund

5.3.2. Equity Financing

Equity financing refers to the issuing of shares to investors in order to support a company's business operations. This mode of financing is especially important during a company's start-up stage. In this method of financing, investors make gains when there is an increase in the share price, as well as through the distribution of dividends by the company in which the investor has purchased a stake.

Advantages of Equity Financing

The first advantage of equity financing is that it offers another source of funding besides arranging for loans from banks or other financial companies. A company may use funds from business investors when it begins its business operations to cover the start-up costs. The company can then use the cash flow from its operations to directly grow the company or to diversify into other areas. Related to this is the fact that investors tend to take a long-term view, and typically don't expect an immediate return on their investment. This allows the company to keep more cash on hand to expand the business, rather than having to pay a portion of its profits to repay loans. For this reason, this method of financing is less risky than debt financing because the company doesn't have to pay back its shareholders. This fact also makes equity financing a good option when a company cannot afford to take on (more) debt.

A second, related advantage to equity financing is that equity financing helps to confer legitimacy, by enabling companies to tap into investor networks and thereby to enhance their credibility.

The third advantage of equity financing is that if companies have prepared prospectuses for corporate investors and explained to them that their money is at risk in the companies' brand new start-up business, then investors will understand that if the business fails, they will not get their investment back.

Finally, equity financing offers additional advantages in terms of management of the company. Some prospective investors may be able to offer valuable business assistance that a company may not be able to provide for itself. Investors provide invaluable assistance in the form of management expertise, business contacts and access to other sources of capital. Quite a number of good investors and Venture Capitals assume the role of business advisors or even come on board fully as part of the management team. This can be important, especially in the start-up period of a new business.

Disadvantages of Equity Financing

The most important disadvantage is that investors must be granted some ownership of the company and a certain percentage of the profits. If the company's business takes off, then the company will have to share a portion of its earnings with the equity investors. Over time, the distribution of profits to shareholders may exceed the sum that a company would have had to pay for loans.

Venture Capitals often request an equity stake of 35–51%, especially when companies are just start-up companies without a strong financial background. The potential for equity financing may be limited for this reason, as company directors are sometimes unwilling to dilute their controlling power through equity financing.

5.3.3. Lease financing

Lease financing is one of the important sources of medium- and long-term financing where the owner of an asset gives another person, the right to use that asset against periodical payments. The owner of the asset is known as lessor and the user is called lessee.

The periodical payment made by the lessee to the lessor is known as lease rental. Under lease financing, lessee is given the right to use the asset but the ownership lies with the lessor and at the end of the lease contract, the asset is returned to the lessor or an option is given to the lessee either to purchase the asset or to renew the lease agreement.

Different Types of Lease:

Depending upon the transfer of risk and rewards to the lessee, the period of lease and the number of parties to the transaction, lease financing can be classified into two categories. Finance lease and operating lease.

1. Operating Lease:

In this type of lease the lessee acquires the right to use the asset for a short period, e.g., a week or month. The lease may be renewed after the expiry of the period. This arrangement is adopted in case of assets which are subject to rapid technological advancements, e.g., computers. Operating lease is relatively more expensive.

2. Financial Lease:

This lease is for a basic term during which the agreement cannot be cancelled. The length of this basic term depends on the economic life of the asset and is usually shorter than the expected life of the asset. This arrangement enables the lessee to use the asset after the expiry of the basic period, or alternatively the lessee may buy the asset at a negotiated price on the termination of the lease. Financial lease is commonly used in case of land and buildings and very expensive equipment. The lessor generally is able to recover his investment in the asset during the lease period.

3. Sale and Lease Back:

It is an arrangement wherein the owner of the asset may sell it to the leasing company and lease it back. Such an arrangement is adopted when the firm faces shortage of funds. The firm can overcome liquidity problem and at the same time retain use of the asset.

4. Leveraged Lease:

Under this arrangement, the lessor borrows funds from the lender and provides a part of the money to acquire the asset. The lessor services the debt out of lease rentals. Thus, there is third party (lender) in addition to the lessor and the lessee. The lender is usually a financial institution or a commercial bank. Leverage lease is used in case of very large assets such as a ship or an aeroplane.

Advantages and Disadvantages of Lease Financing:

At present leasing activity shows an increasing trend. Leasing appears to be a cost-effective alternative for using an asset. However, it has certain advantages as well as disadvantages.

I. Advantages:

Lease financing has following advantages

A. advantage to Lessor: The advantages of lease financing from the point of view of lessor are summarized below

Assured Regular Income: Lessor gets lease rental by leasing an asset during the period of lease, which is an assured and regular income.

Preservation of Ownership: In case of finance lease, the lessor transfers all the risk and rewards incidental to ownership to the lessee without the transfer of ownership of asset hence the ownership lies with the lessor.

Benefit of Tax: as ownership lies with the lessor, the lessor by way of depreciation in respect of leased asset enjoys tax benefit.

High Profitability: The business of leasing is highly profitable since the rate of return based on lease rental, is much higher than the interest payable on financing the asset.

High Potentiality of Growth: The demand for leasing is steadily increasing because it is one of the cost efficient forms of financing. Economic growth can be maintained even during the period of depression. Thus, the growth potentiality of leasing is much higher as compared to other forms of business.

Recovery of Investment: In case of finance lease, the lessor can recover the total investment through lease rentals.

B. Advantage to Lessee: The advantages of lease financing from the point of view of lessee are discussed below:

Use of Capital Goods: A business will not have to spend a lot of money for acquiring an asset but it can use an asset by paying small monthly or yearly rentals.

Tax Benefits: A company is able to enjoy the tax advantage on lease payments as lease payments can be deducted as a business expense.

Cheaper: Leasing is a source of financing which is cheaper than almost all other sources of financing.

Technical Assistance: Lessee gets some sort of technical support from the lessor in respect of leased asset.

Inflation Friendly: Leasing is inflation friendly, the lessee has to pay fixed amount of rentals each year even if the cost of the asset goes up.

Ownership: After the expiry of primary period, lessor offers the lessee to purchase the assets— by paying a very small sum of money.

II. Disadvantages: Lease financing suffers from the following disadvantages

A. Disadvantage To Lessor:

Lessor suffers from certain limitations, which are discussed below:

Unprofitable in Case of Inflation: Lessor gets fixed amount of lease rental every year and they cannot increase this even if the cost of asset goes up.

Double Taxation:

Sales tax may be charged twice: First at the time of purchase of asset and second at the time of leasing the asset.

Greater Chance of Damage of Asset: As ownership is not transferred, the lessee uses the asset carelessly and there is a great chance that asset cannot be useable after the expiry of primary period of lease.

B. Disadvantage to Lessee:

The disadvantages of lease financing from lessee's point of view are given below:

Compulsion: Finance lease is non-cancellable and even if a company does not want to use the asset, lessee is required to pay the lease rentals.

Ownership: The lessee will not become the owner of the asset at the end of lease agreement unless he decides to purchase it.

Costly: Lease financing is more costly than other sources of financing because lessee has to pay lease rental as well as expenses incidental to the ownership of the asset.

Understatement of Asset: As lessee is not the owner of the asset, such an asset cannot be shown in the balance sheet, which leads to understatement of lessee's asset.

Chapter Summary

Leverage refers to the use of an asset or sources of funds which involves fixed costs or fixed charges. Leverage can be of three types, the operating leverage, the financing leverage and the combined leverage.

The operating leverage refers to the use of fixed operating costs to magnify the effects of changes in sales on the operating income (EBIT) of the firm. The operating profit can be favorable when increase in sales volume has a positive magnifying effect on EBIT and is unfavorable when a decrease in sales volume has a negative magnifying effect on the same. Therefore, high operating leverage is good when sales revenues are rising and bad when they are falling. The degree of operating leverage has implication for the business risk of the firm.

The financial leverage implies the employment of sources of funds, involving fixed return payments so as to cause a more than a proportionate change in earnings per share due to change in operating profit (EBIT). Like that of the operating leverage financial leverage can be a positive when operating profits are increasing and negative when operating profits are decreasing. In view of these, the financing leverage will affect the financial risk of the firm.

The combined leverage represents the effect of a given change in the sales revenue on the earnings per share. It affects the total risk of the firm.

Firms may be available with different financing sources and capital structure. The EBIT- EPS analysis can help such firms to sort out financial plans with relatively greater earning per share.

Self-Test Activities

I. Multiple Choices

1. At $DOL = 1$ which one is correct
 - a. The firm cannot cover its fixed operating cost
 - b. The firm is at break even
 - c. The percentage change in sales magnifies change in EBIT by a more than proportionate change in sales.
 - d. all
 - e. none
2. If a firm has $DFL = 4$, then which one of the following is true
 - a. The firm can increase its financing sources in four folds
 - b. A 3 per cent increase in EBIT brings an increase of 12 per cent in EPS
 - c. A 2 per cent increase in volume of sales increase EBIT by 8 per cent
 - d. The firm has EBIT more than the sales level
 - e. all
3. Which of the following is true about the EBIT-EPS analysis?
 - a. It is used by firms in employing operating leverage.
 - b. It is used to identify best financial plan among the availing alternatives.
 - c. It is seen from the combined leverage perspective.
 - d. all
 - e. none

Use the following information for question 4 to 8

A firm has operating fixed cost of Br. 5.8 million, variable cost on sales of 20 percent, sales revenue of Br.8 million, bond outstanding of Br. 2 million at 8 percent interest rate, and it pays annual dividend of Br. 60,000 every year. It is also under the tax bracket of 40 per cent.

4. The DOL is
 - a) 14
 - b) 1.67
 - c) 7.8
 - d) 10.67
 - e) none
5. EBIT is
 - a) Br. 6,000,000
 - b) Br.600,000
 - c) Br. 6,000
 - d) Br. 500,000
 - e)none
6. The break even level of EBIT is
 - a) Br. 600,000
 - b) Br. 160,000
 - c) Br.260,000
 - d) Br.120,0000
 - e)none
7. The DFL is
 - a) 7.8
 - b) 1.26
 - c) 10.67
 - d) 3
 - e) none
8. The DCL is
 - a) 14
 - b) 10.67
 - c) 1.26
 - d) 18.82
 - e) none

II. Self Test Exercises

1. Calculate the degree of (a) Operating Leverage (b) Financial Leverage
(c) Composite Leverage.

Sales 100,000 units at Br. 2 per unit; variable cost per unit is 0.70 cents, total fixed costs Br.100,000 and Interest expenses is Br 3,668.

2. A company has sales of Br. 100,000. The variable costs are 40% of the sales while the fixed operating costs amounts to Br. 30,000. The amount of interest on long-term bonds is Br. 10,000. You are required to calculate the composite leverage and illustrate its impact if sales increase by 5%.
3. The selected financial data for A and B Companies for the year ended December, 31, 2008 are as follows:

Items	A	B
Variable Expenses as a percentage of Sales	66 $\frac{2}{3}$ %	75 %
Interest Expense	Br. 200	Br.300
Degree of Operating Leverage	5 : 1	6: 1
Degree of Financial Leverage	3 : 1	4 : 1
Income Tax Rate	50 %	50 %

Required: Prepare Income Statement for A and B Companies

4. ABC Ltd. has an EBIT of Br. 160,000. Its capital structure consists of the following securities:

10% Bonds	Br. 500,000
12% Preference Shares	Br. 100,000
Common Shares of Br. 100 each	Br. 400,000

The company is in the 35% tax bracket. You are required to determine:

- a. The company's EPS and degree of financial leverage.
- b. The percentage change in EPS associated with 50% increase and 50% decrease in EBIT

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Answer Key for Self-Test Activities

Chapter One

I. True or false

1. True 2. False 3. False 4. False 5. True

II. Multiple Choices

1. d 2. c 3. d 4. b 5. a
-

Chapter Two

1. GETWAY Import-Export Enterprise

Current Ratio	1.985 times
Inventory Turnover	5.766 times
Total asset Turnover	1.697 times
Net Profit Margin	1.7%
Return on Total Assets	2.9%
Return on Equity	7.6%
Debt Ratio	1.625 mes

2. TATU Company

Balance Sheet and Sales Information

Cash	Br. 27,000	Accts payable	Br. 90,000
Accts Receivable	45,000	Long-term debt	60,000
Inventories	67,500	Common stock	52,500
Fixed assets	<u>160,500</u>	Retained earnings	97,500
Total assets	<u>Br. 300,000</u>	Total liabilities & equity	Br. <u>300,000</u>
Sales	<u>Br. 450,000</u>	Cost of goods sold	Br. <u>337,500</u>

3. ATSEDE Corporation

Balance Sheet

Dec. 31, 2007

Assets	Liabilities and Shareholders'
equity Cash -----Br.175	Account payable
	Br.350
Account Receivable-----1,125	Short term loans -----200
Inventory----- <u>1,700</u>	Other Accruals----- <u>450</u>
Current assets -----Br. 3,000	Current liabilities-----Br.1,000
Net fixed assets-----4,500	Long term Debt ----- <u>2,750</u>
	Total liabilities-----Br.3,750
	Common stocks -----1,750
	Retained earnings ----- <u>2,000</u>
Total assets----- <u>Br. 7,500</u>	Total Debts &Equity----- <u>Br. 75000</u>

ATSEDE Corporation Income Statement

For the year ended Dec.31, 2007

Sales (credit) -----	Br.9, 000
Less: Cost of good sold -----	<u>5,100</u>
Gross profit-----	Br. 3,900
Less: Operating expenses -----	<u>2,850</u>
Profit before tax-----	Br. 1,050
Less: Taxes (40%) -----	<u>420</u>
Net income -----	<u>Br. 630</u>

4. ASTEDE Corporation

Balance Sheet

Dec. 31, 2007

Assets	Liabilities and Shareholders'
Equity Cash -----Br.210	Account payable -----Br.420
Account Receivable-----1,350	Notes payable ----- 849

Inventory-----	- <u>2,040</u>	Short term loans-----	200
Current assets -----	Br. 3,600	Other Accruals-----	<u>540</u>
Net fixed assets-----	<u>5,500</u>	Current liabilities-----	Br. 2,009
		Long term Debt-----	<u>2,750</u>
		Total liabilities-----	Br. 4,759
		Common stocks -----	1,750
		Retained earnings -----	<u>2,491</u>
Total assets-----	<u>Br. 9,000</u>	Total Debts &Equity-----	<u>Br. 9,000</u>

Note that Forecasted sales amount is $9,000 + [0.2 \times 9,000] = \text{Br.}10,800$

CHAPTER THREE

EX1: Given: yield to maturity (YTM) = 12%; $t = 35\%$; $K_{dt} = ?$

Since no flotation cost is indicated here, the YTM of 12% to investors represents the effective before –tax cost of debt for **YIRGU** Company, i.e. $K_d = 12\%$,

Therefore, $K_{dt} = 12\% (1 - 35\%) = 7.80\%$

EX2: Given: $P_{pf} = \text{Br. } 50 \times 95\% = \text{Br. } 47.50$; $D_{ps} = \text{Br. } 5 (4 \times \text{Br. } 1.25)$; $f = \text{Br. } 3 (\text{Br. } 50 \times 6\%)$; $K_{ps} = ?$

Then, apply the two steps:

$$\begin{array}{ll} NP_{pf} = \text{Br. } 47.50 - \text{Br. } 3 = & \text{Br. } 44.50 \\ K_{ps} = \text{Br. } 5 \underline{\hspace{1cm}} = 11.24\% & \text{Br. } 44.50 \end{array}$$

EX3: Given: $P_o = \text{Br. } 75$; $D_1 = \text{Br. } 3.38$; $g = 8\%$; $f = \text{Br. } 4.50 (\text{Br. } 3 + \text{Br. } 0.60 + \text{Br. } 0.90)$; $K_s = ?$

Then, apply the two steps:

- $N_{po} = \text{Br. } 75 - \text{Br. } 4.50 = \text{Br. } 70.50$
- $K_s = D_1 + g = \text{Br. } 3.38 + 8\% = 13\%$
 $\quad \quad \quad N_{po} \quad \text{Br. } 70.50$

EX4: Given: $P_o = \text{Br. } 57.50$; $D_1 = \text{Br. } 3.40$; $g = 8\%$; $K_r = ?$

Then, apply the formula:

$$K_r = \frac{D_1}{P_o} + g = \frac{\text{Br. } 3.40}{\text{Br. } 57.50} + 8\% = 14\%$$

EX5. 1. Since no flotation cost is involved here and the bonds are sold at par value, the effective before tax cost of debt (K_d) = coupon rate = 10%.

$$K_{dt} = 10\% (1 - 40\%) = 6\%$$

2. **Given:** $P_0 = \text{Br. } 60$; $f = \text{Br. } 6$; dividend yield $(D_1/P_0) = 4\%$; $g = 8\%$

Cost of retained earnings (K_r) = $D_1/P_0 + g = 4\% + 8\% = 12\%$

P_0

Cost of common stock (K_s) = $D_1/P_0 + g = \frac{\text{Br. } 2.40^*}{\text{Br. } 60 - \text{Br. } 6} + 8\% = 12.44\%$

* $D_1/P_0 = 4\%$

$\Rightarrow D_1 = 4\% \times P_0$

$\Rightarrow D_1 = 0.04 \times 60 = \text{Br. } 2.40$; because P_0 is Br. 60

3. $WACC = W_d K_d + W_r K_r + W_e K_s$

$WACC = 0.5 \times 0.06 + 0.25 \times 0.12 + 0.25 \times 0.1244$

$WACC = 0.0911$

$WACC = 9.11\%$

CHAPTER FOUR

Part I: Discussion

1. Capital expenditure is a cash outlay designed to generate a flow of future cash benefits over a period of time extending beyond one year.
2. The process of capital expenditure decision (selecting capital investment projects) consists the following important steps
 - ☐ Generating alternative capital investment projects proposals
 - ☐ Estimating cash flow for the project proposals
 - ☐ Evaluating and choosing the projects to undertake
 - ☐ Reviewing the projects after implementation

3. Capital budgeting is the process of planning, evaluating and selecting the most profitable project for investment. The process also considers raising of funds and efficiently allocating those funds to capital projects. Capital budgeting is important in long-term investment decisions because of the following reasons.

First capital expenditure is irreversible once an investment is made, it cannot be converted into cash without loss. But careful evaluation helps to avoid such loss. Second, the success of the investment highly depends on how well planned and evaluated the capital projects. It is, therefore, essential that investment projects are well conceived, evaluated and gainful projects are selected, given the objective of the firm.

Part II: Exercises

EX1: Given: Initial investment of the project with 5 year lifetime = 1 million birr

- ☐ Incremental Revenue: 800,000 Birr
- ☐ Incremental cost: half of incremental revenue: 400,000 Birr
- ☐ Marginal income tax: 40%
- ☐ Change in depreciation: 200,000 Birr per year which is equal to the initial investment (1 million) divided by the project life which is equal to 5 years.

The estimated NCF of new equipment that helps to produce the new product line NCF

$$\begin{aligned}
 &= (\bullet R - \bullet C - \bullet D) (1 - t) + \bullet D \\
 &= 800,000 - 400,000 - 200,000 (1 - .4) + 200,000 \\
 &= 200,000 (1 - .4) + 200,000 \\
 &= 200,000 - 80,000 + 200,000
 \end{aligned}$$

NCF = 320,000 Birr per year

During its lifetime the project generates a total of $(320,000 \times 5)$ 1,600,000 Br.

EX2.

a) Payback period			b) Discounted payback period		
		Cumulative		Cumulative	
Year	Cash flow	Cash flow	PV factor	PV	Cash flow
0	\$ -100,000		@12%		-100,000
1	20,000	80,000	0.893	17,860	82,140
2	30,000	50,000	0.797	23,910	58,230
3	40,000	10,000	0.712	28,480	20,750

Using the formula for payback period i.e., $PBP = E + \frac{B}{C}$

$$\begin{aligned} \text{a) Payback period} &= 3 + \frac{10,000}{50,000} \\ &= 3.2 \end{aligned}$$

$$\begin{aligned} \text{b) Discounted Payback period} &= 3 + \frac{29,750}{31,800} \\ &= 4 \end{aligned}$$

c) Net present value

	Total PV	119, 060
Less: Original investment		-100, 000
Net present value		<u>19, 060</u>

$$\begin{aligned} \text{d) Profitability Index} &= \frac{119, 060}{100, 000} \\ &= 1.19 \end{aligned}$$

e)

Year	Cash flow	PV factor @18%	PV	PV factor @20%	PV
1	20, 000	0.847	16,940	0.833	16,660
2	30, 000	0.718	21,540	0.694	20,820
3	40, 000	0.609	24,360	0.579	23,160
4	50, 000	0.516	25,800	0.482	24,100
5	30, 000	0.437	<u>13,110</u>	0.402	<u>12,060</u>
			101,750		96,800

$$\begin{aligned} \text{IRR} &= \text{LRD} + \frac{\text{NPVL}}{\text{PV}} \times R \\ &= 18 + \frac{1,750}{1,450} \times 0.02 \\ &= 18\% + .02414 \\ \text{IRR} &= 18.24\% \end{aligned}$$

EX3:

Equipment A

$$NPV = 20,000 (ACF_{6,11}) - 75,000$$

$$= 20,000 (4.231) - 75,000$$

$$= 84,620 - 75,000$$

$$NPV = 9,620$$

$$\text{Pay back period} = \frac{75,000}{20,000}$$

$$\text{Pay back period} = 3.75 \quad \text{This figure can be used to find IRR}$$

From present value annuity table 3.75 is between

$$PVAF_{15} = 3.784$$

$$PVAF_{16} = 3.685$$

$$IRR = r - \frac{PB - DFr}{DFrL - DFrH}$$

$$IRR = r - \frac{3.75 - 3.784}{(3.784 - 3.685)}$$

$$IRR = \frac{-0.034}{0.099} = 15.34\%$$

Equipment B

$$NPV = 14,000 (ACF_{6,11}) - 50,000$$

$$= 14,000 (4.231) - 50,000$$

$$= 59,234 - 50,000$$

$$= 9,234$$

$$\text{Pay back period} = \frac{50,000}{14,000}$$

$$= 3.571$$

From present value annuity table 3.571 lies between

$$PVAF_{17} = 3.589$$

$$PVAF_{18} = 3.498$$

$$\begin{aligned}
 IRR &= r - \frac{PB - DFr}{DFrL - DFrH} \\
 &= 17 - \frac{3.571 - 3.589}{(3.589 - 3.498)} \\
 &= 17 - \frac{-0.18}{-0.09} \\
 &= 17 + .002 \\
 &= 17.20\%
 \end{aligned}$$

Equipment A has more NPV but lower IRR than B. A should be preferred because it will increase the wealth of shareholders.

EX4:	A	B
Cost	100, 000	150, 000
Expenses	35, 000	20, 000
Cost	B – A = 50, 000	
Expenses	B – A = 15, 000	saving
Depreciation	100, 000 ÷ 8	150, 000 ÷ 8
	12, 500	18, 750
	(14, 000 – 4,000) =	10, 000
	Saving	15, 000
	Less: Depreciation	6, 250
	Profit before tax	8, 750
	Tax 50%	4, 375
	Profit after tax	4, 375
	Add: Depreciation	6, 250
	Annual cash flow	10, 625
	Terminal salvage value	= 10, 000

$$\begin{aligned}
 (B - A) \text{ Net present value} &= 10, 625 (PVA_{F8, 10}) + 10, 000 (PV_{F8, 10}) - 50, 000 \\
 &= 10, 625 (5.335) + 10, 000 (0.467) - 50, 000 \\
 &= 56, 684 + 4, 670 - 50, 000 \\
 &= 61, 354 - 50, 000 \\
 &= 11, 354
 \end{aligned}$$

Project B may be accepted. It has positive NPV

EX5:

$$ARR = \frac{\text{Average income}}{\text{Average investment}} \times 100$$

$$\text{Average income} = \frac{36,875}{5} = 7,375$$

$$\text{Average investment} = \text{NWC} + \text{Salv.V.} + \frac{1}{2} (\text{cost of plant} - \text{salvage value})$$

$$= 3,000 + \frac{1}{2} (56,125 - 3,000)$$

$$= 3,000 + \frac{1}{2} (53,125)$$

$$= 3,000 + 26,562.5$$

$$= 29,562.5$$

$$ARR \text{ for both} = \frac{7,375}{29,562.5} \times 100 = 24.9\%$$

ARR is same for A and B, because both have same annual incomes. The ARR may be compared to the desired one and if the actual is more, it has to be accepted otherwise it has to be rejected.

1) Pay Back Period:

To calculate pay back period we have to add back the depreciation to ACFs after tax and depreciation

	A	B
I. Depreciation: Cost	56,125	56,125
Less: Salvage	3,000	3,000
	53,125	53,125
	5	5
	10,625	10,625

A				B		
0		56, 125			56, 125	
1	3, 375 + 10, 625	14, 000	42, 125	11, 375 + 10, 625	22,000	34,125
2	5, 375 + 10, 625	16, 000	26, 125	98, 375 + 10, 625	20, 000	14, 125
3	7, 375 + 10, 625	18, 000	8, 125	7, 375 + 10, 625	18, 000	
4	9, 375 + 10, 625	20, 000		51, 375 + 10, 625	16, 000	
5	11, 375 + 10, 625	25, 000		3, 375 + 10, 625	17, 000	
	+3, 000			+ 3, 000		

3. Net present value

Project B has more NPV than A hence, preferred

56,125

$$= \frac{71,521}{1.241}$$

$$= \frac{56,125}{1.274}$$

5. Internal Rate of Return

17%				20%		
Year	CFAT	PV Factor	Present value	CFAT	PV Factor	PV
1	\$ 14, 000	0.855	11, 970	\$ 22, 000	0.833	\$ 18, 326
2	16, 000	0.731	11, 696	20, 000	0.694	13, 990
3	18, 000	0.624	11, 232	18, 000	0.579	10, 422
4	20, 000	0.534	10, 680	16, 000	0.482	7, 712
5	25, 000	0.456	<u>11, 400</u>	17, 000	0.402	<u>6, 834</u>
			59, 978			57, 174
	Less: Original Investment		<u>-56, 125</u>			<u>-56, 125</u>
			<u>853</u>			<u>1049</u>

This is higher, let us try higher interest

A				B		
18%				22%		
Year	ACF	PV Factor	Present value	ACF	PV Factor	Present
			value			
1	\$ 14, 000	0.847	\$ 11, 858	\$ 22, 000	\$ 0.820	\$ 18, 040
2	16, 000	0.718	11, 488	20, 000	0.672	13, 440
3	18, 000	0.609	10,962	18, 000	0.551	9,918
4	20, 000	0.516	10, 320	16, 000	0.451	7, 216
5	25, 000	0.437	10,928	17, 000	0.370	6, 290
			<u>55,553</u>			<u>54,904</u>
	Less: Original Investment		<u>-56, 125</u>			<u>-56, 125</u>
			-572			-1,221

$$IRR = LRD + \frac{NPVL}{PV} \times R$$

$$= 17 + \frac{853}{1,425} \times 1$$

$$= 17 + 0.6$$

$$= 17.6\%$$

$$= 20 + \frac{1,049}{2,220} \times 2$$

$$= 20 + 0.9$$

$$= 20.9\%$$

Note that under A: 853 = 56,978 – 56,125 and 1,425 = 56,978 – 55, 553

B: 1,049 = 57,174 – 56,125 and 2,270 = 57,174 – 54,904

EX6:

a) Pay back period

Project	Investment (I)	ACF	Payback period	Rank
A	\$ 10, 000	\$ 2, 500	4	4
B	8, 000	2, 600	3.1	3
C	4, 000	1, 000	4	4
D	10, 000	2, 400	4.2	5
E	5, 000	1, 125	4.4	6
F	6, 000	2, 400	2.5	2
G	2, 000	1, 000	2	1

b) Net Present Value Method

	I	ACF	PV Factor 10%	PV	NPV	Rank
A	10,000	\$ 2,500	3.791	\$ 9,478	-522	-
B	8, 000	2, 600	4.868	12, 657	4, 657	2
C	4, 000	1, 000	7.606	7.606	3, 606	4
D	10, 000	2, 400	8.514	20, 434	10, 434	1
E	5, 000	1, 125	7.606	8, 557	3, 557	5
F	6, 000	2, 400	4.355	10, 452	4, 452	3
G	2, 000	1, 000	1.736	1, 736	-264	-

Note that Project A & G result in negative NPV hence, may be rejected.

Chapter Five

I. Multiple choices:

1. c 2. b 3. b 4. d 5. b 6. c 7. e 8. d

II. Self Test Exercise

1.

$$(a) \text{ Degree of operating leverage} = \frac{\text{Contribution margin}}{\text{EBIT}} = \frac{130,000}{30,000} = 4.33$$

$$(b) \text{ Degree of financial leverage} = \frac{\text{EBIT}}{\text{EBIT} - I} = \frac{\text{EBIT}}{\text{EBT}} = \frac{30,000}{30,000 - 3668} = \frac{30,000}{26,332} = 1.14$$

$$(c) \text{ Degree of combined leverage } \text{DOL} \times \text{DFL} = 4.33 \times 1.14 = 4.94$$

2.

$$(i) \text{ Degree of operating leverage} = \frac{\text{Contribution margin}}{\text{EBIT}} = \frac{60,000}{30,000} = 2.0$$

$$(ii) \text{ Degree of financial leverage} = \frac{\text{EBIT}}{\text{EBIT} - I} = \frac{\text{EBIT}}{\text{EBT}} = \frac{30,000}{30,000 - 10,000} = \frac{30,000}{20,000} = 1.5$$

Hence, Degree of combined (composite) leverage $\text{DOL} \times \text{DFL} = 2.0 \times 1.5 = 3.0$

If sales increase by 5 percent, the EPS of the firm will increase by 15 percent (i.e., $3 \times 5\% = 15\%$)

3.

A Company

Income Statement

For the year ended December 31, 2008

Sales	Br. 4,500
Variable Cost	<u>3,000</u> ^{\$}
Contribution Margin	Br.1,500 [@]
Fixed Cost	<u>1,200</u> [^]
EBIT	Br.300 [*]
Interest Expenses	<u>200</u>
Earning Before Tax(EBT)	Br.100
Tax (50%)	<u>50</u>
Earning After Tax(EAT)	<u>Br.50</u>

B Company

Income Statement

For the year ended December 31, 2008

Sales	Br. 9,600
Variable Cost	<u>7,200</u>
Contribution Margin	Br. 2,400
Fixed Cost	<u>2,000</u>
EBIT	Br. 400
Interest Expenses	<u>300</u>
Earning Before Tax(EBT)	Br.100
Tax (50%)	<u>50</u>
Earning After Tax (EAT)	<u>Br.50</u>

* You can use the degree of financial leverage to find the value of EBIT.

$$DFL = \frac{EBIT}{EBIT - 200} = 3$$

$$EBIT = Br. 300$$

@ You can use the degree of operating leverage to find contribution margin

$$DOL = \frac{\text{Contribution Margin}}{EBIT} = 5$$

$$= \frac{\text{Contribution Margin}}{300} = 5$$

$$\text{Contribution Margin} = \text{Br. } 1,500$$

Since variable cost is $67 \frac{2}{3}$ percent of sales, contribution margin is $33 \frac{1}{3}$ percent of sales.

$$\text{Hence, Sales} = \frac{1,500}{0.3333} = 4,500$$

$$^{\$} \text{ Variable Cost} = 4,500 - 1,500 = \text{Br. } 3,000$$

$$^{\wedge} \text{ Fixed cost} = 1,500 - 300 = 1,200$$

Follow the same step to prepare the income statement of **Company B**.

4. **(a)** ABC Ltd. EPS and Degree of financial leverage

Earning Before Interest Tax	Br.160,000
Interest Expenses(500,000 x 0.10)	<u>50,000</u>
Earning Before Tax(EBT)	Br.110,000
Tax (50%)	<u>38,500</u>
Earning After Tax (EAT)	Br.71,500
Preference Dividend (Dp) (100,000 x 0.12)	<u>12,000</u>
Earning Available for Common Shareholders	Br.59,500
Number of Shares (N) (400,000/ 100)	4,000
Earning Per Share (EPS)	<u>14.875</u>

$$\text{Degree of financial leverage} = \frac{EBIT}{EBIT - I - \frac{D_p}{1-t}} = \frac{160,000}{160,000 - 50,000 - 18,462} = 1.75$$

(b) A 50 percent increase in EBIT will increase EPS by 78.5 percent ($1.75 \times 50\% = 78.5\%$).

The opposite also holds true that a 50 percent decrease in EBIT will decrease EPS by 78.5 percent.
