BBA 3314
Fundamentals of Business Finance
Study Module

স্কুল অব বিজনেস
SCHOOL OF BUSINESS

বাংলাদেশ উন্মুক্ত বিশ্ববিদ্যালয়
BANGLADESH OPEN UNIVERSITY

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BBA 3314
Fundamentals of Business Finance

Course Development Team

Writer
Professor Dr. Md. Jahirul Hoque
Department of Finance & Banking
University of Chittagong

Professor Dr. Begum Ismat Ara Huq
Department of Finance & Banking
University of Chittagong

Editor and Style Editor
Professor Dr. Mohammad Zahir Raihan
Professor, School of Business
Bangladesh Open University

Coordinator
Dean
School of Business
Bangladesh Open University

This book has been published after being refereed for the students of School of Business, Bangladesh Open University

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Preface

The tutorial guide titled ***Fundamentals of Business Finance*** is designed and developed for the BBA students of the School of Business, Bangladesh Open University. It is complied in modular form. The lessons have been so designed that learners find them easy to understand.

The tutorial guide has 06 units comprising 15 lessons. I do not claim it to be an original contribution. Rather it should be regarded as a complied idea from various renowned authorities in Fundamentals of Financial Management. We have also quoted from different textbooks on Financial Management usually followed by post-graduate students in our universities. Our endeavor has been to present the lessons in a very lucid manner so that they can be understood and assimilated by an average distance learner of the BBA program within the stipulated period of a semester.

Each unit is almost equivalent to one chapter of a conventional textbook and contains two to four lessons. Each of them starts with unit "highlights". In fact the lessons are like the lecture notes of a classroom teacher, each starts with "lesson objectives" and ends with "review questions". The review questions include essay type and application discussion questions. We hope that self-learners will not find much difficulty in understanding the lessons by themselves and will need only a little help from the tutor.

Basic Foundation

1

Unit Highlights

- **Lesson -1:** Financial Management: Introductory Notes and Words
- **Lesson -2:** Financial Decision Making Process

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson–1: Financial Management: Introductory Notes and Words

After successfully completing this lesson 1, you should be able to:

- *Have a clear idea about the concept of finance;*
- *Know the basic principles of finance;*
- *Have a clear idea about the concept of financial management;*
- *Explain the relationship of financial management with other major areas of total management;*
- *Realize the significance of financial management in the context of industrial enterprises both public and private sectors, government and non-government organizations, educational institutions and the like;*
- *Identify the major goals and objectives of financial management and*
- *Understand agency relationship and control.*

Concepts of Finance

Finance can be define as the study of how people, businesses and other organizations evaluate investments and raise capital to fund them.

At the personal level, finance is concerned with individuals' decisions about how much of their earnings they spend, how much they save, and how they invest their savings.

In a business context, finance involves the same types of decisions: how firms raise money from investors, how firms invest money in an attempt to earn a profit, and how they decide whether to reinvest profits in the business or distribute them back to investors

The Four Basic Principles of Finance

1) Money Has a Time Value
2) There is a Risk-Return Trade-off.
3) Cash Flows Are The Source of Value.
4) Market Prices Reflect Information.

PRINCIPLE 1: Money Has a Time Value
A dollar received today is more valuable than a dollar received in the future.
We can invest the dollar received today to earn interest. Thus, in the future, you will have more than one dollar, as you will receive the interest on your investment plus your initial invested dollar.

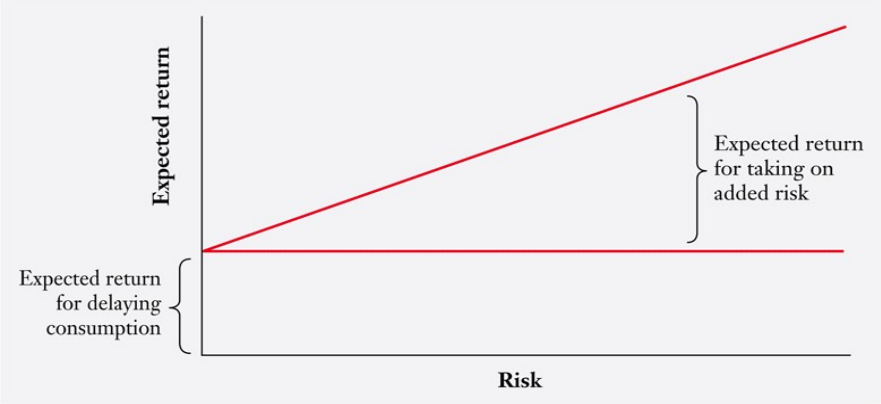
PRINCIPLE 2: There is a Risk-Return Trade-off.

- We only take risk when we expect to be compensated for the extra risk with additional return.
- Higher the risk, higher will be the expected return.

Figure 1.3

There Is a Risk-Return Tradeoff

Investors demand a return for delaying their consumption. To convince them to take on added risk, they demand a higher expected return.



PRINCIPLE 3: Cash Flows Are The Source of Value.

- Profit is an accounting concept designed to measure a business's performance over an interval of time.
- Cash flow is the amount of cash that can actually be taken out of the business over this same interval.

Profits versus Cash

- It is possible for a firm to report profits but have no cash.
- For example, if all sales are on credit, the firm may report profits even though no cash is being generated.

Incremental Cash Flow

- Financial decisions in a firm should consider "incremental cash flow" i.e. the difference between the cash flows the company will produce with the potential new investment it's thinking about making and what it would make without the investment. Or
- Incremental cash flow is the additional operating cash flow that an organization receives from taking on a new project.

PRINCIPLE 4: Market Prices Reflect Information.

- Investors respond to new information by buying and selling their investments.
- The speed with which investors act and the way that prices respond to new information determines the efficiency of the market.
- In efficient markets like United States, this process occurs very quickly. As a result, it is hard to profit from trading investments on publicly released information.
- Investors in capital markets will tend to react positively to good decisions made by the firm resulting in higher stock prices.
- Stock prices will tend to decrease when there is bad information released on the firm in the capital market.

Concepts of Financial Management

Financial Management refers to the proper management of finance functions of an enterprise or organization. In other words, financial management is concerned with the financial decision-making and other financial aspects. Thus, financial management involves financial planning, financial organization, financial coordination and control, financial reporting, financial mergers, combinations and acquisitions, insurance and tax management etc. Financial planning is concerned with the act of deciding in advance the financial activities that are essential if the enterprises are to achieve their financial goals and objectives. These financial activities mainly

consist of properly estimating financial needs; selecting the proper sources of finances; procuring the requisite funds; proper utilization of the funds and custody and safekeeping of funds. Financial organization is the grouping of the finance functions into various divisions, departments, sections and sub-sections of the enterprises for their proper and efficient performance. That is, financial organization deals with the proper allocation of the finance functions amongst the various financial executives. Financial coordination and control deal with the proper adjustment of the finance function and evaluation of the same in relation to the predetermined standards. Financial reporting is the proper collection and recording of financial data, preparing financial reports and statements and disseminating the same to the management for decision-making and other interest groups for information. Financial merger is a process whereby one enterprise is completely absorbed by another which may be achieved either by combination or acquisition. Insurance management deals with management of various insurance policies; while tax management deals with the management of tax aspects of an enterprise.

Relation of Financial Management with Major Areas of Management

Financial management is the most significant aspect of total management of an enterprise. Management has its various aspects viz. marketing management, production management, material management/purchase management, total quality management, human resource management and financial management. Of all these aspects financial management is the core one, since every other aspect either directly or indirectly involves finance. Therefore, financial management has relation with the other aspects of management.

Financial Management and Marketing Management

Marketing is the total movement of goods and services from the original producer to the ultimate consumer. In such movement, many agencies and channels are involved. Marketing management deals with formulation of sales policy and target; selection of sales area; product types and types of customers; pricing of products and services; product promotions and advertisements; undertaking marketing research; selecting proper channels of distribution of products and services etc. In most of the marketing functions finance is involved directly or indirectly. As for example, promotion and advertisement activities require outlays of cash. Moreover, in conducting marketing research and in the channels of distribution the involvement of finance is a must. In these ways, it is seen that financial management has a close relation with marketing management.

Financial Management and Production Management

Production management is mainly concerned with product development; formulation of production policies and targets; selecting proper production systems; following proper production control process; handling inventory problems; ensuring proper product quality etc. In most of the production functions of manufacturing enterprises, the involvement of finance is unavoidable. As for example, for purchasing raw materials a huge cash outlays is required. Moreover, for carrying out production cash outlays are needed for meeting various factory overheads as well as for direct or indirect labor. Thus, it is seen that financial management is also closely related with the production management of a manufacturing enterprise.

Financial Management and Material/ Purchase Management

In case of manufacturing concerns material management is the vital one; while in case of trading concerns, the purchase management is very much significant. The purchase, movement, use and storage of production materials are fundamental management concerns in any manufacturing organization. Production material management deals with planning and scheduling of production functions; controlling the various types of inventories; purchasing materials and supplies; management of stores etc. In most of the material management functions, involvement of cash outlays is unavoidable. Production managers always try to make the best use of finance through careful scheduling of the sequence and timing of works and through the efficient control of

buying, using and storing materials. Thus, it can be said that financial management is also closely related with materials/ purchase management.

Financial Management and Human Resource Management

People are the most valuable assets of an enterprise, which are not subject to depreciation like physical assets. Therefore, human resource management is the core of total management of an enterprise. Human Resource Management concerns with selection of the proper employees; methods of proper orientation and training of employees; policies and methods of remunerating the personnel; policies and procedures for the promotion and welfare of the personnel; policies and procedures for the transfer, hiring and firing of the employees; providing life and health insurance and pension policies of employees; system and criteria for evaluating employees' performances etc. In most of the personnel management areas, the involvement of finance is unavoidable. Hence, the question of proper management of finance functions also arises in the area of human resource management. Thus, it is seen that financial management is also closely related with human resource management.

Significance of Finance and Financial Management

Financial management is the hard core of total management since every decision in an enterprise is ultimately a financial decision. The complex nature of the business enterprises demands that management is expected to give greater emphasis upon financial management of any enterprise whether trading, manufacturing, service rendering, government or non-government organizations, educational and charitable institutions and the like. Therefore, the following sub-sections examine the significance of financial management in the context of these organizations.

Industrial Organizations

In case of industrial organizations whether public or private sectors and whether small, medium and large; financial management is significant for the following main reasons:

(i) Determining financial goals and objectives of both the short-term and long-term;
(ii) Formulating financial policies both short-term and long-term;
(iii) Financing both short-term and long-term;
(iv) Determining proper capital and financial structure;
(v) Determining cost capital of each of the sources;
(vi) Formulating capital investment policy;
(vii) Selecting proper methods and techniques of capital budgeting;
(viii) Formulating working capital policy including cash, receivables and inventory policies;
(ix) Formulating profit planning and control policies including dividend policies;
(x) Developing proper financial information system and
(xi) Formulating policies relating to maintenance of funds, insurance and tax and mergers, combinations and acquisitions.

Government and Non-government Organizations

Financial management plays a pivotal role in case of the government and her organizations and agencies for ensuring financial discipline. For efficient and effective government financial administration, financial management has a great role to play. Therefore, financial management is of utmost importance for government; since government deals with public money and hence subject to public accountability. For government and in case of government agencies and organizations financial management is significant for the following important purposes:

(i) Preparation of government budgets and getting the budgets passed by the competent authority/ legislation;
(ii) Implementation of the budgets;
(iii) Raising the requisite funds for the implementation of the development projects;

(iv) Financing capital budgets of the government;
(v) Formulating policies relevant to fund management, tax and insurance management;
(vi) Selection of the major heads of revenue income of the government;
(vii) Selection of the major heads of expenditures of the government;
(viii) Treasury management i.e. safe custody of funds collected and due arrangement for the necessary payments to meet the liabilities and
(ix) Arranging for proper accounting and audit of the government funds and other affairs.

Government Educational Institutions

An efficient and effective financial management is important not only in business and government organizations but also in educational institutions like schools, colleges and universities. A huge financial involvement is essential to run the public schools, colleges and universities. Theses institutions are run purely on public money and are also subject to public accountability; hence proper financial management practice is a must in these cases. Therefore, financial management is of utmost significance in cases of government educational institutions for the following main purposes:

(i) Estimating the financial requirements during a particular financial year for smooth running of the institutions;
(ii) Preparation of both the revenue and development budgets of the institutions and getting them approved by the concerned authority;
(iii) Selecting the revenue sources of finance, both internal and external;
(iv) Identifying the major heads of revenue expenditures;
(v) Financing of development expenditures and
(vi) Adjustment of advances, if any.

Major Goals and Objectives of Financial Management

Financial management of any business organization, whether large, medium and small has a basic goal of maximization of profits of the organizations; since financial management acts as the representative or agent of their owners. The following sub-section examines the maximization of profits as the basic goal of financial management**:**

Maximization of Profits

Profit maximization generally refers to the increase in net profits of an enterprise during a particular year as compared to the previous year. But, increase in absolute figures of net profits is not significant if sales volume increases proportionately to the increase in net profits. Therefore, it is not the absolute profit maximization but the maximization of profitability is the basic goal of financial management. Profitability refers to net profits in terms of sales, investment, equity capital etc. But, profitability maximization goal has four main shortcomings viz.; (i) it is ambiguous having no precise connotation; (ii) it does not consider time value of money; (iii) it ignores the degree of certainty of benefits, that is, it ignores risk factor involved in earning profits and (iv) it does not always equate to more money in the shareholders' pockets and thereby fails to an increase in shareholders' stock price and, in turn, to shareholders' wealth. Therefore, profitability maximization may not be the proper goal of financial management; since the criterion is inappropriate and unsuitable as an operational objective of investment, financing and dividend decisions of a firm. In order to remove the shortcomings involved in the profitability maximization goal; wealth maximization goal has been evolved and also recognized by the authors of financial management as well as by the professionals. Such goal is examined in sub-section 1.4.2.

Wealth Maximization

This criterion is also known as value maximization or net present worth maximization. Wealth/ value maximization is almost universally accepted as an appropriate operational decision criterion for financial management decisions for the following main grounds:

(i) It has a definite connotation in the sense that cash flow is considered here as a measure of benefit which has a precise concept;
(ii) It takes into consideration both the quantity and quality dimensions of benefits. In such criterion, necessary adjustments are made in the cash flow pattern, firstly to incorporate risk and secondly, to make an allowance for differences in timing of benefits;
(iii) It incorporates the time value of money. The value of a stream of cash flow is calculated by discounting its element back to the present at a capitalization rate that reflects both time and risk.
(iv) Since wealth is measured by the share price; it leads to an increase in the share price and hence in the shareholders' value /wealth if the financial management takes those actions or decisions that will increase share price. Therefore, the skill of financial managers must lie in their ability to identify those investments and financing that would increase the share price.

Social Goals

Besides the above discussed goal, financial management has some social goals to achieve in order to increase the welfare of its employees, in one hand, and increase the image of the organization, on the other. Such social goals assume the social responsibility of the firm. Social responsibility of the firm comprises the following:

i) Protecting consumers' interest;
ii) Paying fair wages and salaries and other fringe benefits to the employees;
iii) Maintaining fair staff hiring practices and safe and congenial working conditions;
iv) Providing requisite training to the existing staff and supporting education to their children;
v) Involving in environmental issues like fresh air and pure water;
vi) The interests of the stakeholders consisting of creditors, suppliers, customers, financiers, communities and the relevant government agencies should also be given due care and weightage.

Agency Relationship and Control

The relationship that exists between organization, its owners or shareholders and management is known as agency relationship. The management team is the agent that is, they are hired on behalf of the shareholders. The goals of these parties are different. The shareholders' goal is to maximize their wealth; whereas the management's goal is to maximize their own welfare. So, there is conflict between these two goals and such conflict of goal is known as agency problem or agency cost. In such a context, the conflict of goals must be removed or minimized. There are two ways for removing/ minimizing the negative impact of the agency problem. The first is to ensure that the management objectives do not conflict with shareholders' objectives. The second is to use the ultimate control of the firm by exercising voting rights of the board of directors to remove a manager who is not acting in the best interest of the shareholders.

Review Questions

Short Questions

1. What is finance?
2. "Finance stands on four basic principles"-Explain.
3. Give the concept of the term Financial Management.
4. Why financial management is said to be the core of total Management?
5. "The objective of a company must be to create value for its shareholders" – Explain the statement logically.
6. "Maximization of wealth goal is superior to maximization of profit goal" – Explain.
7. Why social goals of financial management are significant?
8. What is agency problem? How it can be solved?

Broad Questions

1. Define finance. Explain the basic principles of finance.
2. Examine the relation of financial management with the following major areas of management:
   (i) Marketing management (ii) Production management
   (iii) Material management (iv) Human Resource Management
3. Examine the significance of Financial Management in the context of the following organizations:
   (i) Industrial organizations (ii) Government organizations
   (iii) Educational institutions
4. Explain the major goals and objectives of financial management.

Lesson–2: Financial Decision-Making Process

After carefully reading this Lesson 2, you should be able to-

- *Discuss the fundamentals of financial decision making, explaining the financial decision-making process;*
- *Realize the proper role of top-level financial executives of the enterprises and*
- *Have an overview of the major financial decision-making process.*

Fundamental Areas of Financial Decision Making

The finance functions involving decision-making are known as financial decision-making functions. The performance of these functions requires the professional knowledge and skill of the executives. Such decision making finance functions are broadly categorized into three groups namely: (i) investment decision; (ii) financing decision and (iii) dividend decision. The following sub-sections deal with these decisions briefly.

Investment Decision

The investment decision is the most significant of these three decisions when it is considered as the creation of value. Investment decision is the proper allocation of capital, both fixed and working to the investment projects whose benefits are to be realized in the future. Investment decision broadly includes the following main aspects:

Category – A : Long-term Investment Decision

i) Capital Budgeting Decision – It is a multi-dimensional activity which embraces searching for new and more profitable investment proposals; investigating engineering and technical, financial, economic, marketing and management considerations to predict the consequences of accepting on investment proposal in order to examine whether the investment proposal is viable. Any capital budgeting decision is a major financial decision and it is significant for a company for the three basic reasons such as **:** (a) it entails a huge amount of cash outlays; (b) it involves risk and uncertainty and (c) it affects the company's operation for a larger period of time.

ii) Analysis of risk and uncertainty
iii) Analysis of cost of the specific sources of fixed capital

Category – B: Short-term Investment Decision

i) Short-term financial objectives,
ii) Working capital investment policy namely cash, inventory marketable securities and receivables policies and
iii) Working capital control.

Financing Decision

After investment decision, the question of financing decision arises. Such decision consists of the following two main aspects:

i) Capital structure decision, which involves determining the best mix of equity, preferred stock, long-term debt and hybrid securities to employ. In such decision cost of each source of capital must be considered carefully. Moreover, the factors that affect the determination of capital structure must be given due weightage.

ii) Financial structure decision which is nothing but a financing mix consisting of shareholders' equity, preferred stock, long-term and short-term debts and hybrid securities. In case of such decision the cost of capital must be given due weightage.

While determining capital and financial structure of a firm its financial management should see whether the firm is under-capitalized or over-capitalized. Both the under-capitalization and over-capitalization have harmful effects on the form. Therefore, determination of an optimal capital and financial structure is a must for a firm if it would like to continue over a longer period of time.

Dividend Decision

The final important financial decision of an enterprise is dividend decision. It mainly involves: (i) formulation of profit plan, (ii) formulation of dividend policy, (iii) formulation of retention policy and (iv) investment of accumulated profits.

While taking dividend decision of a firm, its financial management must give due considerations on the following aspects:

a) Current earnings;
b) Preference of the shareholders as to the current dividend income or future capital gains;
c) Amount that should pay as dividend, that is, dividend payout ratio;
d) Constraints on paying dividends;
e) Retention ratio, that is, amount to be retained;
f) Stable dividend policy – to follow or not;
g) Forms of dividend – cash or bonus share and
h) Stock split vs. stock dividend.

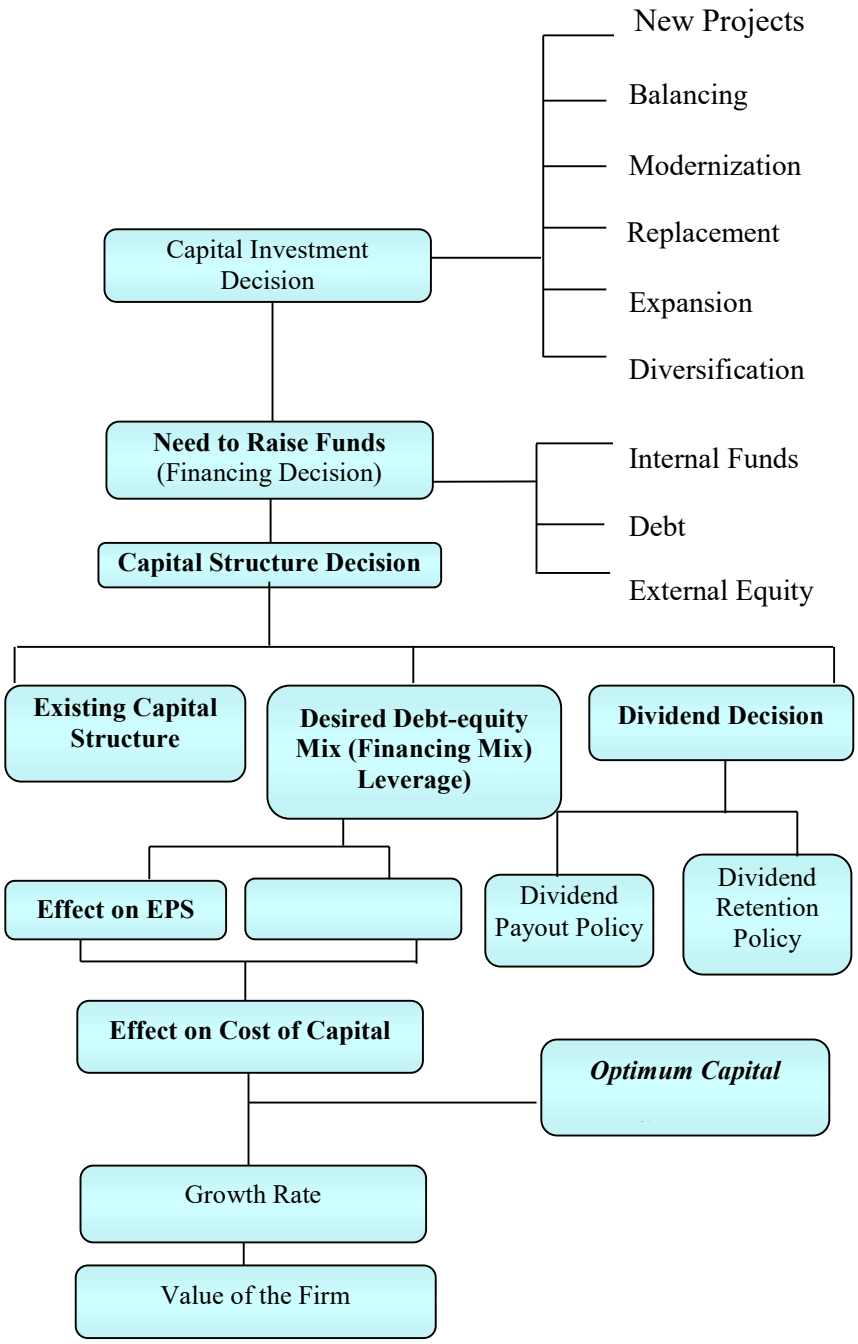
Financial Decision Making Process

The process with which the financial management of a firm will take the above discussed financial decisions is known as financial decision making process. The process starts from the initial establishment of the firm and ends with the closure of the firm. That is, the process continues during the lifecycle of the firm. At the time of initial establishment i.e. at the gestation period; the firms have to take investment decision. During the operating period, the firms have to take new investment decision, if needed; financing decision and dividend decision.

The proposition of the theory of a firm's finance is the capital structure theorem which specifies the relationship between the firm's capital structure and its cost of capital. From the theorem follow other propositions concerning the relationship between the firm's investment decision, financing decision and dividend decision, its cost capital and market value. The process is shown in Chart-1, explaining the relationship between firm's financial decisions.

Chart – 1

Relationship between Firm's Major Financial Decisions



Role of Financial Executives in Decision Making Process

Financial executives starting from finance director down to cashier, a junior financial executive have a great role to play in the corporate firms. Their roles are discussed in the following sub-sections:

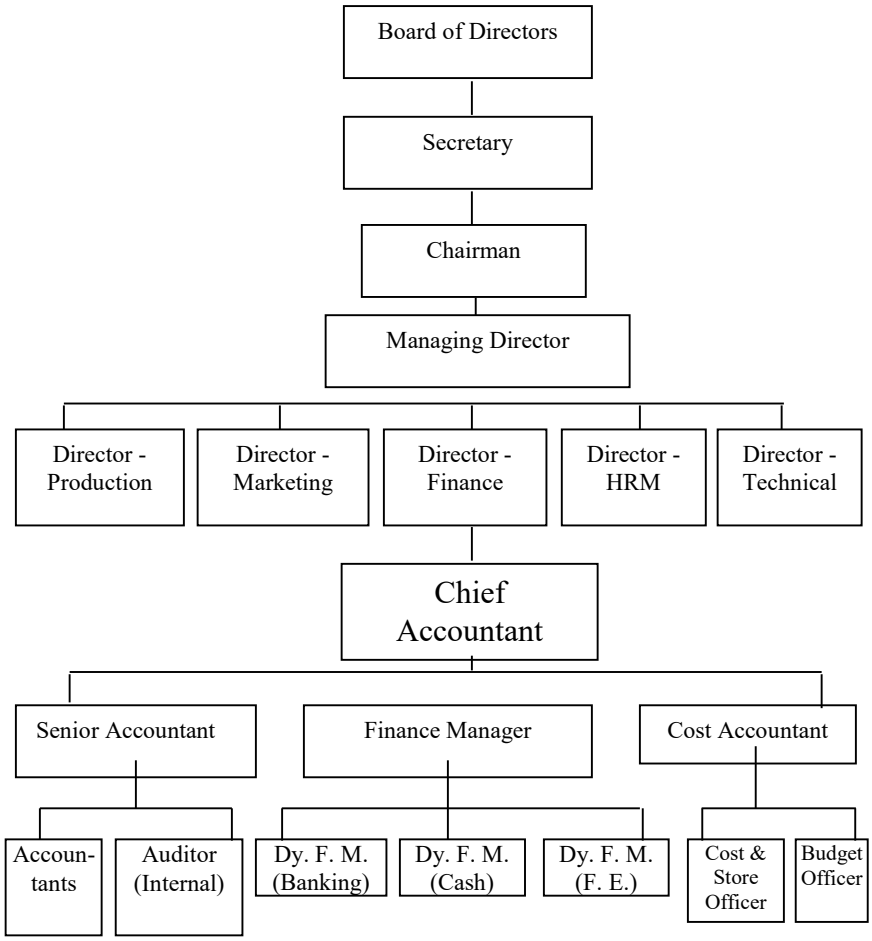
Status of the Top level Financial Executives

Financial executives are those personnel of the organization who are involved in the finance functions of that organization. That is, financial executives are responsible for the performance of financial functions. The financial executives who are involved in the executive or decision making finance functions are known as top level financial executives. In the performance of these executive finance functions, the financial executives have to possess executive skill i.e. specialized knowledge and skill. But, the financial executives who are involved in the incidental or non-decision making finance functions are known as mid and / or low level financial executives. In the performance of these finance functions the executives need not have to possess specialized knowledge and skill.

Top level financial executives are the key and responsible personnel of the organizations since they are involved in the decision makings. All the financial decisions are taken by the top level financial executives. Their status is exhibited in Chart-2 in case of a large private industrial enterprise in Bangladesh.

Chart - 2

Status of Top Level Financial Executives in Financial Organization Structure



Source: Organization Manual of the Selected Private Sector Industrial Enterprises in Bangladesh.

In Chart-1, it is evident that the topmost financial executive in the private sector industrial enterprises is the Director – Finance. Although he ranks equal status of other Directors viz., Production, Marketing, HRM and Technical; he holds central position among the directors in the organizational hierarchy. This is because of the fact the Director – Finance is the head of finance functions of the enterprise and in all the other directorates finance is involved, directly or indirectly. Under the Finance Director, there is the Chief Accountant under whose direct supervision and control there are departmental heads namely Senior Accountant for General Accounts, Finance Manager for Finance and Cost Accountant for Cost,, Stores and Budget Departments. Although they possess the same status like other departmental heads under the Production, Marketing, HRM and Technical Directorates; they hold comfortable positions in the organizational hierarchy, since they are entrusted with the financial decision making functions, the key functions of the enterprises. Under the direct supervision and control of the departmental heads, there are sections namely Accounts (General), Audit (Internal), Cash, Banking, Foreign Exchange, Cost, Store and Budget. Although these section chiefs have the same status like other section chiefs under Production, Marketing, HRM and Technical Departments; their positions in the organizational hierarchy are higher since they deal with the finance.

Functions and Responsibilities of the Top Level Financial Executives

The finance functions of an enterprise can be grouped into two namely executive finance function or treasury finance function and incidental finance function or controllership finance function. All the executive finance functions are decision making finance functions and some of the controllership functions are also decision making functions. These functions have to be performed by the top level financial executives.

The important executive finance functions are mentioned below **:**

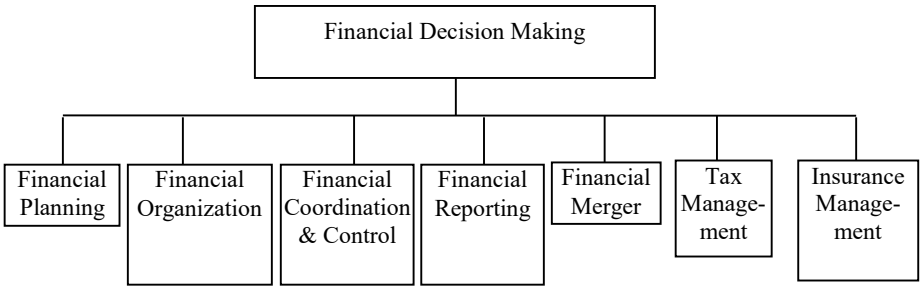
i) Determination financial goals and objectives;
ii) Formulation of financial policies;
iii) Forecasting of cash flows;
iv) Determination of fixed assets management policies;
v) Determination of current assets management policies;
vi) Determination of capital and financial structure;
vii) Selection of sources of capital;
viii) Raising of funds;
ix) Credit management;
x) Cash management;
xi) Inventory management;
xii) Receivable management;
xiii) Marketable Securities Management
xiv) Control of cost of capital;
xv) Control of working capital;
xvi) Control of inventory;
xvii) Profit planning and control;
xviii) Cost control;
xix) Determination of dividend policy;
xx) Insurance and tax management;
xxi) Financial merger and acquisition and
xxii) Product/ service pricing.

Overview of Financial Decision Making Process

While explaining the concept of financial decision making, the major processes of it has been identified. However, this process of financial management is shown in Chart-3.

Chart - 3

Major Process of Financial Decision Making



The following sub-sections deal with the major steps involved in each of the financial decision making process**:**

Financial Planning

Financial planning involves the following three fundamental steps **:**

i) Determining both long-term and short-term financial goals and objectives;
ii) Formulating as well as promulgating both long-term and short-term financial policies;
iii) Developing strategies and procedures that aid in the promulgation of the financial policies;

Financial Organization

This financial organization process involves the following main steps**:**

i) Grouping of financial functions into divisions, departments and sections etc.;
ii) Allocation of financial functions amongst financial executives;
iii) Entrusting financial powers and duties amongst the financial executives and
iv) Fixing financial accountability and responsibilities of the financial executives

Financial Coordination and Control

This process of financial management involves the following main steps**:**

i) Coordination of financial functions between the financial executives;
ii) Determination of operational standards relating to financial functions;
iii) Evaluation of the enterprises' actual performances in relation to pre-determined standards;
iv) Instigation of corrective actions in case of deviations and
v) Follow-up actions to ascertain if corrective actions are effective

Financial Reporting

The following major steps are involved in this process of financial management**:**

i) Collection and recording of financial data;
ii) Processing and analyzing of financial data;
iii) Preparation and publication of financial reports and statements;
iv) Circulation of financial reports and statements to interest groups.

Financial Merger

The following major steps are included in this process of financial management**:**

i) Determining legal framework and also identifying legal process involved in mergers;
ii) Determining the price considerations of the acquired or merged company;
iii) Identifying the methods to be followed in mergers;
iv) Determining the mode of payment of purchase consideration.

Tax Management

This process includes the following main steps of financial management**:**

i) Following the appropriate tax policy by the government of the country;
ii) Proper assessing of the enterprises in respect of income tax, VAT, etc. and
iii) Evolving appropriate tax accounting system in the enterprises.

Insurance Management

The following major steps are involved in this process of financial management**:**

i) Introducing and following appropriate insurance system and
ii) Determining appropriate insurance policy to be taken by the enterprises.

Review Questions

Short Questions

1. Who are financial executives of an enterprise? Classify them in terms of administrative hierarchy.
2. What are the executive finance functions? Give examples.
3. What are the incidental finance functions? Give examples.

Broad Questions

1. Examine the following financial decisions in the context of a large-scale industrial enterprise-
   i) Investment decision
   ii) Financing decision
   iii) Dividend decision
2. Examine the relationship between firm's major financial decisions with the help of a chart.
3. Discuss the role of top-level financial executives of a large industrial organization.
4. Briefly discuss major steps involved in the following financial management process:
   i) Financial Planning ii) Financial Organization
   iii) Financial Coordination and Control iv) Financial Reporting v) Financial Merger

SOURCES OF FINANCE

2

Unit Highlights

- **Lesson -1:** Short-term sources of Financing.
- **Lesson -2:** Long-term Sources of Financing.

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson–2: Short term Financing

After carefully reading this Lesson 2, you should be able to-

- *Realize the concepts and necessity of short term financing and selection of its sources*
- *Know the mode and procedures involved in short-term financing and*
- *Determine the costs involved in trade and bank credits.*

Concepts and Necessity of Short term Financing

The need for short-term financing arises mainly because the investment in working capital/current assets, that is, raw materials, work/stock-in-process, finished goods and receivables typically fluctuates during the year. Although long-term funds partly finance current assets and provide the margin money for working capital, such assets/working capitals are virtually exclusively supported by short-term sources. The necessity for financing working capital also arises to maintain the liquidity and short-term solvency of a firm. Lenders, suppliers and creditors expect prompt payments of their dues. This requires the solvency of a firm on a continuous basis. Again, the sources of financing working capital play a vital role in maintaining liquidity and profitability of the firm. If permanent working capital is financed by short-term loans, the business will face lack of liquid assets when the loan falls due. It will cause interruption in the normal business operation. On the other hand, if temporary working capital is financed by long term finance, the amount will remain idle after the need for such capital is over; this causes loss to the firm to the extent of cost of capital. Therefore, it is also expected that an organization is to select appropriate source for financing the working capital.

Major Sources of Short term Financing.

The main sources of short term financing are: (i) trade credit; (ii) bank credit; (iii) accruals; (iv) commercial paper and (v) factoring. The following sub-sections deal with each of the sources.

Trade Credit

Features

Trade credit refers to the credit extended by the supplier of goods and services in the normal course of transaction/business/sale of the firm. According to trade practices, cash is not paid immediately for purchases but after an agreed period of time. Thus, deferral of payment (trade credit) represents a source of finance for credit purchases. There is, however, no formal/specific negotiation for trade credit. It is an informal arrangement between the buyer and the seller. There are no legal instruments/ acknowledgements of debt, which are granted on an open account basis. Such credit appears in the records of the buyer of goods as sundry creditors/accounts payable.

There are two components of trade credit namely free and costly.

Free trade credit Credit received during the discount period.

Costly trade credit Credit taken in excess of "free" trade credit, whose cost is equal to the discount lost.

Costs of Trade Credit

Trade credit does not involve any explicit interest charge. However, there is an implicit cost of trade credit. It depends on the credit terms offered by the supplier of goods. If the terms of the credit are, say, 45 days net, the payable amount to the supplier of goods is the same whether paid on the date of purchase or on the 45th day and, therefore, trade credit has no cost, that is, it is cost-free. But if the credit terms are, say, 2/15, net 45, that is, there is

discount for prompt payment, the trade credit beyond the discount period has a cost equals to : [(Discount/1 – Discount) × (360 days/Credit period - Discount period)]. Alternatively, the credit terms, 2/15, net 45, imply that the firm (buyer) is entitled to 2 percent discount for payment made within 15 days when the entire payment is to be made within 45 days.

To sum up, as the cost of trade credit is generally very high beyond the discount period, firms should avail of the discount on prompt payment. If, however, they are unable to avail of discount, the payment of trade credit should be delayed till the last day of the credit (net) period and beyond without impairing their credit-worthiness. But, a precondition for obtaining trade credit particularly by a new company is cultivating good relationship with suppliers of goods and obtaining their confidence by honoring commitments.

The following equation can be used to calculate the approximate percentage cost, on an annual basis, of not taking cash discounts – that is, the cost of forgoing discounts.

Approximate Cost of forgoing a Cash Discount (%) =

$$\frac{\text{Discount Percent}}{100-(\text{Discount Percent})} \times \frac{360 \text{ days}}{\text{Total days Net credit is a available} - \text{Discount Period}}$$

Bank Credit

Bank credit is the primary institutional source of working capital finance in Bangladesh. In fact, it represents the most important source for financing of current assets. Working capital finance is provided by banks in five ways: (i) cash credits/overdrafts, (ii) loans, (iii) purchase/ discount bills, (iv) letter of credit and (v) working capital term loans.

Cash Credits/Overdrafts**: Under cash credit/overdraft form/ arrangement of bank finance, the bank specifies a predetermined borrowing/credit limit. The borrower can draw/borrow up to the stipulated credit/ overdraft limit. Within the specified limit, any numbers of drawls/drawings are possible to the extent of his requirements periodically. Similarly, repayments can be made whenever desired during the period. The interest is determined on the basis of the running balance/amount actually utilized by the borrower and not on the sanctioned limit.**

Loans**: Under this arrangement, the entire amount of borrowing is credited to the current account of the borrower or released in cash. The borrower has to pay interest on the total amount. The loans are repayable on demand or in periodic instilments. They can also be renewed from time to time. As a form of financing, loans imply a financial discipline on the part of the borrower.**

Bills Purchased/Discounted: This arrangement is of relatively recent origin in Bangladesh. Under this arrangement, bank credit is being made available through discounting of usance bills by banks. The amount made available under this arrangement is covered by the cash credit and overdraft limit. Before discounting the bill, the bank satisfies itself about the credit-worthiness of the drawer and the genuineness of the bill. To popularize the scheme, the discount rates are fixed at lower rates than those of cash credit.

The modus operandi of bill finance as a source of working capital financing is that a bill arises out of a trade sale-purchase transaction on credit. The seller of goods draws the bill on the purchaser of goods, payable on demand or after a usance period not exceeding 90 days. On acceptance of the bill by the purchaser, the seller offers it to the bank for discount/purchase. On discounting the bill, the bank releases the funds to the seller. The bill is presented by the bank to the purchaser/acceptor of the bill on due date for payment the bills can also be rediscounted with the other banks. However, this form of financing is not very popular in the country.

Term Loans for Working Capital Under this arrangement, banks advance loans for 3-7 years repayable in yearly or half-yearly instilments.

Letter of Credit While the other forms of bank credit are direct forms of financing in which banks provide funds as well as bear risk, letter of credit is an indirect form of working capital financing and banks assume only the risk, the credit being provided by the supplier himself.

The purchaser of goods on credit obtains a letter of credit from a bank. The bank undertakes the responsibility to make payment to the supplier in case the buyer fails to meet his obligations. Thus, the modus operandi of letter of credit is that the supplier sells goods on credit/extends credit (finance) to the purchaser and the bank gives a guarantee and bears risk only in case of default by the purchase.

Cost of Bank Credit

Prime Rate

A published rate of interest charged by banks to short-term borrowers (usually large, financially secured corporations) with the best credit; rates on short-term loans generally are "pegged" to the prime rate. The cost of bank loans varies for different types of borrowers at any given point in time and for all borrowers over time. Interest rates arc higher for riskier borrowers and rates also are higher on smaller loans because of the fixed costs involved in making and servicing loans. If a firm can qualify as a "prime credit" because of its size and financial strength, it might be able to borrow at the prime rate, which traditionally has been the lowest rate banks charge. Rates on other loans generally are scaled up from the prime rate.

Interest paid on a hank loan generally is calculated in one of three ways: (1) simple interest (2) discount interest; and (3) add—on interest. These three approaches are explained in the following sections.

Computing the Annual Cost (Rate) of Bank Loans

Before we describe the specific feature of each of the three approaches to computing the interest paid on hank loans, it will be useful to briefly discus how the effective annual rate of return (percent cost) and the annual percentage rate (APR) arc calculated.

For any types of short-term credit, we can compute the interest rate for the period the funds are used with the following equation.

We can compute the effective annual rate and the annual percentage rate (APR) using the following formula:

$$\text{Interest rate per period (cost)} = \frac{\text{Dollar Taka cos t of borrowing}}{\text{Amount of usable funds}}$$

$$\text{Effective annual rate} = \text{EAR} = (1 + \text{Interest rate per period})^{m} - 1.0$$

$$\text{Annual percentage rate} = \text{APR} = (\text{Interest rate per period}) \times m$$

Where m is the number of borrowing periods in one year (i.e., if the loan is for one month, m = 12).

Simple Interest Loan

Both amount borrowed and the interest charged on that amount are paid at the maturity of the loan; there are no payments made before maturity.

Face value The amount of the loan or the amount borrowed; also called the principal amount of the loan.

Discount Interest Loan: A loan in which the interest, which is calculated on the amount borrowed, is paid at the beginning of the loan period; interest is paid in advance.

Add-on Interest: Interest that is calculated and then added to the amount borrowed to obtain the total dollar amount to be paid back in equal installments.

Accruals

Accruals refer to continually recruiting short-term liabilities, liabilities such as wages and taxes that increase spontaneously with operations. Firms generally pay employees on a weekly, biweekly, or monthly basis, so the balance sheet typically will show some accrued wages. Similarly, the firm's own estimated income taxes, the social, the social security and income taxes withheld from employee payrolls, and the sales taxes collected generally are paid on a weekly, monthly, or quarterly basis, so that balance sheet typically will show some accrued taxes along with accrued wages.

Accruals increase automatically or spontaneously, as a firm's operations expand. Further, this type of debt generally is considered "free" in the sense that no explicit interest is paid on funds raised through accruals. However, a firm ordinarily cannot control its accruals. The timing of wage payments is set by economic forces and industry custom, while tax payment dates are established by law. Thus, firms use all the accruals they can, but they have little control over the levels of these accounts.

Commercial Paper:

Commercial paper (CP) is a short-term unsecured negotiable instrument, consisting of usance promissory notes with a fixed maturity. It is issued on a discount on face value basis but it can also be issued in interest- bearing form. A CP when issued by a company directly to the investor is called a direct paper. The companies announce current rates of CPs of various maturities and investors can select those maturities which closely approximate their holding period. When CPs are issued by security dealers/dealers on behalf of their corporate customers, they are called dealer paper. They buy at a price less than the commission and sell at the highest possible level. The maturities of CPs can be tailored within the range to specific investments.

As the CPs are issued at discount and redeemed at it face value, their effective pre-tax cost/interest yield

$$= \left(\frac{\text{Face value} - \text{Net amount realised}}{\text{Net amount realised}} \right) \times \left(\frac{360}{\text{Maturity period}} \right)$$

Where net amount realized = Face value – discount – issuing and paying agent (IPA) charges, that is, stamp duty, rating charges, dealing bank fee and fee for stand by facility.

Factoring

Factoring provides resources to finance receivables as well as facilitates the collection of receivables. Although such services constitute a critical segment of the financial services scenario in the developed countries; but in our country factoring is quite new.

Definition Factoring can broadly be defined as an agreement in which receivables arising out of sale of goods/services are sold by a firm (client) to the factor (a financial intermediary) as a result of which the title of the goods/services represented by the said receivables passes on to the fact the factor.

Mechanism Credit sales generate the factoring business in the ordinary course of business dealings Realization of credit sales is the main function of factoring services. Once a sale transaction is completed the factor steps in to realize the sales. Thus, the factor works between the seller and the buyer and sometimes with the seller s banks together.

Functions of a Factor

Depending on the type/form of factoring the main functions of a factor in general terms can be classified into five categories;

- Financing facility/trade debts;
- Maintenance/administration of sales ledger;
- Collection facility/of accounts receivable;
- Assumption of credit risk/credit control and credit restriction and
- Provision of advisory services

Modes of Security

Banks provide credit on the basis of the following modes of security **:**

Hypothecation: Under this mode of security, the banks provide credit to borrowers against the security of movable property, usually inventory of goods. The goods hypothecated, however, continue to be in the possession of the owner of these goods (i.e., the borrower). The rights of the lending bank (hypothecate) depend upon the terms of the contract between the borrower and the lender.

Pledge: Pledge as a mode of security is different from hypothecation in that in the former unlike in the latter, the goods which are offered as security arc transferred to the physical possession of the lender. An essential prerequisite of pledge, therefore, is that the goods are in the custody of the bank.

Lien: The term 'lien' refers to the right of a party to retain goods belonging to another party until a debt due to him is paid. Lien can be of two types (i) particular lien and (ii) general lien Particular lien is a right to retain goods until a claim pertaining to these goods is fully paid. On the other general lien can be applied till all dues of the claimant are paid. Banks usually enjoy general lien.

Mortgage: It is the transfer of a legal/equitable interest in specific immovable property for securing the payment of debt. The person who parts with the interest in the property is called 'mortgagor' and the bank in whose favor the transfer takes place is the 'mortgagee. The mortgage interest in the property is terminated as soon as the debt is paid. Mortgages are taken as an additional security for working capital credit by banks.

Charge: Where immovable property of one person is, by the act of parties or by the operation of law, made security for the payment of money to another and the transaction does not amount to mortgage, the latter person is said to have a charge on the property and all the provisions of simple mortgage will apply to such a charge.

Secured Loan: It refers to a loan backed by collateral; for short-term loans the collateral often is inventory, receivables, or both. So far we have not addressed the question of whether loans

should be secured or not. Commercial paper is never secured, but all other types of loans can be secured if this is deemed necessary or desirable. Given a choice, it ordinarily is better to borrow on an unsecured basis because the bookkeeping costs of secured loans often are high. However, weak firms might find that they can borrow only if they put up some type of security or that by using security they can borrow at a lower rate.

Uniform Commercial Code: It refers to a system of standards that simplifies procedure for establishing loan security.

Accounts Receivable Financing: Pledging Receivables using accounts receivable as collateral for a loan. Accounts receivable financing involves either the pledging of receivables or the selling of receivables (called factoring). The pledging of accounts receivable is characterized by the fact that the lender not only has a claim against the receivables but also has recourse to the borrower.

Recourse: Under this, the lender can seek payment from the borrowing firm when receivables' accounts used to secure a loan are uncollectible.

Problems and Solution

Problem - 1

Galliinger Corporation projects an increase in sales from $ 1.5 million to $2 million, but it needs an additional $300,000 of current assets to support this expansion. The money can be obtained from the bank at an interest rate of 13 percent, discount interest; no compensating balance is required. Alternatively Gallinger can finance the expansion by no longer taking discounts, thus increasing accounts payable. Galliger purchases under terms of 2/10, net 30, but it can delay payment for an additional 35 days paying in 65 days and thus becoming 35 days past due- without a penalty because of its suppliers' current excess capacity problems.

a. **Based strictly on effective annual interest rate comparisons, how should Gallinger finance its expansion?**

b. **What additional qualitative factors should Gallinger consider before reaching a decision?**

Solution

a. Commercial bank loan		
Amount loaned	= (0.75) ($250.000)	= $187,500
Discount	=0.09/12) ($187.500)	= (1,406)
Compensating balance	=(0.20) ($187.500)	= (37,500)
Amount received		= $148,594
Interest expense	= (0.09) ($187, 500)	= $ 16,875
Credit department*	= ($4,000) (12)	= $ 48,000
Bad debts*	=0.02) ($250,000) (12)	= $ 60,000
Total annual costs		= $124,875.

The costs of the credit department and bad debts are expenses that will be incurred if a bank

loan is used, but these costs will be avoided if the firm accepts the factoring arrangement.

Factoring :		
Amount loaned	= (0.85)($250,000)	=$212,500
Commission for period	=(0.035)($250,000)	=(8,750)
Prepaid interest	=(0.09/12)($203,750)	=(1,528)
Amount received		=$202,222
Annual commission	=($8,750)(12)	=$105,000
Annual interest	=(0.09)($203,750)	=18,338
Total annual costs		=123,338

b. The factoring costs are slightly lower than the cost of the bank loan, and the factor is willing to advance significantly greater amount. On the other hand, the elimination of the credit department could reduce the firm's options in the future.

Problem – 2

Gifts Galore Inc. borrowed $1.5 million from National City Bank (NCB). The loan was made at a simple annual interest rate of nine percent a year for three months. A 20 percent compensating balance requirement raised the effective interest rate because the company does not maintain a checking balance at NCB.

Required

The approximate interest rate (APR) on the loan was 11.25 percent. What was the true effective rate?

Solution

Total amount of loan = $ 15,00,000
Interest 9% on $ 15,00,000 = $ 1,35,000
Effective loan = Total loan – Compensating balance
= $ 15,00,000 – 20% of $ 15,00,00
= $ 12,00,00

Hence, true effective interest rate = $\frac{\text{Total Interest}}{\text{Effective Loan}} \times 100$

$= \frac{1,35,000}{12,00,000} \times 100$

= 11.25%

Problem – 3

Calculate the approximate cost of non-free trade credit under each of the following terms:

(a) 1/15, net 20;
(b) 2/10, net 60
(c) 3/10, net 45
(d) 2/10, net 45
(e) 2/15, net 40

Solution

a) We know that approximate cost of foregoing cash discount (ie. Cost of non free trade credit)

$$= \frac{\text{Discount \%}}{(100 - \text{Discount \%}))} \times \frac{360}{(\text{Total days net payable - Discount period})}$$

$$= \frac{1}{(100-1))} \times \frac{360}{20-15}$$

$$= 7.27\%$$

b) Cost of non free trade credit $= \frac{2}{(100-2)} \times \frac{360}{(60-10)} = 14-69\%$

c) Cost of non free trade credit

$$= \frac{3}{(100-3)} \times \frac{360}{(45-10)} = \frac{1080}{3395} = 3.18\%$$

d) Cost of non free trade credit

$$= \frac{2}{(100-2)} \times \frac{360}{(45-10)} = \frac{720}{3430} = 20.99\%$$

e) Cost of non free trade credit

$$= \frac{2}{(100-2)} \times \frac{360}{(40-15)} = \frac{720}{2450} = 29.39\%$$

Problem – 4

a) If a firm buys under terms of 3/15, net 45, but actually pays on the 20th day and still takes the discount, what is the approximate cost of its non-free trade credit?

(b) Does it receive more or less credit than it would if it paid within 15 days?

Solution

a) Approximate cost of non free trade credit

$$= \frac{\text{Discount \%}}{(100 - \text{Discount \%})} \times \frac{360}{(\text{Total days net payable - Discount period})}$$

$$= \frac{3}{(100-3)} \times \frac{360}{(45-20)} = \frac{3}{97} \times \frac{360}{25}$$

$$= \frac{1080}{2425} = 44.54\%$$

b) Yes, it would receive more or less credit; because in this situation -

Approx cost of non free trade credit

$$= \frac{3}{(100-3)} \times \frac{360}{(45-15)} = \frac{1080}{2910} = 37.11\%$$

Problem – 5

Susan Visscher, owner of Visscher's Hardware, is negotiating with First Merchant's Bank for a $50,000, one-year loan, first Merchant's has offered Visscher the following alternatives. Calculate the effective interest rate for each alternative. Which alternative has the lowest effective interest rate?

(A) A 12 percent annual rate on a simple interest loan with no compensating balance required and interest due at the end of the year.
(B) A nine percent annual rate on a simple interest loan with a 20 percent compensating balance required and interest against due at the end of the year.
(C) An 8.75 percent annual rate on a discounted loan with a 15 percent compensating balance.

Solution

A Effective Interest Rate =

$$= \frac{\text{Interest on total loan}}{\text{Total loan}} \times 100 \frac{50{,}000 \times .12}{50{,}000} \times 100$$

$$= \frac{6000}{50{,}000} \times 100 = \underline{\underline{12\%}}$$

B Effective Interest Rate

$$= \frac{\text{Interest on total loan}}{\text{Total loan - compensating balance}} \times 100$$

$$= \frac{50{,}000 \times .09}{50{,}000 - 20\% \text{ of } 50{,}000} \times 100 \quad = \frac{4500}{40000} \times 100 = \underline{\underline{11.25\%}}$$

C Effective Interest Rate

$$= \frac{\text{Interest on total loan}}{(\text{Total loan - (Interest on Total loan} + \text{compensating balance}} \times 100$$

$$= \frac{50{,}000 \times .0875}{(50{,}000 - (4375 + 50{,}000 \times .15)} \times 100 \quad = \frac{4375}{38{,}125} \times 100 = \underline{\underline{11.48\%}}$$

Review Questions

A. Short Questions

1. Why shot term financing is necessary? Explain.
2. Why do the financial managers aware of the selection of sources of finance?
3. What is a trade credit? What are its main features?
4. Examine the components of trade credit.
5. What is the cost of trade credit? How it is determined?
6. What is bank credit? Distinguish between bank credit and trade credit.
7. How accounts play the role of short-term financing? Examine.
8. What is the cost of bank credit? How it is measured?
9. Examine the role of commercial paper as the source of short term financing.
10. 10. What is a factoring? What are the main functions of a factor?
11. What is receivable financing?
12. What is inventory financing?

B. Broad Questions

1. Briefly discuss the major sources of short-term financing.
2. Discuss the modes of procedures of using security in short term financing.
3. What are the merits of demerits of short term financing? Explain.

Review Problems

Problem - 1

Gallinger Corporation projects an increase in sales from $1.5 million to $2 million, but it needs an additional $300,00 of current assets to support this expansion. The money can be obtained from the bank at an interest rate of 13 percent, discount interest; no compensating balance is required. Alternatively, Gallinger can finance the expansion by no longer taking discounts, thus increasing accounts payable Gallinger purchases under terms of 2/10, net 30, but it can delay payment for an additional 35 days- paying in 65 days and thus becoming 35 days past due- without a penalty because of its suppliers' current excess capacity problems.

a. Based strictly on effective annual interest rate comparisons, how should Gallinger finance its expansion?
b. What additional qualitative factors should Gallinger consider before reaching a decision?

Problem – 2

The UFSU Corporation intends to borrow $450,000 to support its short-term financing requirements during the next year. The company is evaluating its financing options at the bank where it maintains its checking account. UFSU's checking account balance, which averages $50,000 can be used to help satisfy any compensating balance requirements the bank might impose. The financing alternatives offered by the bank include the following:

Alternative- 1: A discount interest loan with a simple interest of 9 ¼ percent and no compensating balance requirement.

Alternative- 2: A ten percent simple interest loan that has a 15 percent compensating balance requirement.

Alternative- 3: A $1 million revolving line of credit with simple interest of 9 ¼ percent paid on the amount borrowed and a ¼ percent commitment fee on the unused balance. No compensating balance is required.

a. Compute the effective cost (rate) of each financing alternative assuming UFSU borrows $450,000. Which alternative should UFSU use?

b. For each alternative, how much would UFSU have to borrow in order to have $45,000 available for use (to pay the firms bills) ?

Problem – 3

Cooley Industries needs an additional $500,000, which it plans to obtain through a factoring arrangement. The factor would purchase Cooley's accounts receivable and advance the invoice amount, minus a two percent commission on the invoices purchased each month. Cooley sells on terms of net 30 days. In additional, the factor charges a 12 percent annual interest rate on the total invoice amount, to be deducted in advance.

a. What amount of accounts receivable must be factored to net $50,000?
b. If Cooley can reduce credit expenses by $3,500 per month and avoid bad debt losses of 2.5 percent on the factored amount, what is the total dollar cost of the factoring arrangement?
c. What would be the total cost of the factoring arrangement if Cooley's funding needs rose to $750,000? Would the factoring arrangement be profitable under these circumstances?

Problem – 4

Boles Corporation needs to raise &500,00 for one year to supply capital to a new store. Boles buys from its suppliers on terms of 3/10, net 90, and it currently pays on the 10^{th} day and takes discounts, but it could forgo discounts, pay Alternatively, Boles could borrow from its bank on a 12 percent discount interest rate basis. What is the effective annual interest rate of the lower cost sources?

Problem – 5

Bankston Feed and Supply Company buys on terms of 1/10, net 30, but it has not been taking discounts and has actually been paying in 60 rather than 30 days. Bankston's balance sheet follows (thousands of dollars):

Cash	$50	Accounts payable	$ 500
Accounts receivable	450	Notes payable	50
Inventories	750	Accruals	50
Current assets	$1,250	Current liabilities	$ 600
		Long term debt	150
Fixed assets	750	Common equity	1,250
Total assets	$2,000	Total liabilities and equity	$2,000

*Stated net of discounts.

Now Bankston's suppliers are threatening to stop shipments unless the company begins making prompt payments (that is, paying in 30 days or less). The firm can borrow on a one-year note (cell this a current liability) from its bank at a rate of 15 percent, discount interest, with a 20 percent compensating balance required. (Bankston's $50,000 of cash is needed for transactions; it cannot be used as part of the compensating balance).

a. Determine what action Bankston should take by calculating (1) the cost of non free trade credit and (2) the cost of the bank loan.

b. Assume that Bankston forgoes discounts and then borrows the amount needed to become current on its payables from the bank. How large will the bank loan be?

Lesson–2: Long Term Financing–Internal and External

After carefully reading this lesson 2, you should be able to -

- *Realize the necessity of long-term financing.*
- *Identify the features, merits and demerits of long term financing.*
- *Discuss the sources of long-term internal financing.*
- *Describe the sources of long term external financing and*
- *Compare and contrast the internal and external sources of long term financing.*

Necessity of Long-Term Financing

By long term financing, we mean the financing of fixed or permanent aspects of a firm. That is, fixed or permanent capital can be procured by using long term sources of financing. By long term, we mean the period exceeding 3/5 years. Therefore, financing the fixed or permanent types of aspects namely land, building, factories, plant, machining equipment, furniture and fixtures, patents and copyright etc. for a period exceeding 3/5 years is known as long-term financing.

Every company whether manufacturing, trading or service rendering have to invest their funds in fixed or permanent assets as mentioned above. These assets are used for production purposes in cases of the manufacturing and service rendering firms and for trading purposes in cases of the trading concerns. The expected life span of these assets is longer exceeding 3/5 years. Therefore, the long term investment decision of a firm involves the acquisition of long-term/ fixed, permanent assets of the firm. The long-term investment decisions are the most significant in determining long term existence, profitability and growth of a firm. The success or failure of a firm depends mainly on the correct long term investment decision, of the firm. In order to implement such long-term investment decisions successfully, the long-term funds are essential. Here lies the necessity of long term financing by a firm.

There are a number of sources from which long-term funds or fixed/ permanent capital may be raised. These are: issuing shares/stocks, common or preferred, issuing debentures, bonds, taking term loans and or project loans from development financial institutions and internal sources like depreciation, retained earnings, general reserves etc. Hence, the selection of proper source(s) of long-term financing is crucial to the financial management. While selecting sources of long term finance, the financial management should consider (i) availability of source; (ii) Terms and condition involved in the source and (iii) cost of capital. If these considerations are favorable in case of the source (s); the firm select that source(s) and raise funds from that sources(s). On the other hand, if the considerations are not favorable in case of the source(s), the firm does not select that source(s) for raising the fund. Here lies the significance of the selection of long term financing source by a firm.

Features, Merits and Demerits of Long-term Financing

Long-term financing is the most important method of financing. The main features of such financing are described below:

i. **Period:** Generally, long-term financing relates to the long period exceeding 3/5 years.
ii. **Origin of source:** Long-term financing mainly consists of internal and external sources.
iii. **Fixed rate of interest:** Long-term debt financing carries a fixed rate of interest which must be paid to the financiers.
iv. **Fixed dividend:** Long-term preferred stock financing also carries a fixed dividend which must be paid to the preferred stock holders.
v. **Risk:** Long term procedure involved in long-term financing increases risk of the firm.
vi. **Security:** In case of debt financing, the debt holders need to be given security by the firm in the form of any of its assets.
vii. **Formalities:** A number of formalities is to be undertaken by the firm raising long-term fund.

Merits: Long-term financing has the following merits:

i. **Taking more fund:** More long-term fund may be raised by the use of long-term sources.
ii. **For more period:** Long-term funds are usually taken for more periods.
iii. **Less costly:** Debt financing generally involves less cost than equity, preferred and internal sources of financing.
iv. **Tax benefits:** Debt financing brings tax benefits in the sense that interest on debt is exempted for tax purposes.
v. **Easy way of raising fund:** If the capital market is organized, long-term funds may be raised easily.
vi. **Effective investment:** Long-term financing may ensure effective investment on the part of the firm.
vii. **Control:** Dilution of control of the firm does not arise if the firm use debt financing instead of equity financing.
viii. **Expansion and development:** It is through long-term financing that the firms can invest their funds for their expansion and development.

Demerits:

i. **Security problem:** Long-term financing creates security problems on the part of the borrowing firms.
ii. **Control problem:** Long-term equity financing creates control problem for the existing equity shareholders of the firm.
iii. **Increase risk:** Debt financing increases risk of the borrowing firms.
iv. **High rate of interest:** Debt financing which is the most important method of long-term financing for the corporate firms involves high rate of interest.
v. **Difficulty in re-payment:** Since long-term debt financing is of larger amount, hence in most of the cases difficulty arises on the part of the borrowing firms at the time of repayment of the loans.

Sources of Long-term Internal Financing

Internal financing refers to the funding from within the organization and not from any outside sources. Hence, internal financing is confined to the organization itself. The sources of internal financing are (i) provision of retained earnings; (ii) depreciation and (iii) general reserves. Each of the sources is discussed in the sub section that follows:

Retained Earnings

The retained earnings enable a firm to withstand seasonal reactions and business fluctuations. They create greater resistance power for the industry to face depression. Secondly, the large retained earnings facilitate a stable dividend policy and enhance the credit-standing of a company. Thirdly, they act as an important internal source of capital for expansion purpose and without creating a charge against the assets a company meets its requirements of finance internally for expansion and other development schemes. Fourthly, the deficiencies of depreciation, depletion and obsolescence can be made up by utilizing the retained earnings. The operating efficiency is thus maintained easily by the corporate savings. Lastly, the retained earnings can also be used for retiring the bonds, debentures etc. for creating sinking funds and for redeeming the debts. A firm can thus be relieved of the fixed burden of the interest charges.

Depreciation Provision

Depreciation is the expiry of service potential or consumption of operating capacity and unless it is provided for, capital would not be taken to be maintained intact. In fact, the concept of depreciation derives from the desire to maintain capital intact. The main emphasis here is on the maintenance of assets or operating capacity therein. Charging depreciation against profits helps to retain a firm equal to profits, if profits are sufficient to cover all costs including losses related to

the assets. The funds thus accumulated during the life time of an asset finally assist in maintenance of service potential through purchase of an identical asset or an asset having the same operating period.

Depreciation is a non-cash expense; although it is a charge against profit. Charging depreciation against profit is nothing but an underestimation of profit by the amount of depreciation. But, the real profit is more than the accounting profit by the amount of that depreciation. So, depreciation provision acts as a creation of fund from the operating profits of the firm. That is why; depreciation is added back with the operating profit in order to find out the fund or cash inflows of an enterprise. That is, for finding out fund from operations depreciation is added with the operating profits. As a source of fund, internal resource is preferred by the corporate firms because of its easy availability within the firm as well as non-involvement of any floatation costs.

General Reserves/ Dividend Reserve

General reserves/ dividend reserves refer to a portion of profit transferred to those reserves. Such reserves are created out of net profits of a firm. The owners are the claimants of such reserves. These reserves when reinvested in business for balancing, modernizing, replacement, expansion of the same act as the internal source of long term financing. As a source of finance, they are easily available within the firm if they have been already created by the firm. Floatation/issue costs are not involved in case of these reserves. There is also no dilution of the control of the firm by the use of these reserves.

Sources of Long term External Financing

External financing refers to the long term funding by using sources outside the organization. That is, wherever the firms use the sources outside themselves for raising long terms funds; it is known as long term financing. The major sources of long term financing are discussed in the following sub sections.

Equity Share/ Common Stock

Equity capital represents ownership capital and its owners-ordinary shareholders/equity holders share the reward and risk associated with ownership of corporate enterprises. It is also called ordinary share capital in contrast with preference share capital which carries certain preferences/prior rights in regard to income and redemption.

The equity shares have some especial features in terms of (i) residual claim to income; (ii) residual claim on assets; (iii) right to control; (iv) voting system; (v) pre-entire right and (vi) limited liability.

Preferred Stock/ Preference Share

Preference capital is a unique type of long-term financing in that it combines some of the features of equity as well as debentures. As a hybrid security/form of financing, it is similar to debenture insofar as **:** (i) it carries a fixed/stated rate of dividend, (ii) it ranks higher than equity as a claimant to the income/assets, (iii) it normally does not have voting rights and (iv) it does not have a share in residual earnings/assets. It also possesses some of the attributes of equity capital, namely, (i) dividend on preference capital is paid out of divisible/after tax profit that is, it is not tax-deductible, (ii) payment of preference dividend depends on the discretion of management, that is, it is not an obligatory payment and non-payment does not force insolvency/liquidation and (iii) irredeemable type of preference shares have no fixed maturity date.

Debentures/ Bonds/ Notes

Akin to a promissory note, debentures/bonds represent creditorship securities and debenture holders are long-term creditors of the company. As a secured instrument, it is a promise to pay

interest and repay principal at stipulated times. In contrast to equity capital which is a variable income (dividend) security, the debentures/notes are fixed income (interest) security.

Term Loans

Term loans are also known as term/project finance. The primary sources of such loans are financial institutions. Commercial banks also provide term finance in a limited way. The financial institutions provide project finance for new projects and also for expansion/diversification and modernization whereas the bulk of term loans extended by banks is in the form of working capital term loan to finance the working capital gap. Though they are permitted to finance infrastructure projects on a long-term basis, the quantum of such financing is marginal.

Internal Vs External Sources of Long term Financing

Differences between Internal Vs External Sources of Financing

The following table presents the main differences between the internal and external sources of financing:

SL. No.	Points of Differences	Internal Sources	External Sources
1	Organization	Comprise the sources within the organization	Comprise the sources outside the organization
2	Sources	Retained earnings depreciation provision, general reserves and dividend reserves etc. are the main sources.	Share issues, bond and debenture issues, long term loans are the main sources.
3	Dependence	Internal financing generally depends on profit volume & its stability.	External financing depends on financial conditions of the country, the organization and the capital markets.
4	Impact	It is influenced by dividend policy	It is influenced by future profitability.
5	Floatation & Issue costs	Does not arise in case of internal financing.	Always arises in case equity and debt financing.
6	Amount of fund	In this case, amount of fund is limited by amount of retained earnings, depreciation and other general reserves.	In case of profitable investment, no limit of amount of fund.
7	Interest/ Dividend	No interest or dividend is involved.	Interest and dividend are involved in case of debt financing and equity and performance respectively.
8	Time limit of repayment	No fixed time limit of repayment.	There is fixed time limit of repayment which is based on terms in case of debt financing.

Merits and Demerits of Internal Financing and External Financing

Merits of Internal Financing

The following are the main merits of long term internal financing

1. Requires less formality, complexity and cumbersome.
2 No changes occur in ownership and voting rights.
3. No difficulty arises as to repayment of loan.

4. Favorable financial leverage leads to payment of dividend at a higher rate.
5. No involvement of interest and external dividend
6. May successfully face the fluctuation in market rate
7. May increase profitability if it is used judiciously

Demerits of Internal Financing

The following are the demerits of long-term of external financing **:**

1. It is not possible to use internal sources of finance in cases of inadequate or no profit.
2. May give rise to misuse of funds by the management.
3. In case of emergency, these sources may not be used because of shortage of profits.
4. In case of inflation, the use of these sources are not desirable.

Merits of External Financing

The following are the merits of external financing:

1. In case of lower interest rate, owners can be paid dividend at a higher rate.
2. Less income tax payment due to exemption of interests from tax.
3. In case of debt financing, there is no dilution of control of business.
4. It acts as the lender of last resort for the firms having less or no internal sources.
5. At the time of inflation the use of external finance is profitable since real burden of debt remains lower at that time.

Demerits of External Financing

1. Debt financing increases financial risk of the firm
2. Interest is a compulsory payment whether the firms earns profit or not
3. In case of lower rate of profit than the rate of interest, it may impose adverse impact on the owners' dividend
4. Anxiety may arise amongst the financial managers just before repayment of loan.

Review Questions

Short Questions:

1. What do you mean by long term financing?
2. Discuss the necessity of using long-term financing.
3. Why selection of proper source(s) of long-term financing is important? Explain.
4. Discuss the features of long-term financing
5. What are the merits of long-term financing? Discuss.
6. What are the demerits of long-term financing? Explain.
7. Distinguish between internal financing and external financing.
8. What are merits and demerits of internal financing?
9. What are the merits and demerits of external financing?

Broad Questions

1. Discuss the various sources of long-term internal financing.
2. Discuss the various sources of long-term external financing.
3. "The main crux of the financial manager of a corporate firm is the proper mix of internal and external financing". Explain the statement. Give arguments for and against internal and external financing.

Time Value of Money

3

Unit Highlights

- **Lesson -1:** Time Value of Money: Basic Concepts
- **Lesson -2:** Time Value of Money: Annuity

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson-1: Time Value of Money: Basic Concepts

After successfully completing lesson 1, you should be able to-

- *Have a clear concept on time value of money and other relevant values;*
- *Know the tools and techniques involved in determining present, future or terminal values and*
- *Solve for time and interest rates for present and future values.*

Concept of Time Value of Money and other Relevant Values

In the literature of Finance and Mathematics, time value of money concept has been recognized. The concept signifies that money has time value. That is, the value of money varies in terms of time. According to this concept, a dollar received today is worth more than a dollar expected to be received in the future. This is because of the fact that the sooner a dollar is received, the quicker it can be invested to earn a positive return. Therefore, it is true that one dollar in the future is less valuable than one dollar of today. The relationship between one dollar in the future and one dollar of today is known as the time value of money. This present value concept of time value of money should be clearly understood by the investors as well as financial managers in order to examine its impact on the value of an asset.

Future value or terminal value and present value are associated with present value of money. The following paragraphs deal with these values.

Future Value or Terminal Value

Future value is the value of a cash flow or a series of cash flows at some time of a present amount of money. That is, future value refers to the amount to which a cash flow or a series of cash flows will grow over a given period of time. Therefore, the future value is dependent on three things: i) present value; (ii) period and (iii) rate of interest. Thus, the future value at the end of one year equals the present value multiplied by one plus interest rate. As for example, if present value equals to Tk. 100, period is 1 year and rate of interest is 10 percent; then future value will be Tk. 110.

Present Value

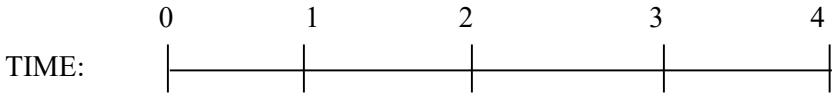
Present value is the value today of a future cash flow or series of cash flows. That is, present value is a future amount discounted to the present by some required rate. The present value is dependent on three things: (i) future value, (ii) period and rate of interest. As for example, if future value is Tk.115, period is one year and rate of interest is 15 percent; then present value will be Tk. 100 only.

Since, cash flow is involved in both the future value and present value; it needs clarification. Cash flow embraces both cash outflow and cash inflow. Cash outflow is a payment or disbursement of cash for expenses, investments and so on. On the other hand, cash inflow is a receipt of cash from an investment, an employer, a banker or from any other sources.

Tools and Techniques of Time Value of Money

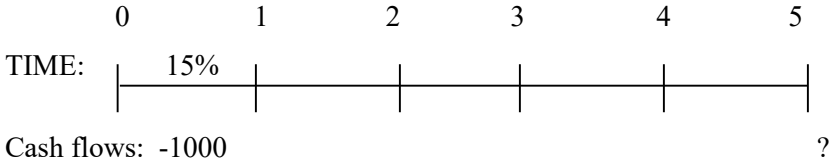
Tools used in Time Value of Money

One of the most important tools in time value of money analysis is the cash flow time line. It is a graphical representation used to show the timing of cash flows. Such line is used helping us visualizing when the cash flows associated with a particular situation. Constructing a cash flow time line will help us to solve problems related to the time value of money. This is because of the fact that it illustrates what happens in a particular situation, making it easier to set up the problem for solution. To illustrate the time line concept, let us consider the following diagram.



The above diagram shows that time 0 is today, time-1 one period from today or the end of the period-1; time-2 is two periods from today or the end of period-2 and so on. Thus the values on the top of the tick marks represent end of period values. Often the periods are years, but other time intervals like semi-annuals, quarters, months or even days are also used.

Cash flows are placed directly below the tick marks and interest rates are shown directly above the cash flows time line. Unknown cash flows which need to be found out in the analysis are indicated by question mark. As for example, consider the following time line.



In the above diagram, the interest rates for each of the five periods is 15%; a single amount or lump sum cash flows are made at time-0; and the time-5 value is an unknown inflow. Because, the initial Tk. 1000 is a cash outflow or an investment, so it has a minus sign. But, the period-5 amount is a cash inflow; so it does not have a minus sign. Note that no cash flows occur at times-1, 2, 3 and 4. Also note that we do not show Taka signs on time lines; this reduces clutter.

The cash flow time line is an essential tool for better understanding time value of money concepts. The financial experts use cash flow time line to analyze the complex problems.

Techniques of Time Value of Money

The following two techniques are generally used in time value money: (i) compounding and (ii) discounting.

Compounding Technique

A Taka in hand today is worth more than a Taka to be received in the future. This is because of the fact that if you had it now, you could invest it, earn interest and end up with more than one Taka. The process of going from today's values which are termed as present values (PV), to future values (FV) is called compounding. That is, the process of determining the value of a cash flow sometime in the future, by applying compound interest rate is known as compounding. By compound interest we mean interest earned on interest.

Compound Interest vs. Simple Interest

Compound interest refers to the interest earned on both the initial principal and the interest reinvested from prior periods, while simple interest refers to the interest earned only on the original principal amount invested. Let us clear these with examples. Suppose your principal amount is Tk. 1000 and the rate of interest is 10% and the period is 3 years. In the example, compound interest comes to Tk. 331 (100+110+121); whereas, simple interest comes to Tk. 300 (100+100+100) only at the end of 3 years.

Now, the question arises how the FVs are determined. There are two approaches to determine FVs**:** one is Equation approach and the other is Tabular approach.

In case of annual (single) compounding:

Under Equation Approach:

$$FVn = PV (1+i)^n$$

Where, FVn = Future value at period n

PV = Present value

i = Rate of interest

n = Time period

Under Tabular Approach:

$$FVn = (1 + i)n = PV(FV\ IF\ i,n)$$

Where, FVn = Future value at period n

PV = Present value

IF = Interest factor to be found out from Future Value Table

i = Rate of interest

n = Time period

Terms of Interest and Future Values

Interest may be paid annually, semiannually, quarterly, monthly, even daily and even continuously or infinitely and such mode of payment of interest is known as terms of interest. Interest may be paid annually, semiannually, quarterly, monthly, even daily and even continuously or infinitely and such mode of payment of interest is known as terms of interest. Such terms of interest have impact on the FVs. In the above Equation and Tabular Approaches of calculating FVs, we have assumed that interest is paid annually. Now, let us consider the relationship between FVs and interest rates for different periods of compounding. FVs and terms

of interest have direct relationship, implying that the number of times interest paid in a year (m) is increased, the FV also increases. For different terms of interest, the formula for finding out FVs under both the Equation and Tabular Approaches need to be adjusted as follows:

a) In case of Multiple Compounding

Under Equation Approach	**Under Tabular Approach**
$FVn = Pv\ (1 + \frac{i}{m})^{mn}$	$FVn = (1 + \frac{i}{m})^{mn}\ PV\ (FVIF\ \frac{i}{m}, mn)$

b) In case of continuous or infinite compounding

Under Tabular Approach

$FVn = PV\ (e^{i \times n})$

Where, e is the value equal to 2.7183

Future Value Interest Factor for i and n ($FVIF_{i, n}$)

FVIFi,n refers to the future value of Tk. 1 left on deposit for n periods at a rate of i percent per period that is, the multiplier by which an initial investment grows because of the interest earned. In order to find out IF from Future Value Table, time period (n) and rate of interest (i) should be considered simultaneously. In the Table, the vertical column represent n; whereas, the horizontal columns represent rates of interest.

Problems and solutions

Problem – 1

Find out the future values (FV) in the following situations:

a) At the end of 3 years, how much is an initial deposit of Taka 1,000 worth, assuming a quarterly compounded interest rate of (i) 10% and (ii) 100%.

b) At the end of 10 years, how much is an initial investment of Taka 1,000 worth, assuming an interest rate of 10% compounded **:** (i) annually; (ii) semiannually; (iii) quarterly, (iv)monthly and (v) continuously ?

Solution:

a) In this problem, given PV = Tk. 1,000; n = 3years and i = 10% percent; 100%; required finding out FV.

Under Equation Approach

(i) $FVn = PV(1+i)^n$

Where, FVn = Future value at n period;
PV = Present value
i = Interest rate and
n = Time period

Under Tabular Approach

(i) FVn = PV (FVIFi,n)
1,000(FVIF10%,3)
1,000 x 1.3310
Tk. 1,331.

$= 1{,}000(1 + .10)^3$

$= 1{,}000(1.10)^3$

$= 1{,}000 \times 1.331$

$= \underline{\text{Tk. } 1{,}331}$

(ii) FVn = PV(FVIFi,n)

= 1,000(FVIF100%,3)

= 1,000 x 8.000

$= \underline{\text{Tk. } 8.000.}$

(ii) Again, $1{,}000(1 + 1)^3$

$= 1{,}000 \times 8$

$= \underline{8{,}000.}$

b) In this problem, given PV = Tk. 1,000; n = 10 years and i = 10%; what is FV.

Solution:

Under Equation Approach	**Under Tabular Approach**
In case of annual interest : i) $FVn = PV(1+i)^n$ $= 1000(1+0.10)^{10}$ $= 1{,}000 \times 2.594$ $= \underline{\underline{\text{Tk.}2{,}594}}$	*i)* $FVn = PV(FVIFi, n)$ $= 1{,}000(FVIF10\%, 10)$ $= 1{,}000 \times 2.594$ $= \underline{\underline{Tk.2{,}594}}$
In case of semiannual interest : *ii)* $FVn = PV(1+\frac{i}{m})^{mn}$ $= 1000(1+\frac{10}{2})^{2\times10}$ $= 1000(1+0.05)^{20}$ $= 1000 \times 2.6533$ $= \underline{\underline{Tk.2{,}653}}$	ii) $FVn = PV(FVIF_{\frac{i}{m}}\ mn)$ $= PV(FVIF5\%,20)$ $= PV(2.6533)$ $= \underline{\underline{\text{Tk.}2653}}$

In case of quarterly interest :

iii) $FVn = PV(1+\frac{.10}{4})^{4.10}$
$= 1000(1+.025)^{40}$
$= 1000(2.6851)$
$= \underline{\underline{TK.2{,}685}}$

iii) $FVn = PV(FVIF_{\frac{i}{m}}, mn)$
$= 1000(FVIF_{2.5\%}, 40)$
$= 1000x2.6851$
$= \underline{\underline{\text{TK.}2{,}685}}$

In case of monthly interest :

iv) $FVn = PV(1+\frac{.10}{12})^{12x10}$
$= 1000(1+.00833)^{120}$
$= 1000(2.7059)$
$= \underline{\underline{TK.2706}}$

iv) $FVn = PV\ (FVIF_{\frac{i}{m}}, mn)$
$= 1{,}000\ \ (2.7059)$
$= \underline{\underline{TK.2{,}706}}$

In case of Compounding Interest:

v) $FVn = PV\ (e^{i\ x\ n})$
$= (2.7183)^{.10\ x\ 10}$
$= Tk.\ \underline{2{,}718.30}$

[**Note**: In cases of FVIF value has not been provided in the Future Value Table. So, in these cases FVIF has been calculated by using the alternative formula viz. FVIF = $\left(1+\frac{i}{m}\right)^{mn}$]

Problem - 2

Assume that it is now January 1, 2000. On January 1, 2001, you will deposit Tk. 1000 into a Savings Account of Janata Bank that pays 12 percent interest per annum.

Required:

(a) If the bank compounds interest annually how much will you have in your account on January-1, 2006?
(b) What would your January-1, 2005 balance be if the bank used quarterly compound?
(c) Suppose you deposited Tk. 1000 in payments of Tk. 200 each on January 1, 2001, 2002, 2003, 2004 and 2005. How much would you have in account on January-1, 2005, based on 10 percent annual compounding?

Solution:

Under Equation Approach

(a) $FVn = PV\ (1 + i)^n$

$= 1000\ (1 + 0.12)^5$

$= 1000 \times 1.7623$

$= Tk.\ \underline{1762}$

Under Tabular Approach

$FVn = PV\ (FVIFi, n)$

$= 1000\ (FVIF_{12\%}, 5)$

$= 1000 \times 1.76723$

$= Tk.\ \underline{1762}$

(b) **Under Equation Approach**

$$FVn = PV\ (1 + \frac{i}{m})^{mn}$$

$$= 1000\ (1 + \frac{.12}{4})^{4.4}$$

$$= 1000\ (1.03)^{16}$$

$$= 1000 \times 1.60477$$

$$= \underline{Tk.1605}$$

Under Tabular Approach

$$FVn = PV(FVIF_{\frac{i}{m}}, mn)$$

$$= PV(FVIF_{3\%}, 16)$$

$$= 1000 \times 1.6047$$

$$= \underline{Tk.1605}$$

(c) You may solve this problem by finding the future value of an annuity of Tk. 200 for 5 years at 10 percent**:**

$FVn = PMT\ (FVIFA_{i},n)$

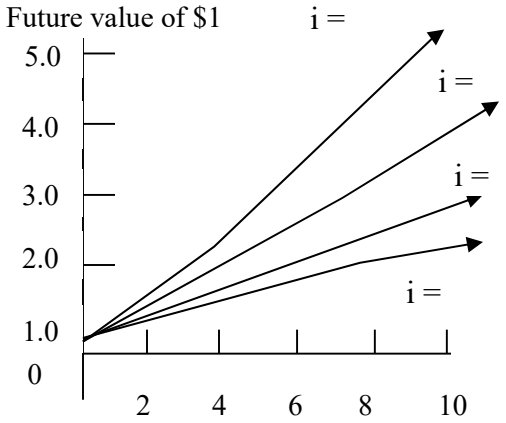
$Tk.\ 200(FVIFA_{10\%,}5)$

$Tk.\ 200\ (6.1051)$

$Tk.\ \underline{1,221.}$

Graphic View of the Compounding Process : Growth

Figure -1 shows Tk. 1 or any other sum grows over time at various interest rates. The higher the rate of interest, the faster the rate of growth. The interest rate is, in fact, a growth rate. An example is shown in figure-1 which indicates relationships among future value, growth, interest rates and time.

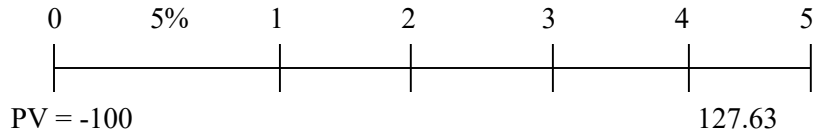


If a sum is deposited and earns 5 percent interest, then the funds on deposit will grow at a rate of 5 percent per period. Again, if a sum is deposited and earns 10 percent interest, then the funds on deposit will grow at a rate of 10 percent per period and so on. Also note that time value of money concepts can be applied to anything that is growing – sales, purchases, inventory, population, earning per share and so on.

Discounting Technique

Discounting refers to the process of determining the present value of a cash flow or a series of cash flows. It is the reverse of compounding. That is, the process of finding present values from future values is called discounting. If you know the FVs, you can discount the PVs. At the time of discounting you would follow these steps.

CASH FLOW TIME LINE



In the above figure it is seen that Tk. 100 would grow to Tk. 127.63 in 5 years at a 5 percent interest rates. Therefore, Tk. 100 is the PV of Tk. 127.63 due in 5 years in the future when the opportunity cost rate is 5 percent.

Determining Pvs Through Discounting

Like determination of FVs, PVs can also be determined by Equation Approach and Tabular Approach.

Under Equation Approach

$i)\quad PV = \dfrac{FVn}{(1+i)^n}$

(In case single interest payment)

$ii)\quad PV = \dfrac{FVn}{(1+\frac{i}{m})^{mn}}$

(In case multiple interest

Under Tabular Approach

PV (Single payment) =

$$FVn\left[\frac{1}{(1+i)^n}\right] = FVn(PVIF_i, n)$$

PV (Multiple payment) =

$$FVn\left[\frac{1}{(1+\frac{i}{m})^{mn}}\right] = FVn(PVIF_{\frac{i}{m}}, mn)$$

payment in a year like semiannually, quarterly, monthly and daily.)

iii) $PV = \frac{FVn}{e^{i \times n}} = FVn(e - i \times n)$

(In case continuous or infinite compounding)

Where *e* is the value equal to 2.7183.

Present Value Interest Factor (PVIF)

Present value interest factor for i and n (PVIFi,n) refers to the present value of Tk. 1 due n periods in the future discounted at i percent per period. In order to find out IF from Present Value Table, time period (n) and rate of interest (i) should be considered simultaneously. In the Table, the vertical column represents n; whereas, the horizontal column represent rates of interest.

Problems and Solutions

Problem - 3

Determine the Present Values (PVs) in the following cases:

a) Taka 1,000 at the end of 5 years is worth how much today, assuming a discount rate of: (i) 10 percent and (ii) 100 percent;

b) What is the aggregate PVs of the following receipts, assuming a discount rate of 15 percent?

i) Taka 1,000 at the end of 1 year;
ii) Taka 1,500 at the end of 2 years;
iii) Taka 1,800 at the end of 3 years;
iv) Taka 2,200 at the end of 4 years and
v) Taka 2,500 at the end of 5 years?

Solution

a) (i) In case of 10 percent discounting rate **:**

Under Equation Approach	**Under Tabular Approach**
$PV = \frac{FVn}{(1+i)^n}$ $= \frac{1000}{(1+.10)^5}$ $= \frac{1000}{1.6105}$ $= \underline{TK \quad 620.93}$	PV = FVn (PVIFi,n) = 1,000 (PVIF10%,5) = 1,000(.6209) = TK. 620.9

(ii) In case of 100 percent discounting rate **:**

Under Equation Approach	**Under Tabular Approach**
$PV = \frac{FVn}{(1+i)^n}$ $= \frac{1000}{(1+1)^5}$ $= \frac{1000}{325}$ $= \underline{TK \quad 31.25}$	PV = FVn (PVI Fi,n) = 1,000 (PVI F 100%,5) = 1,000(.031259) = TK. 31.25

b)

Under Equation Approach	**Under Tabular Approach**
i) $PV = \frac{FVn}{(1+i)^n} = \frac{1000}{(1+.15)^1} = \underline{TK. \quad 869.57}$	i) PV = FVn (PVI Fi,n) = 1,000 (PVI F15%,1) = 1,000(.8696) = TK. 869.60
ii) $PV = \frac{FVn}{(1+i)^2} = \frac{1500}{(1+.15)^2} = \frac{1500}{1.3225} = \underline{TK. \quad 1134.22}$	ii) PV = FVn (PVI F15%,2) = 1,500 (.7561) = TK. 1134.15
iii) $PV = \frac{FVn}{(1+i)^3} = \frac{1800}{(1+.15)^3} = \frac{1800}{1.5209} = \underline{TK. \quad 1183.51}$	iii) PV = FVn (PVI F15%,3) = 1,800 (.6575) = TK. 1183.50
iv) $PV = \frac{FVn}{(1+i)^4} = \frac{2200}{(1+.15)^4} = \frac{2200}{1.7490} = \underline{TK. \quad 1257.86}$	iv) PV = FVn (PVI F15%,4) = 2,200 (.5718) = TK. 1257.96
v) $PV = \frac{FVn}{(1+i)^5} = \frac{2500}{(1+.15)^5} = \frac{2500}{2.0114} = \underline{TK. \quad 1242.92}$	v) PV = FVn (PVI F15%,5) = 2,500 (.4972. = TK. 1243.00

Hence, aggregate PVs = Tk. 869.57 + Tk. 1,134.22 + 1,183.51 + Tk. 1,257.86 + 1,242.92=Tk. 5,688.08

Hence, aggregate PVs= Tk. 869.60 +1,134.15 +1,183.50 +1,257.96+ Tk. 1,243.00 = Tk. 5,688.21

Problem - 4

Find the present values of the following amount due :

a) Taka 6,600 due in 10 years at a 6 percent discount rate, calculating annually;

b) Taka 9,000 due in 8 years at a 12 percent discount rate, calculated semiannually;

c) Taka12,000 due in 6 years at a 18 percent discount rate, calculated quarterly and

d) Taka 15,000 due in 3 years at a 12 percent discount rate, calculated monthly.

e) Taka 18,000 due in 5 years at a 15 percent discount rate, calculated continuously.

a) $PV = \frac{FVn}{(1+i)^n} = \frac{6{,}600}{(1+.06)^{10}} = \frac{6{,}600}{1.7908} = \underline{TK.\ 3{,}685.50}$ b) $PV = \frac{FVn}{(1+\frac{i}{m})^{mn}} = \frac{9000}{(1+\frac{.12}{2})^{2.8}} = \frac{9000}{2.54035} = \underline{TK.\ 354282}$ c) $PV = \frac{FVn}{(1+\frac{i}{m})^{mn}} = \frac{12000}{(1+\frac{.18}{4})^{4.6}} = \frac{12000}{2.8760} = \underline{TK.\ 417246}$ d) $PV = \frac{FVn}{(1+\frac{i}{m})^{mn}} = \frac{15000}{(1+\frac{.12}{12})^{123}} = \frac{15000}{1.4308} = \underline{TK.\ 1048365}$	a) PV = FVn (PVI Fi,n) = 6,600 (PVI F6%,10) = 6,600(.5584) = TK. 3685.44 b) PV = FVn (PVI Fi/m,mn) = 9,000 (PVI $F_{12\%/2,2.8}$) = 9,000 (PVIF 6%, 16) = TK. 3542.40 c) PV = FVn (PVI Fi/m,mn) = 12,000 (PVIF 4.5%, 24) =12,000 (.3477) = TK. 4172.40 d) PV = FVn (PVI Fi/m,mn) = 15,000 (PVIF 1%, 36) = 15,000 (.6989) = TK. 10483.50 e) PV = $\frac{FVn}{e^{i \times n}}$ $= \frac{18{,}000}{2.7183^{.12 \times 5}}$ $= \frac{18{,}000}{1.8221}$ = Tk. 9,878.71

[Note – In the present Value Table, PVIF for 4.5% and 24 periods and 1% for 36 periods are not shown. Hence, in cases two cases PVIF has been found out by using the alternative formula which goes as under **:** $\text{PVIF} = \frac{1}{(1+\frac{i}{m})mn} - 1$

Graphic View of the Discounting Process: Decrease

Figure–2 shows that Tk. 1 or any other sum to be received in the future diminishes as the time to receipt or the interest rate increases. An example shown in figure – 2 indicates the relationships among Present Value, Interest Rates and Time:

Solving Time and Interest Rates

In the determination of present values and future values, time factor and interest or discount factor have been worth-mentioning. As for example, in determining future value, present value, time factor and interest factor must exist. On the other hand, in determining present value future value , time factor and interest factor must exist. It is evident that in each of these cases, the values of any three are given. The value of the fourth one can be found out. In such a context the necessity of determining the value of either interest (i) or period (n) has arisen.

In cases of Future Value (FV) and Present Value (PV)

Suppose, you can buy a security at a price of Tk. 78.35 that will pay you Tk. 100 after 5years. In this case, PV, FV, and n are given; we are to find out i, the interest rate you will earn on your investment.

Value of i is found out by applying the following formula:

$FV_n = PV (1 + i)^n = PV (FVIFi, n)$

Hence, Tk. 100 = Tk. 78.35 $(1 + i)^5$ = (FVIFi, n)

$$\text{Or, } (1+i)^5 = \frac{100}{78.35} = 1.2763 = \text{FVIFi, 5}$$

Or, $(1 = i) = (1.2763)^{1/5} = 1.05$

Or, i = 1.05-1 = 0.05 = 5%

Solving for Period (n)

In cases of PV, FV and Annuities (ordinary and due), the period n can be found out if other elements of Time Value of Money viz.; PV, FV, Annuities and rate of interest/ discount (i) are given. The following paragraphs deal with the determination of period n.

Solving for period n in cases of FVs and PVs

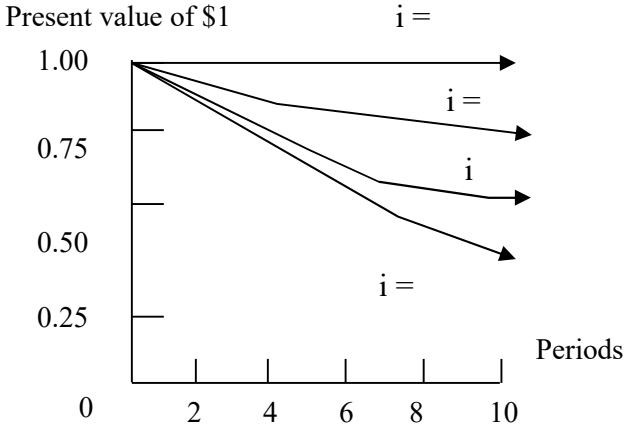
Suppose you know that the investment in security will provide a return of 10% per year, that it will cost Taka 204.90 and that you will receive Tk. 300 at maturity. But, you do not know when the security matures. In this case you know PV, FV and i; but you are to know n, the number of periods. The solution is as under:

We know that $FVn = PV (1 + i)^n = PV (FVIF_{i, n})$

Or, 300 = 204.90 (FVIF10%, n)

$$\text{Or, FVIF10\%, n} = \frac{300}{204.90} = 1.4641$$

Now, let us look across the 10% column in Future Value Table until we find FVIF = 1.4641. This value is in Row 4, which indicates that it takes 4 years for Taka 204.90 to grow to Taka 300 at 10% interest rate.



Review Questions

A. Short Questions

1. What is 'Time Value of Money'? Explain with an example.
2. Distinguish between future value and present value. Give example of each of them.
3. What is cash flow time line? Explain with the help of a diagram.
4. What are the techniques of time value of money? Explain with suitable examples.
5. Distinguish between compounding and discounting.
6. Define the following terms:
   a) FVIFi, n b) PVIFi, n c) FVIFAi, n d) PVIFAi, n.
7. What effects do (a) increasing rate of interest and (b) increasing time periods have on the (i) Present value of a future sum and (ii) Future Value of the present sum? Why?
8. Explain the significance of time value of money.
9. Distinguish between compound interest and simple interest with examples

B. Broad Questions

1. Discuss the tools and techniques of time value of money.
2. Explain the graphic views of the (i) compounding process and (ii) discounting process.

Review problems

Problem - 1

You have been awarded MBA degree from Bangladesh Open University just one month ago. You have applied for the post of Finance Manager in BRAC. As part of the BRAC's evaluation process, you have been asked to appear at a test that covers several financial analysis techniques. The first section of the test addresses time value of money analysis. See how you would do by answering the following questions:

a) What is the future value of an initial investment of Taka 1,500 after 7years if the investment earns 12% annual interest?
b) What is the present value of Taka 2,700 to be received in 5 years if the interest rate is 15%?
c) If a company's sales are growing at a rate of 20% annually, approximately how will it take sales triple?
d) What annual interest will cause Taka 2,200 to grow to Taka 7,700 in 5 years?
e) At what time periods Taka 3,000 will grow to Taka 9,000 if the rate of interest 15% p. a.?
f) Which amount is worth more at 14%: Taka 1,000 in hand today Taka 2,000 due in 6 years?

Problem - 2

Find the amount to which Taka 1,500 will grow under each of the conditions:

a) 12 percent compounded annually for 7 years;
b) 12 percent compounded semiannually for 7 years;
c) 12 percent compounded quarterly for 7 years;
d) 12 percent compounded monthly for 7 years;
e) 12 percent compounded daily for 7 years;
f) 12 percent compounded continuously for 7 years.

Comment whether the growth will show an increasing or decreasing trend. Why?

Problem - 3

Find the present value of Taka 5,000 due in the future under each of the conditions:

a) 15 percent interest rate, compounded annually, discounted back 10 years;
b) 15 percent interest rate, semiannually compounding, discounted back 10 years;
c) 15 percent interest rate, quarterly compounding, discounted back 10 years;
d) 15 percent interest rate, monthly compounding discounted back 5 years;
e) 15 percent interest rate, daily compounding discounted back 6 years;
f) 15 percent interest rate, continuously compounding discounted back 7 years.

Lesson–2: Time Value of Money: Annuity

After attentively reading this lesson 4, you should be able to –

- *Know about concept of annuity;*
- *Know how to determine future value of an ordinary annuity and future value of an annuity due;*
- *Know how to determine of present value of an ordinary annuity and present value of an*
- *annuity due;*
- *Understand how to determine payments and*
- *Solve time and interest rates for annuities, ordinary and due.*

Concept of Annuity

An annuity is a series of equal payments known as installments at fixed intervals for specified number of periods. As for instance Tk. 100 paid as an installment at the end of the each of the next five years is a five year annuity. The installment payments are symbolized as PMT and they can occur at either the beginning or the end of each year. If the installment payments occur at the end of each period, as they typically do in business transactions, the annuity is known as ordinary/ deferred annuity. If installment payments are made at the beginning of each period, the annuity is called an annuity due. Since ordinary annuities are more common in Finance, when the annuities are used in this book, you should assume that the installment payments occur at the end of each period values otherwise mentioned. Such annuities are closely related with PV and FV which are examined in the following sub-sections.

Future Value of an Ordinary Annuity

Future value of an ordinary annuity depends on three things namely: (i) amount of PMT; (ii) rate of interest and (iii) period. The more the amount of PMT, rate of interest and the period, the higher will be the amount of FV of an annuity. Let us take an example. If you deposit Taka 100 at the end of each of three years in a Savings A/C that pays 5% interest per year; how much will you have at the end of 3 years? To answer this question, we must find out FV of an ordinary annuity (FVAn). Hence, FVAn represents the FV of an ordinary annuity over periods. Each payment is compounded out to the end of period n and he sum of the compounded payments is the FVAn.

There are two approaches of determining FVAn viz. (i) Equation Approach and (ii) Tabular Approach.

i) Under Equation Approach

ii) Under Tabular Approach

$$FVAn = PMT\sum_{t=0}^{n1}(1+i)^t$$

$$FVAn = PMT[\frac{(1+i)^n - 1}{i}]$$
$$= PMT(FVIFAi,n)$$

Explanation of FVIFAi,n :

The summation term in the brackets in the formula under Tabular Approach is called the Future Value Annuity Interest Factor for an annuity of n payments compounded at 1 percent of interest. In order to find out this interest factor, both n and I should be considered simultaneously in the Future Value Annuity Table.

Problem and Solution

Problem - 1

Find out the Future Values of the following ordinary annuities:

(i) Taka 4,000 per year for 10 years at 12 percent;

(ii) Taka 2,000 per year for 5 years at 10 percent;

(iii) Taka 1,000 per year for 6 years at 0 percent.

Solution (After tabular approach)

(i) FVAn = PMT (FVIFAi,n)

= 4,000 (FVIFA12%, 10)

= 4,000 (17.549)

= Tk. 70,196

(ii) FVAn = PMT (FVIFAi,n)

= 2,000 (FVIFA10%, 5)

= 2,000 (6.1051)

= Tk. 1,2210.20

(iii) FVAn = PMT (FVIFAi,n)

= 1,000 (FVIFA0%, 6)

= 1,000 (6)

= Tk. 6,000.

Future Value of an Annuity Due

Like future value of an ordinary annuity, future value of an annuity due also depends on the:

(i) amount of payments; (ii) rate of interest and (iii) number of periods. The more the amount of PMT, rate of interest and the number of periods; the higher will be future value of annuity due. Had there been Tk. 100 payments in the previous example being made at the beginning of each year, the annuity would have been known as an annuity due.

Future value of an annuity due FVA (DUE) can also be found out in two approaches viz. : (i) Equation Approach and (ii) Tabular Approach.

Under Equation Approach

$$FVA(DUE) = PMT \left[\left\{ \frac{(1+i)^n - 1}{i} \right\} \times (1+i) \right]$$

Under Tabular Approach

$$FVA(DUE) = PMT \left[\{ FVIFA_{i,n} \} \times (1+i) \right]$$

Future value interest factor annuity (DUE) for n periods at I interest percent can be found from the Future Value Annuity Table, considering n periods and I interest rates.

Problem and Solution

Problem – 2

Find out the future value of the following annuities due -

(a) Tk. 3,000 per year for 8 years at 8%;

(b) Tk. 5,000 per year for 10 years at 12% and

(c) Tk. 2,000 per year for 7 years at 0%.

Solution

FVA (DUE) = PMT [(FVIFAi, n) (1 + i)]

(a) FVA (DUE) = 3,000 [(FVIFA8%, 8) (1+.08)]

= 3,000 [(10.637) (1.08)]

= Tk. 34,463.88

(b) FVA (DUE) = PMT [(FVIFAi, n) (1 + i)]

= 5,000 [(17.549) (1.12)]

= Tk. 98,274.40

(c) FVA (DUE) = PMT [(FVIFAi, n) (1 + i)]

= 2,000 [(FVIFA0%, 7)]

= Tk. 14,000

Present Value of an Ordinary Annuity

Present value of an ordinary annuity refers to the value today of a future ordinary annuity. Suppose you are offered the following alternatives: (i) a three year annuity with payments of Tk. 100 at the end of each of the 3 years and (ii) a lump-sum payment today. Now, the question is: How large must the lump-sum payment today be to make it equivalent to the annuity? To answer this question, we must find out the present value of an ordinary annuity (PVAn). Each of the payment is to be discounted and the sum of the discounted payments is the PVAn.

Under Equation Approach	**Under Tabular Approach**
$PVAn = PMT \left[\sum_{t=1}^{n} \frac{1}{(1+i)^t} \right]$	PVAn = PMT ($PVIFA_{i,n}$)

There are two approaches of finding out PVAn viz.: (i) Equation Approach and (ii) Tabular Approach.

PVIFA refers to the summation term in the bracket in this Equation is called the Present Value Interest Factor Annuity. It is the present value interest factor for an annuity of n periods, discounted at I interest percent. In order to find out this interest factor, Present Value Annuity Table should be consulted considering n periods and discounted I interest factor. The present value of an annuity depends on: (i) amount of PMT; (ii) n periods and (iii) rate of discount i. The more the amount of PMT, n periods and rate of discount, the higher will be the amount of annuity and vice-versa.

Problem and Solution

Problem - 3

Find out the present values of the following ordinary annuities:
a) Taka 2,500 for 10 years at 12 percent;
b) Taka 4,500 for 12 years at 10 percent and
c) Taka 6,000 for 8 years at 0 percent.

Solution

a) PVAn = PMT (PVIFAi,n)
= Tk. 2,500 (PVIFA12%, 10)
= Tk. 2,500 (5.6502)
= Tk. 14,125.50

b) PVAn = PMT (PVIFAi,n)
= Tk. 4,500 (PVIFA10%, 12)
= Tk. 4,500 (6.8137)
= Tk. 30,661.65

c) PVAn = PMT (PVIFAi,n)
= Tk. PMT (PVIFA0%, 8)
= Tk. 6,000 (8)
= Tk. 48,000

Present Value of an Annuity Due

In the previous example cited in 3.3.3, had the three Tk. 100 payments been made at the beginning of each of the three years; the annuity would have been an annuity due. Like the present value of an ordinary annuity; present value of an annuity due can be found out on the basis of the amount of payment, n periods and present discount rate. More the amount of PMT, n periods and i percent of discount; the higher will be the annuity due and vice-versa.

Present value of an annuity due can also be measured by two approaches viz.: (i) Equation Approach and (ii) Tabular Approach.

(i) Equation Approach

$$PVAn(DUE) = PMT \left[\left\{ \sum_{t=1}^{n} \frac{1}{(1+i)^t} \right\} \times (1+i) \right]$$

The present interest factor for an annuity due – PVIFAn (DUE)I, n is equal to PVIFAi, n X (1 + i). Such interest factor would be found out from the Present Value Annuity Table, considering n periods and I rate of discount.

Problem and Solution

Problem - 4

Find the present value of the following annuities; if the PMT occur at the beginning of the year i.e. annuities due **:**

a) Taka 7,500 for 9 years at 14 percent;
b) Taka 10,000 for 5 years at 9 percent and
c) Taka 6,600 for 7 years at 0 percent.

(ii) Tabular Approach

PVAn (DUE)

= PMT [(PVIFAi, n) (1 + i)]

Solution

PVA (DUE) = PMT (PVIFAi, n) x (1 +i)
= Tk. 7,500 (PVIFA14%, 9) x (1 + 0.14)
= Tk. 7,500 (4.9464) x (1.14)
= Tk. 42291.72

b) PVA (DUE) = PMT (PVIFAi, n) x (1 +i)
= Tk. 10,000 (PVIFA9%, 5) x (1 + 0.09)
= Tk. 10,000 (3.8897) x (1.09)
= Tk. 42,397.73

c) PVA (DUE) = PMT (PVIFAi, n) x (1 +i)
= Tk. 6,600 (PVIFA0%, 7) x (1 + 0)
= Tk. 6,600(7) x (1)
= Tk. 46,200

Determination of Payments (PMT)

In this sub-section, we shall examine how payments (PMT) are determined in cases of both types of annuities viz. ordinary annuity and annuity due; where the values of annuities, rate of interest i and period n are given.

a) Determination of PMT in case of Ordinary annuity

Suppose you have borrowed Taka 18,000 from a bank with 12% interest for a period of 15 years. What is the annual interest payment if the payments are to be made at the end of each year?

This is a case of ordinary annuity. So, PVAn = PMT (PVIFAi, n)

18,000 = PMT (PVIFA12%, 15)

18,000 = PMT (6.8109)

18,000 = PMT

6.8109 PMT = Taka 2642.82

b) Determination of PMT in case of Annuity Due

Suppose you have borrowed house building loan of Taka 10 lacs from HBFC with 10% interest for a period of 20 years. What is the annual interest payment if the payments are to be made at the beginning of each year?

This is a case of annuity due. So, PVAn (DUE) = PMT (PVIFAi, n)

(1 + i) 10, 00,000 = PMT (PVIFA10%, 20) (1 + 0.10)

10, 00,000 = 1.10 PMT (8.5136)

$$\text{PMT} = \frac{10,\,00,000}{1.10 \times 8.5136} = \frac{10,\,00,000}{9.365} = \text{Tk. } 1,\,06,780.57$$

Solving Time and Interest Rates

In the determination of annuities, time factor and interest or discount factor have been worth-mentioning. While determining annuities, either ordinary or due; payment, time factor and interest factor must exist. It is evident that in each of these cases, the values of any three are given. The value of the fourth one can be found out. In such a context the necessity of determining the value of either interest (i) or period (n) has arisen.

In case of Annuities (Ordinary and Due)

In the previous problems the FVs and PVs of ordinary annuity as well as annuity due have been found out where PMT, i and n are given. But, here we are interested to determine i where FVs or PVs, PMT and n are given. For the purpose of determining i, the same formula given under Tabulation Approach while calculating FVs and PVs in cases of ordinary annuity and annuity due need to be followed. The following problem deals with the calculation of i.

Problem and Solution

Problem - 5

Find out the interest rate (i) in the following cases:

a) You borrow Taka 9,000 and promise to make equal payments of Taka 2,684.80 at the end of each year for 5 years;

b) You borrow Taka 13,250 and promise to make equal payments of Taka 2,640.07 at the beginning of each year for 10 years.

Solution

This problem relates to ordinary annuity; since payments are made at the end of the year. So, the formula for ordinary annuity will be followed which is given as:

$PVAn = PMT\ (PVIFAi, n)$

$Or, 9{,}000 = 2{,}684.80\ (PVIFAi, 5)$

$$\text{Hence, } PVIFA = \frac{9{,}000}{2684.80} = 3.3522$$

In Present Value Annuity Table, let us look across the period (n) 5 row until we find PVIFA = 3.3522. This value lies in the 15% columns; so the interest rate at which a five year 2,684.80 annuity has a PV of Taka9, 000 is 15 percent.

b) This problem relates to annuity due; since payments are made at the beginning of the year. So, the formula for annuity due will be applied which is as under:

$PVAn\ (DUE) = PMT\ [(PVIFAi, n)\ (1 + i)$

$Or, 13{,}250 = 2{,}640.07\ [(PVIFAi, 10)\ (1 + i)]$

$$\text{Hence, } PVIFA_{i,\,10} = \frac{13{,}250}{2{,}640.07} = 5.0188\ (1 + i)$$

In the Present Value Annuity Table, let us look across the period (n) 10 row until we find PVIFA = 5.0188. This value lies in 15% column; so the interest rate at which a ten-year 2,640.07 annuity has a PV of Taka 13,250 is 15 – 0.15 percent i.e. 14.85%.

b) Solving period n in cases of Annuities, Ordinary and Due

In case of either ordinary annuity or annuity due, period n can be found out if values of ordinary annuity or annuity due, PMT and i are given. The following examples will clear the matter.

Examples

a) Suppose you borrow Taka 15,000 and promise to make equal installment payments of Taka 2,604.62 at the end each of the requisite years at 10 percent.. In this case, you know the value of ordinary annuity, PMT and i; you are to determine period n. The solution goes as follows:

PVAn = PMT (PVIFAi, n)

$$\text{Or, } 15{,}000 = 2{,}604.62\ (\text{PVIFA}10\%, n)$$

$$\text{PVIFA}10\%, n = \frac{15{,}000}{2{,}604.62} = 5.759$$

In Present Value Annuity Table, let us look across the 10% column until we find PVIFA = 5.759. This value lies in Row 9, which indicates that it takes 9 years for Taka 2,604.62 to grow to Taka 15,000 at 10% interest rate.

b) Suppose you borrow Taka10, 000 and promise to make equal installment payments of Taka 2,054.06 at the beginning of each of the requisite years of 10 percent. In this case, you know the value of annuity due, PMT and i; you are to find out period n. The solution goes as under**:**

$$\text{PVAn (DUE)} = \text{PMT (PVIFAi, n)}\ (1 + i)$$

$$\text{Or, } 10{,}000 = 2{,}054.06\ (\text{PVIFA}10\%, n)\ (1 + 0.12)$$

$$\text{Or, PVIFAn}10\%, n = \frac{10{,}000}{2{,}054.06}\ (1 + 0.10)$$

$$= 4.8684\ (1 + 0.10) = 5.3552$$

In the Present Value Annuity Table, let us look across the 10% column until we find PVIFA = 5.3552. This value lies around Row 7, which indicates that it takes around 7 years for Taka 2,054.06 to grow to Taka 10,000 at 10% interest rate.

Review Questions

A. Short Questions

1. Define ordinary annuity and annuity due. How are they determined? Explain.
2. For a given interest rate and given number of years, is the factor for the sum of an annuity larger or smaller than the interest factor for the present value of the annuity?
3. How would you determine payments in case of ordinary annuity and annuity due?

B. Broad Questions

4. What are (i) Annuity (Ordinary) and (ii) Annuity (Due)? Explain their relationship with the FV and PV.
5. How would you solve for time and interest rates in cases of (i) ordinary annuity and (ii) annuity due?
6. How would you determine future value and present value in cases of (i) ordinary annuity and (ii) annuity due?

Review Problems

Problem - 1

Find the present value of Taka 5,000 due in the future in case of annuity due and ordinary annuity under the following conditions:

a) 15 percent interest rate, compounded annually, discounted back 10 years;
b) 15 percent interest rate, semiannually compounding, discounted back 10 years;
c) 15 percent interest rate, quarterly compounding, discounted back 10 years;
d) 15 percent interest rate, monthly compounding discounted back 5 years;
e) 15 percent interest rate, daily compounding discounted back 6 years;
f) 15 percent interest rate, continuously compounding discounted back 7 years.

Problem - 2

To help you reaching your Tk. 10,000 goal, your mother offers to give you Tk. 4,000 on January 1, 2001. You will get a part time job and make 6 additional payments of equal amount each of 6 months thereafter. If all these money is deposited in bank that pays 12 percent, compounded semiannually, how large must each of the 6 payments be?

Problem - 3

Find the future value of Taka 15,000 in case of annuity due and ordinary annuity under the following conditions:

a) 12 percent interest rate, compounded annually, discounted back 10 years;
b) 12 percent interest rate, semiannually compounding, discounted back 10 years;
c) 12 percent interest rate, quarterly compounding, discounted back 10 years;
d) 12 percent interest rate, monthly compounding discounted back 5 years;
e) 12 percent interest rate, daily compounding discounted back 6 years;
f) 12 percent interest rate, continuously compounding discounted back 7 years.

CAPITAL MARKET FINANCING AND SECURITY VALUATION AND RETURN CALCULATION

4

Unit Highlights

- **Lesson -1:** Capital Market and Its Role
- **Lesson -2:** Valuation of Bonds, Common Stock and Preferred Stock
- **Lesson -3:** Measurement of Returns From Long – Term Securities

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson–1: Capital Market and Its Role

After attentively reading the lesson 1, you should be able to-

- *Understand the definition & characteristics of capital market.*
- *Know the various components of capital market*
- *Discuss the functions of capital market: Stock market and Bond Market.*
- *Compare the capital market with financial and money markets.*
- *Understand the nature of perfect capital market. And*
- *Realize the role of capital market in the industrial and hence the economic development of a developing country.*

Definition and Characteristics of Capital Market

Capital market refers to a place where long-term supply of funds is available as well as procurement of those funds is made. That is, capital market is the origin of long-term funds of all types, whether, equity stock, preferred stock and bonds securities. That is, capital market deals with capital market securities like treasury notes or bonds, municipal bonds, corporate bonds, mortgage & equity securities namely common stock and preferred stock. It is through capital market that the personal as well as institutional savings are converted into investment. That is why the capital market is formed in coordination with the savers and investors.

A capital market may be called an ideal capital market when the supplies of capital according to the needs of industrial enterprises are guaranteed. It should also be organized, transparent and efficient in order become an ideal one. An ideal capital market should have the following characteristics:

i) Adequate number of individual and institutional investors;
ii) Existence of various competitors and auxiliary organizations namely stock exchanges, investment banks, broker firms etc.
iii) Liquidity benefits through sufficient transactions in the indirect market.
iv) Expected transparency and reasonableness in dealings and contracts
v) Proper supervisory organization like stock exchange commission in order to control the functioning of capital market
vi) Transactions of various types of securities like stock, equity and preferred, bond and other securities.
vii) To have a clear cut conception of the investors and savers about the functioning and administration of capital market with presence of skilled entrepreneurs and professionals.

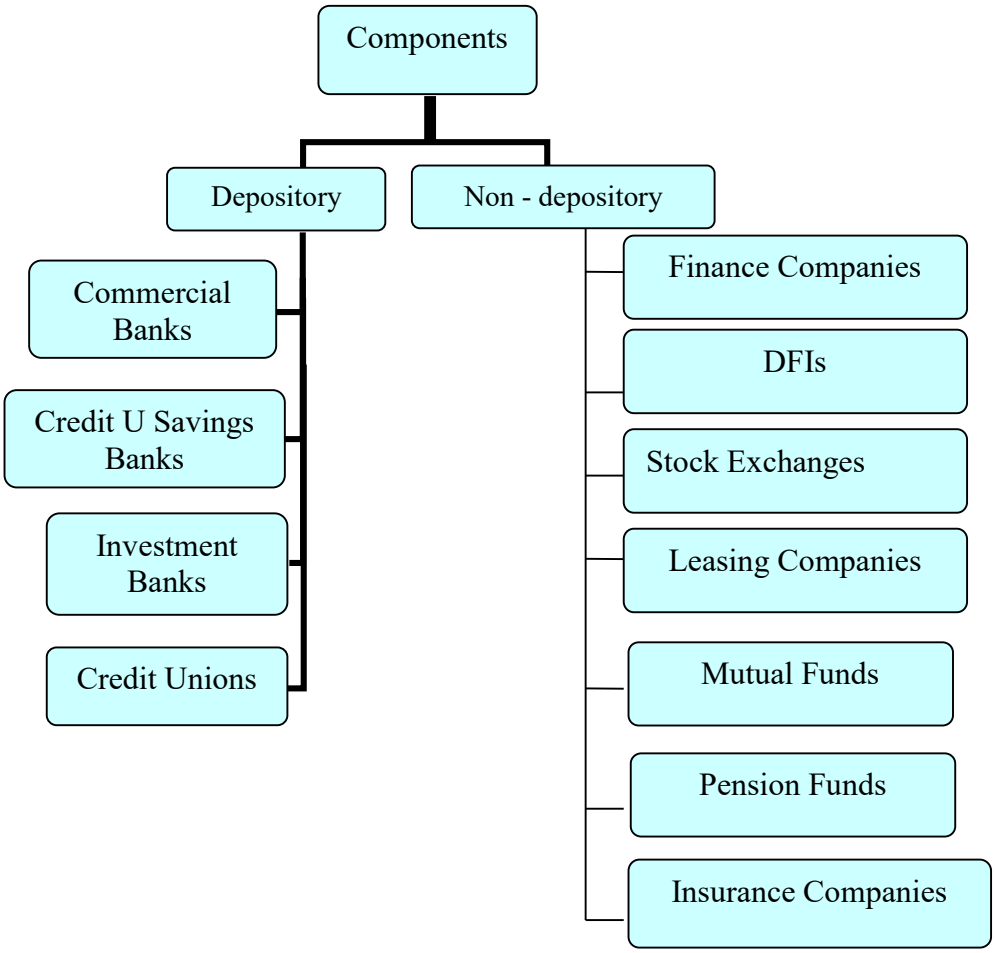
Components of Capital Market

Since capital market is formed in coordination with the investors and savers, hence the main elements of capital market are -

i) Saving banks; ii) Investment banks; iii) Finance companies

iv) Development Financial Institutions (DFI) v) Commercial banks, vi) Stock exchanges; vii) Leasing companies; viii) Credit units, ix) Mutual funds; x) Insurance companies and xi) Pension funds. The various components of capital market may be grouped into depositors and non depository financial institutions which are shown in the following chart:

Chart - 1 : Showing Various Components of Capital Market



A brief discussion of each of the above components of capital market is given below:

i) Commercial Banks

Commercial banks are those, which accept deposits from the individuals, organizations and governments in one hand and lend funds to the parties, on the other. In aggregate, they are the most dominant depository institutions in any country. They collect the scattered savings of the country; then create investible funds and lastly, mobilize the same into productive investments.

ii) Saving Banks

Like commercial banks, savings banks also accumulate the scattered savings of the country and then create investible funds and lastly channelise these funds into productive investments. Most savings banks are mutual in nature.

iii) Investment Banks

Investment banks are those, which under write shares and debentures of corporate firms and deal in capital market through trading various transactions. They also create securities & provide institutional financing.

iv) Credit Unions

Credit union differs from commercials savings banks in that they (a) are not profit oriented and (b) restrict their business to the main members only. They use most of their funds to provide loans to their members.

v) Finance Companies

Most finance companies obtain funds by issuing securities and then lend the funds to individuals and small businesses.

vi) DFIS

DFIS play the significant role as the source of long-term funds mainly for the corporate firms. They supply fixed capital to the investors for investment in fixed capital expenditures. They also perform the underwriting functions relating to shares and debentures of the corporate firms.

vii) Stock Exchange

Stock exchange means any body comprising of individuals organizations whether incorporated or not, constituted for the purpose of assisting and controlling of buying, selling or dealing in securities. In its primary market, funds are obtained by issuing shares, stocks and securities of the firms, individuals and government.

viii) Leasing Companies

Leasing companies are the easiest sources of financing fixed assets requirements of the corporate firms, individuals and other organizations.

ix) Mutual Funds

Some of the mutual funds concentrate their investments in capital market securities such as stocks or bonds. In this way, they provide funds for long-term investments by the investors.

x) Insurance Companies

Insurance companies receive premium in exchange for insurance policies and use these funds to purchase a variety of securities. Thus, they invest the proceeds received from insurance in stocks and bonds.

xi) Pension funds

Many companies, corporations and government organizations and agencies offer pension plans to their employers their employers or both periodically contribute funds to such plans. The funds contributed are invested in securities until they are withdrawn by the employees upon their retirement.

Functions of Capital Market: Stock Market & Bond Market

Before discussing the functions of capital market, it is essential to classify the capital market, since the functions differ in terms of the types of the market. Generally speaking, the capital markets may be broadly classified into two types namely stock market and bond market. Stock market may be again of two types namely common stock market and preferred stock market. Bond market may also be of three types namely corporation bond market, Treasury bond markets and municipal bond market. Therefore, the broad type functions of capital market are discussed in the following sub-sections.

Functions of Stock Market

i. Providing adequate permanent floor for performing transactions in common stock or preferred stock. As a result, rate of selling and buying stocks and liquidity and transferability of invested stocks increases along with increasing in the stability in stock prices.

ii. Ensuring adequate volume of trade leading to liquidity.

iii. Providing reasonable level of fairness in deal making of trading.

iv. Allowing the determination of actual transfer prices of stock on the basis of corporate firms' present and future profitability; since the market helps creating competitive stock market.

v. Helps increasing the transparency, accuracy and safety of transactions by following certain norms and disciplines while allowing trading.

vi. Ensuring arrangement of investment in productive sectors of the economy after accumulating surplus money of the individuals and organizations.

vii. Helps equitable distribution of capital in any specific industry, factory etc.

viii. Protecting the interests of the investors.

ix. Helps government in framing policy in the interests of the investors and industrial growth

x. Registering and monitoring stock prices and

xi. Providing adequate instruments and technical aids for prompt and smooth trading.

Functions of Bond Market

i. They allow the individuals as well as the organizations to raise the requisite long-term funds by selling their bonds.

ii. They help investors having surplus funds to make investments in the purchase of bonds and thereby earning returns.

iii. They play the vital role in proper functioning of the capitalistic economy where they serve to charnel funds from severs to borrowers.

iv. They can provide an important allocative function by channeling the funds to productive investors.

v. They can render corporate advisory services.

Money Market, Capital Market Vs Financial Market

i) Financial Market

The term financial market is used to describe the place where investors with surplus capital provide their surplus capital to those who are in need of capital. This may be done directly, such as a person borrowing from a friend/ relative, or financial intermediaries such as banks, mutual funds, insurance companies may facilitate this process. Similar to financial institutions, financial markets allow for the suppliers and demanders of funds to deal with each other. Therefore, financial market facilitates the needs of investors having surplus capital and borrowers who are need of capital.

ii) Money Market

A money market is one which deals in short term securities of a maximum period of one year. It is a market where dealers purchase and sell securities. The examples of short term securities are commercial paper, treasury bills and bankers acceptances. Money market is one of the components of financial market.

iii) Capital Market

A capital market is one that deals in long-term securities. The examples of long-term securities are shares and bonds of corporations, long term government bonds and debentures of companies and corporations. The capital market is one of the important components of financial market. A capital market may be either equity market or bond market.

Nature of Perfect Capital Market

A perfect capital market imposes more stringent conditions. The following are the attributes of a perfect capital market:

* ***No entry barriers*** Any one can participate in the market. Thus the suppliers or users of funds can enter the market and deal with each other.

* ***Large number of buyers and sellers*** Perfect competition in the market is ensured by the presence of large number of buyers and sellers of securities.

* ***Divisibility of financial assets*** Financial assets are divisible and therefore, affordable investments are made by all participants.

* ***Absence of transaction costs*** There are no transaction costs. Participants can buy and sell securities with ease and without many costs.

* ***No tax differences*** Ideally, there are no taxes. There should not be any tax distortions. One set of investors should not be favored over others.

* ***Free trading*** Any one is free to trade in securities in the capital market. There should not be government restrictions on trading.

An efficient capital market is perfect if the above mentioned conditions are fully satisfied. A capital market which is otherwise reasonably efficient will have imperfections to the extent it does not satisfy the conditions of the perfect capital market. There are three significant imperfections that may be found in most capital markets in different degrees. These are discussed as follows:

* **Tax asymmetries** Most economies have varieties of taxes and tax incentives which cause tax asymmetries. These make security transactions more beneficial to some ones. A number of financial transactions may create additional wealth because of tax differences.

* **Information asymmetries** Most financial information are published and therefore, are publicly available. But sometimes, certain persons may have superior information than others. These persons may earn abnormal return for sometimes.

* **Transaction costs** These costs do not affect the prices. But, they can cause one transaction to be more profitable than the other. Transaction costs of two similar financial transactions may be different. Similarly transaction costs of two persons to a particular transaction may be different.

In practice, capital markets have imperfections. Efficient markets may not be perfect. For developing frameworks for analyzing financial decisions, a good starting point is to assume that capital markets are perfect. Once a framework is developed, the practical implications of market imperfections can be analyzed.

Role of Capital Market

Capital market is an integral part of developed and industrialized economy. One can hardly escape the impact of activities of the capital markets or lack thereof on the economy. In fact, capital markets augment the process of economic development, efficiency and welfare through a number of ways viz., i) encouraging savings, ii) drawing more savers and users into the investment process, iii) helping mobilization of non-financial resources, iv) attracting external re-

sources, v) offering financial innovations to match the diverse and changing needs of savers and users, etc. There are strong correlation among the level of economic development, industrial development and the level of capital markets development. In the capital market, stock exchange is an important segment which plays a vital role in the industrial development especially in a free market economy. In practice, Stock Exchange (SE) can broadly be classified into security market and non-security market. Security market can further be classified into primary market and secondary market. Primary market deals with new issues and secondary market deals with existing issues. The transactions in secondary market, in practice, may be done either in organized stock exchange or in over the counter market (OTC). In the SE, only the listed securities are traded by the members either by themselves or on behalf of their customers. OTC markets handle the securities of companies that do not meet exchange listing requirements. Some times secondary transactions take place off the trading floor giving rise to a third market known as "Kerb market", not often officially recognized.

Review Questions

A. Short Questions

1. Define capital market and discuss its characteristics.
2. What are the various types of capital market? Discuss.
3. Compare and contrast financial market, money market and capital market.
4. What are the attributes of a perfect capital market? Explain.
5. Are all efficient capital markets are perfect? Why not?

B. Broad Questions

1. What are the components of capital market? Discuss each of them.
2. Describe the functions of capital market.
3. Examine the role of capital market in the economic development of a country.

Lesson–2: Valuation of Bonds, Common Stock and Preferred Stock

On successful completion of the lesson 2, you should be able -

- *To know how to determine the present value of bonds.*
- *To describe bond maturity and interest rate risk involved in bonds; and*
- *To know how to determine the present values of common and preferred stocks.*

Determination of Present Value of Bonds

A bond is redeemable after a specified period. It is relatively easy to determine the present value of a bond since its cash flows and the discount rate can be determined without much difficulty. If there is no risk of default, then there is no difficulty in estimating the cash flows associated with a bond. The expected cash flows consist of annual interest payments plus repayment of principal. The appropriate capitalization, or discount rate to apply will depend upon riskiness of the bond. The risk in holding a government bond is less than the risk associated with a debenture issued by a company. Consequently, a lower discount rate would be applied to the cash flows of the government bond and a higher rate of the cash flows of the company debenture.

The following formula can be used to determine the value of a bond:

$$B_0 = \frac{INT_1}{(1 + k_d)} + \frac{INT_2}{(1 + kd)^2} + \ldots\ldots\ldots + \frac{INT_n + B_n}{(1 + kd)^n}$$

$$B0 = \sum_{t=1}^{n} \frac{INTt}{(1 + kd)^t} + \frac{Bn}{(1 + kd)^n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where B_0 = present value of a bond/debenture

INT_t = amount of interest in period t

K_d = required rate of return on bond (%)

B_n = terminal, or maturity, value in period n

n = number of years to maturity.

A bond or debenture may be amortized every year. In that case, the principal will decline with annual payments and interest will be calculated on the outstanding amount. Let us consider Illustration 43.1

ILLUSTRATION

The government is proposing to sell a 5-years bond of Tk. 1,000 at 8 percent rate of interest per annum. The bond amount will be amortized equally over its life. If an investor has a minimum required rate of return of 7 percent, what is the bond's present value for him?

The amount of interest will go on reducing because the outstanding amount of bond will be decreasing due to amortization. The amount of interest for five years will be: Tk 1,000 x 0.08 = Tk. 80 for the first year; (Tk. 1,000 – Tk. 200) x 0.08 = Tk. 64 for the second year; (Tk. 800 – Tk. 200) x 0.08 = Tk. 48 for the third year; (Tk. 600 – Tk. 200) x 0.08 = Tk. 32 for the fourth year and (Tk 400 – Tk. 200) x 0.08 = Tk. 16 for the fifth year. The outstanding amount of bond would be zero at the end of the fifth year.

Since the government will have to return Tk. 200 every year, the outflows every year will be Tk. 200 + Tk. 80 = Tk. 280; Tk. 200 + Tk 64 = Tk. 264; Tk. 200 + Tk. 48 = Tk 248; Tk. 200 + Tk 32

= Tk. 232; and Tk. 200 + Tk 16 = Tk. 216 respectively from first through five years. Referring to the present value table at the end of the book, the value of the bond is calculated as follows:

$$B0 = \frac{280}{(1.07)^1} + \frac{264}{(1.07)^2} + \frac{248}{(1.07)^3} + \frac{232}{(1.07)^4} + \frac{216}{(1.07)^5}$$

= 280 x 0.935 + 264 x 0.873 + 248 x 0.816 + 232 x 0.763 + 216 x 0.713

= Tk. 261.80 + Tk. 230.47 + Tk. 202.37 + Tk. 177.02 + Tk. 154.00

= Tk. 1,025.66

If the bond or debenture is amortized every year, then Equation (1) can be rewritten as follows:

$$B_0 = \frac{INT_1 + B_1}{(1 + k_d)^1} + \frac{INT_2 + B_2}{(1 + k_d)^2} + \ldots\ldots\ldots\ldots\ldots + \frac{INT_n + B_n}{(1 + k_d)^n}$$

$$B_0 = \sum_{t=1}^{n} \frac{INT_t + B_t}{(1 + k_d)^t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2)}$$

Semi-annual interest Payment

In practice, it is quite common to pay interest on bonds/debentures semi-annually. The formula for bond valuation can be modified in terms of half-yearly interest payments and compounding periods as given below:

$$B_0 = \sum_{t=1}^{2n} \frac{½(INT_t)}{(1 + kd/2)^t} + \frac{B_n}{(1 + kd/2)^{2n}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3)}$$

Let us give an example.

ILLUSTRATION

A 10-YEAR BOND OF Tk. 1,000 has an annual rate of 12 percent. The interest is paid half-yearly. If the required rate of return is 16 percent, what is the value of the bond?

We can use Equation (3) as follows:

$$B_0 = \sum_{t=1}^{2n} \frac{½(INT_t)}{(1 + kd/2)^t} + \frac{B_n}{(1 + kd/2)^{2n}}$$

$$B_0 = \sum_{t=1}^{2x10} \frac{½(120)}{(1 + 0.16/2)^t} + \frac{1,000}{(1 + 0.16/2)^{2x10}}$$

$$B_0 = \sum_{t=1}^{20} \frac{60}{(1.08)^t} + \frac{1,000}{(1.08)^{2x10}}$$

= 60(PV Annuity factor for 20 years @ 8%)+1000 (PV factor for 20 years @ 8%)

= 60 x 9.818 + 1,000 x 0.215 = 589.08 + 215 = 804.08

If the interest is payable annually, then the value of the bond would be **:**

$$B_0 = \sum_{t=1}^{10} \frac{120}{(1.16)^t} + \frac{1{,}000}{(1.16)^{10}} = 120 \times 4.833 + 0.227 \times 1{,}000$$

(PV AF for 10 years @ 16%+PVF for 10 years @ 16%)

= 580 + 227 = Tk. 807

Bond Maturity and Interest Rate Risk

The value of a bond depends upon the interest rate. As interest rate changes, the value of a bond also varies. There is an inverse relationship between the value of a bond and the interest rate. The value will decline when the interest rate rises and vice-versa. For instance, the value of 5-year bond in the Table-1 comes down to Tk. 960.51 from Tk. 1,000 when interest rate is assumed to rise from 7 percent to 8 percent, resulting in a loss of Tk. 39.49 to the bondholder. Interest rates have the tendency of rising or falling in practice. Thus, investors investing their funds in bonds are exposed to risk from increasing or falling interest rates.

The intensity of interest rate risk would be higher on bonds with long maturities than those in short periods. This point can be verified by examining Table43.1 where values of 5-year and 10-year bonds (coupon rate 7 percent and maturity value of Tk. 1,000) and a perpetual bond are given. These values are also plotted in Figure 1 At 7 percent interest rate, values of all three bonds are same, Tk. 1,000. When interest rate rises to, say, 8 percent 5-year bond falls to Tk. 961, 10-year bond to Tk. 933 and perpetual bond still further to Tk. 875. Similarly, the value of long-term bond will fluctuate (increase) more when rates fall below 7 percent. The differential value response to interest rates changes between short and long-term bonds will always be true. Thus, two bonds of same quality (in terms of risk of default) would have different exposure to interest rate risk – the one with longer maturity is exposed to greater degree of risk from increasing interest rates.

Table-1: Bond Value at Different Interest Rates

Interest rate (%)	Value of 5-year bond(Tk.)	Value of 10-year bond (Tk.)	Value of perpetual bond (Tk.)
4	1,134	1,244	1,750
5	1,087	1,155	1,400
6	1,042	1,073	1,167
7	1,000	1,000	1,000
8	961	933	975
9	922	871	778
10	886	816	700

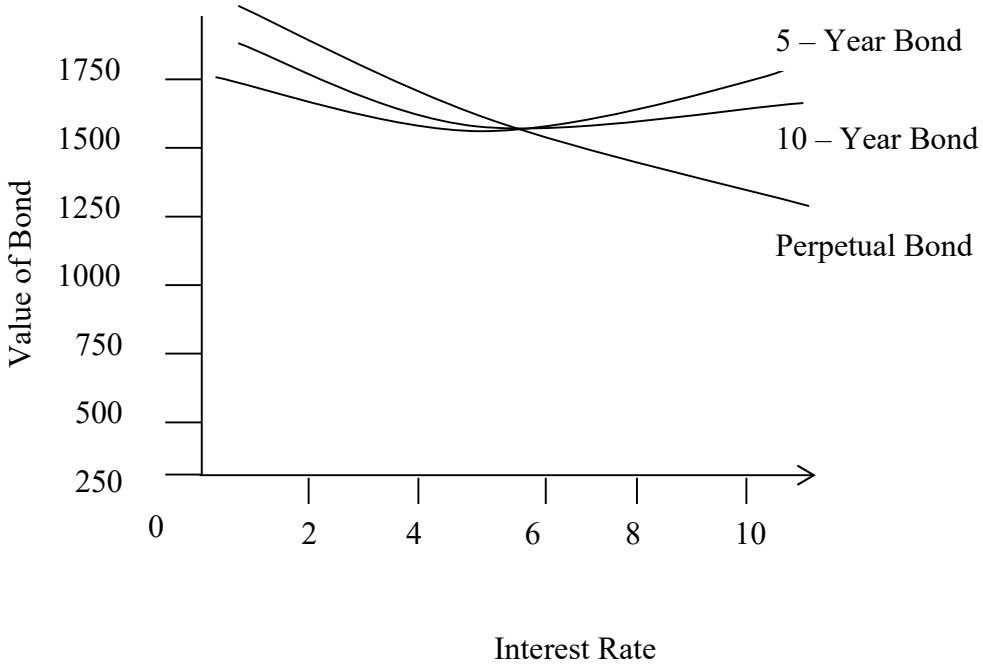


Figure-1 : Value of bonds at varying interest rates

The reason for this differential responsiveness is not difficult to understand. For example, in the 10-year bond situation, one would get just Tk. 700 even if interest rate rises to, say, 10 percent. In case of 5-year bond, one can, at least sell the bond after five years, and reinvest money to receive Tk. 100 for the next five years.

Present Values of Preferred Stock and Common Stock

Present Value of Preferred Stocks

A company's shares may be divided into two categories: (a) Ordinary (or common) shares/stocks and (b) Preference shares/stocks. Owners of shares are called shareholders, and capital contributed by them is called share capital (ordinary or preference).

Preference stocks may be issued with or without a maturity period. The holders of preference shares get dividends at a fixed rate and have a preference over ordinary shareholders. Like bonds, it is relatively easy to estimate the cash outflows associated with preference shares.

A formula similar to Equation (1) can be used to value preference shares with a maturity period:

$$P_0 = \frac{PDIV_1}{(1+k_p)^1} + \frac{PDIV_2}{(1+k_p)^2} + \ldots\ldots\ldots\ldots + \frac{PDIV_n + P_n}{(1+k_p)^n}$$

$$P_0 = \sum_{t=1}^{n} \frac{PDIV_t}{(1+k_p)^t} + \frac{P_n}{(1+k_p)^n}$$

Where $PDIV_t$ is the preference dividend per share in period t, k_p the required rate of return on preference share and P_n the value of the preference share on maturity.

Present Value of Common Stock

The valuation of equity shares is relatively more difficult. The difficulty arises because of two factors: First, the rate of dividend on equity (ordinary) shares is not known; also, the payment of equity dividend is discretionary. Thus, the estimates of the amount and timing of the cash flows expected by equity shareholders are more uncertain. In the case of debentures and preference shares, the rate of interest and dividend respectively are known with certainty. It is, therefore, easy to make the forecasts of cash flows associated with them. Second, the earnings and dividends on equity shares are generally expected to grow, unlike interest on bonds and preference dividend. This feature of variable dividend on equity shares makes the calculation of share value difficult. However, the following Dividend Capitalization method is used to find the present value of common stocks.

Dividend Capitalization

The general principle of valuation applies to the share valuation. The value of a share today is a function of cash inflows expected by investors and risk associated with those cash inflows. Cash inflows expected from an equity share will consist of dividends expected to be received by the owner while holding the share and the price which he expects to obtain when the share is sold. The price which the owner is expected to receive when the share is sold will include the original investment plus a capital gain (or minus a capital loss).

It is normally found that a shareholder does not hold the share in perpetuity. He holds the share for some time, receives the dividends and finally sells it to obtain capital gains. But when he sells the share, the buyer is also simply purchasing a stream of future dividends and a liquidating price when he sells the share. The logic can be extended further. The ultimate conclusion is that, for shareholders in general, the expected cash inflows consist only of future dividends and, therefore, the value of an ordinary share is determined by capitalizing the future dividend stream at an appropriate rate of discount. The value of a share is the present value of its future stream of dividends. How can a share be valued?

(i) Single Period Valuation: Formula for finding present value of a common stock

$$P_0 = \frac{DIV_1 + P_1}{1 + k_e}$$

$$P_0 = \frac{DIV_1 + P_0 (1 + g)}{1 + k_e}$$

(ii) Multi-period Valuation: Formula for finding present value of a common stock

$$P0 = \sum_{t=1}^{n} \frac{DIV_t}{(1 + k_e)^t} + \frac{P_n}{(1 + k_e)^n}$$

Problems and Solutions

Problem - 1

(a) A Tk. 100 perpetual bond is currently selling for Tk. 95. The coupon rate of interest is 13.5 percent and the appropriate discount rate is 15 percent. Calculate the value of the bond. Should it be bought? What is its yield at maturity?

(b) A company proposes to sell ten-year debentures of Tk. 10,000each. The company would repay Tk. 1,000 at the end of every year and will pay interest annually at 15 percent on the outstanding amount. Determine the present value of the debenture issue if the capitalization rate is 16 percent.

Solution

$$\text{(a) Value of bond} = \frac{\text{INT}}{\text{Kd}} = \frac{13.5}{0.15} = \text{Tk. } 90$$

The bond is overvalued, it should not be bought.

$$\text{Yield to maturity} = \frac{\text{Interest}}{\text{Current value of bond}} = \frac{13.5}{95} = 0.142 \quad \text{or} \quad 14.2 \text{ percent}$$

(b) The cash flow of the company every year wil be Tk. 1,000 plus interest on outstanding amount. The present value is determined as follows:

Year (1)	Interest (Tk.) (2)	Repayment (Tk.) (3)	Cash Flow (Tk.) (4) = (2) + (3)	PV Factor 16% (5)	Present Value (6) = (4) x (5)
1	1,500	1,000	2,500	0.862	2,155.00
2	1,350	1,000	2,350	0.743	1,746.05
3	1,200	1,000	2,200	0.641	1,410.20
4	1,050	1,000	2,050	0.552	1,131.60
5	900	1,000	1,900	0.476	904.40
6	750	1,000	1,750	0.410	717.50
7	600	1,000	1,600	0.354	566.40
8	450	1,000	1,450	0.305	442.25
9	300	1,000	1,300	0.263	341.90
10	150	1,000	1,150	0.227	261.05
Present value of debenture					**9,676.35**

Problem - 2

A company is currently paying a dividend of Tk. 2.00 per share. The dividend is expected to grow at a 15 percent annual rate for three years, then at 10 percent for the next three years, after which it is expected to grow at a 5 percent rate forever. (a) What is the present value of the share if the capitalization rate is 9 percent? (b) If the share is held for three years, what shall be its present value?

Solution

(a) PV during super-normal growth period:

Year	Dividend Tk. Tk.	PVF at 9%	PVF Dividends Tk.
1	$2.00\ (1.15)^1 = 2.30$	0.917	2.11
2	$2.00\ (1.15)^2 = 2.64$	0.842	2.22
3	$2.00\ (1.15)^3 = 3.04$	0.772	2.35
4	$3.04\ (1.10)^1 = 3.35$	0.708	2.37
5	$3.04\ (1.10)^2 = 3.68$	0.650	2.39
6	$3.04\ (1.10)^3 = 4.05$	0.596	2.41
			13.85

$$\text{PV at the end of year 6} = \frac{DIV1}{Ke - g} = \frac{4.05(1.05)}{0.09 - 0.05} = \text{Tk. } 106.25$$

PV of Tk. 106.25 today at 9 percent discount rate = Tk. 106.25 (0.596 = Tk. 63.33

PV of the share today = Tk. 13.85 + 63.33 = 77.18

(b) Present value of the share at the end of year 3 will equal to the discounted value of dividends expected after three years. Thus,

P3 = Tk. 2.37 + Tk. 2.39 + Tk. 2.41 + Tk. 63.33 = Tk. 70.50

Present value of dividends expected at the end of years 1, 2, and 3

= Tk. 2.11 + Tk. 2.22 + Tk. 2.35 = Tk. 6.68

The present value of share today i.e. P0 = Tk. 70.50 + Tk. 6.68 = 77.18. Thus, the value for the same if the share is held for three years, instead of indefinitely.

Problem - 3

The managing director of a company decides that his company will not pay any dividends till he survives. His current life expectancy is 20 years. After that time it si expected that the company could pay dividends of Tk. 30 per share indefinitely. At present the firm could afford to pay Tk. 5 per share forever. The required rate of this company's shareholders is 10 percent. What is the current value of the share? What is the cost to each shareholder of the managing director's policy?

Solution

The value of the share at the end of 20 years is:

$$P_{20} = \frac{30}{0.10} = \text{Tk. } 300$$

The value today will be:

$$P_0 = \frac{300}{(1.1)^{20}} = 300\ (0.1486) = (300 \times \text{PVF for 20 years@10\%})\ \text{Tk. } 44.58$$

If the company could pay dividends of Tk. 5 per share forever from the beginning, the price would be:

$$P_0 = \frac{5}{0.10} = \text{Tk. } 50$$

Thus, the cost to each shareholder is the lost of the difference of two prices:

Tk. 50 – Tk. 44.58 = Tk. 5.42 per share.

Review Questions

1. How would you determine the present value of bonds? Explain with example.
2. What is the difference between valuation of bonds and preferred stocks? Illustrate.
3. Explain the methods of valuing present values of:
   (a) Common Stock and (b) Preferred Stock
4. Explain the relationship between bond maturity and interest rate risk. Give example.

Review problems

Problem - 1

An investor is looking for a four-year investment. The share of Skylark Company is selling for Tk. 75. They have plans to pay a dividend of Tk. 7.50 per share each at the end of first and second years and Tk. 9 and Tk 15 respectively at the end of third and fourth years. If the investor's capitalization rate is 12 percent and the share's price at the end of fourth year is Tk. 70, what is the value of the share? Would it be a desirable investment?

Problem - 2

The earnings of a company have been growing at 15 percent over the past several years and are expected to increase at this rate for the next seven years and thereafter, at 9 percent in perpetuity. It is currently earning Tk. 4 per share and paying Tk. 2 per share as dividend. What shall be the present value of the share with a discount rate of 12 percent for the first seven years and 10 percent thereafter?

Problem - 3

The total assets of Tk. 80,000 of a company are financed equity funds only. The internal rate of return on assets is 10 percent. The company has a policy of retaining 70 percent of its profits. The capitalization rate is 12 percent. The company has 10,000 shares outstanding. Calculate the present value per share.

Problem - 4

Determine the market values of the following bonds which pay interest semi-annually:

Bond	Interest Rate	Required Rate	Maturity Period
1	16%	15%	25 years
2	14%	13%	15years
3	12%	8%	20years
4	12%	8%	10years

If the par values of bonds are Tk. 100 and if they are currently selling for Tk. 95, Tk. 100, Tk 110 and 115, respectively, determine the effective annual yields of the bonds. Also calculate the semi-annual yields.

Lesson–3: Measurement of Returns from Long-term Securities

After successfully completing this lesson 3, you should be able to-

- *To study the techniques of measuring returns from bonds;*
- *To study the techniques of measuring stock return and*
- *To examine the criteria used in measuring financial risk involved in these returns.*

Techniques of Measuring Returns

We know that long-term securities consist of long-term bond and stock, common and preferred. The return from such securities is also known as yield, which refers to the internal rate of return (IRR). IRR or yield for an investment is the discount rate that equates the present value of the expected cash outflows with the present value of the expected cash inflows. IRR can be found out by applying the following equation:

$$A_0 = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)} + \ldots\ldots\ldots\ldots\ldots + \frac{A_n}{(1+r)^n}$$

Where **:** A_0 = Initial cash out flows or outlays.
$A_1, A_2, \ldots\ldots A_n$ = Cash inflows.
r = Required rate of return.
n = No. of years

Against the above discussion, let us discuss the technique as used in measuring returns from Bonds and Stocks. The following sub-sections deal with them.

Bond Returns

Bond return or bond yield is simply a bond's internal rate of return (IRR). While valuing bonds, we have mentioned that bonds are of two types namely: (a) Maturity Bond and (ii) Perpetual Bond. So, bond return differs in cases of these two types of bonds; which are explained as follows**:**

(a) Returns from Maturity Bonds

In case of maturity bonds, yield to maturity (YTM) is applicable which is the average rate of return earned on a bond, if it is held to maturity. In case of maturity bonds, there are two discounts or coupon bonds viz., (i) Pure discount (zero coupon bonds) and (ii) Coupon bonds.

(i) **Zero Coupon Bonds:** It is one where the issuer promises to make a single payment at a specified future date. The single payment is the same as the face value of the bond. In case of zero coupon bonds, YTM is found out as follows **:**

$$P = \frac{\text{Face Value}}{(1 + r/2)^{2n}}$$

Where **:** P = Present market price of the bond;

r = Yield to Maturity (YTM);

n = Maturity.

(ii) In case of Coupon Bonds

To determine the YTM (r) in case of the coupon bond, the following equation is to be used **:**

$$YTM = \frac{INT + \frac{M - Vd}{N}}{\left[\frac{2(Vd) + M}{3}\right]}$$

Where **:** M = Par Value of Bonds;

Vd = Market value of bond and

N = No. of years,

b) Returns from Perpetual Bonds

With a perpetuity, a fixed cash inflow is expected at equal intervals forever. In case of perpetual bonds, return (r) is calculated as follows:

$$r = \frac{A^*}{A_0}$$

Where **:** A* = Fixed annual interest payment and

A_0 = Market price of the bond.

Problems and Solutions

Problem - 1

Find IRR in cases of the following investments:

a. An investment of Tk. 10,000 today will return Tk. 2,000 at the end of 10 years.
b. An investment of Tk 1,000 today will return Tk 500 at the end of each of the next 3 years.
c. An investment of Tk. 1,000 will return Tk. 60 per year forever.

Solution

a) Cash outflow (Investment) = Tk. 10,000

Cash inflows at the end of 10 years = Tk. 2,000

$$PVAF = \frac{10{,}000}{2{,}000} = 5.000$$ (It is also known as payback period (PB)

Looking at the Present Value Annuity Table across 10 years row, this factor 5.000 is found within 15% and 16% columns. Hence, IRR lies within 15% and 16%.

$$\text{So, Exact IRR} = r - \frac{PB - DFr}{DFrL - DFrH}$$

Where:

PB = Payback period;

DFr = Discount factor for interest rate r;

DFrL = Discount factor for lower interest rate and

DFrH = Discount factor for higher interest rate.

$$= 15\% - \frac{5.000 - 5.0188}{5.0188 - 4.8332}$$

$$= 15\% - \frac{0.0188}{0.1856}$$

$$= 15\% + 0.10\%$$

$$= \underline{15.10\%}$$

b) Cash outflows = Tk. 1,000

Cash inflows = Tk. 500

$$\text{PAVF or PB} = \frac{\text{Tk. } 1{,}000}{\text{Tk. } 500} = \underline{2.000}$$

Looking at the Present Value Annuity Table across 3 years row, this factor 2 is found within 23% and 24% columns. Hence, IRR lies within 23% and % and 24%.

$$\text{So, Exact IRR} = r - \frac{PB - DFr}{DFrL - DFrH} = 23\% - \frac{2.000 - 2.0114}{2.0114 - 1.9813}$$

$$= 23\% - \frac{-0.0114}{0.0301} = 23\% + 0.379\% = \underline{23.38\%}$$

c) Cash outflows = Tk. 1,000

Cash inflows = Tk. 60, 1,000, 60

Looking at the Present Value Annuity Table across 55 years (the last year) row, this factor 16.666 is found within 5% and 6% columns. Hence, IRR lies within 5% and 6%.

$$\text{So, Exact IRR} = r - \frac{PB - DFr}{DFrH} = 5\% - \frac{16.666 - 18.6335}{18.6335 - 15.9905} = 5\% - \frac{1.9675}{2.643} = 5\% + 0.74$$ DFrL –

$$= \underline{5.74\%}$$

Problem - 2

The Eastern Ltd.'s bonds have 4 years remaining to maturity. Interest is paid annually. The bonds have a Tk. 1,000 par value and the coupon interest rate is 9%.

Compute approximate yield to maturity for the bonds if the current market price is either: (i) Tk. 829 or (ii) Tk. 1,104.

Solution

We know that –

$$YTM = \frac{INT + \frac{M - Vd}{N}}{\left[\frac{2(Vd) + M}{3}\right]}$$

In case of (i)

$$YTM = \frac{90 + \frac{1000 - 829}{4}}{\left[\frac{2(829) + 1000}{3}\right]} = \frac{90 + 42.75}{886} = \frac{132.75}{886} = 0.1498 \quad or \quad 15\%$$

In case of (ii)

$$YTM = \frac{90 + \frac{1000 - 1104}{4}}{\left[\frac{2(1104) + 1000}{3}\right]} = \frac{90 - 26}{1069.33} = \frac{64}{1069.33} = 0.059 \quad or \quad 6\%$$

Problem - 3

What will be the rate of return on a perpetual bond with a Tk. 1,000 par value, at an 8% coupon rate and current market price of: (a) Tk. 600; (b) Tk. 800 and (c) Tk. 1,500? Assume interest is paid annually.

Solution

We know that -

$$r = \frac{A^*}{A_0}$$

Where **:** A^* = Fixed annual interest payment and

A_0 = Market price of the bond.

So, in case of (a) -

$$r = \frac{80}{600} = 0.1333 \quad \text{or} \quad 13.3\%$$

In case of (b) -

$$r = \frac{80}{800} = 0.10 \quad \text{or} \quad 10\%$$

In case of (c) -

$$r = \frac{80}{1,500} = 0.053 \quad \text{or} \quad 53\% \quad (5.3\%)$$

Stock Returns

Stock return is the discount rate, which equates the present value of the dividend stream and ending price with the purchase price. One period stock return (r) may be found out by applying the following formula:

$$r = \frac{\text{Dividends} + (\text{Ending price} - \text{Beginning price})}{\text{Beginning price}}$$

But, if stock holding period is more than one, then r is found out by applying the following equation for r **:**

$$P0 = \sum_{t=1}^{N} \frac{Dt}{(1+r)^t} + \frac{Pn}{(1+r)^n}$$

Dividend Discount Models

Dividend discount models are designed to measure the implied stock return under the specific assumptions as to the expected growth pattern of the future dividends.

a) Perpetual Growth Model

Perpetual growth model assumes the dividend one period in the future grows at a constant rate in perpetuity. According to this model the expected return may be measured by using the following equation **:**

$$r = \frac{D_1}{P_0} + g$$

Again, price of stock (P_0) is found out by using -

$$P_0 = \frac{D_1}{r - g}$$

With the perpetual growth model, we can easily shift from dividend valuation to P/E ratio valuation. In this context, it is assumed that dividend payout ratio, calculated as dividends per share dividend by earning per share, would be constant. Therefore,

$$1 - b = \frac{D_1}{E_1}$$ Where **:** b = Retention ratio.

Problems and Solutions

Problem - 1

You are interested to buy a share of stock of a corporation for Tk. 150. The corporation is expected to pay a Tk. 6 dividend at the end of the year and its market price is expected to be Tk. 165 a share. Calculate your expected return.

Solution

We know that -

$$r = \frac{\text{Dividends} + (\text{Ending Price} - \text{Beginning Price})}{\text{Beginning Price}}$$

$$= \frac{6.00 + (165 - 150)}{150} = \frac{21}{150} = 0.14 \quad \text{or } \underline{14\%}$$

Problem - 2

In the above problem – 1, if the stockholding period is 10 years, instead of 1 year; what is the expected return then?

Solution

We know that -

$$P_0 = \sum_{t=1}^{10} \frac{D_t}{(1+r)^t} + \frac{P_n}{(1+r)^n}$$

$$150 = \sum_{t=1}^{10} \frac{6}{(1+r)^{10}} + \frac{165}{(1+r)^{10}}$$

$$\text{or}, 150 = \frac{(6+165)}{(1+r)^{10}}$$

$$\text{or}, 150(1+r)^{10} = 171$$

$$\text{or}, (1+r)^{10} = \frac{171}{150} = 1.14$$

$$\text{or}, (1+r)^{10} = 1.14$$

$$\text{or}, r = 1.14 - 1.00$$

$$\text{or}, r = 14\%$$

Problem -3

The Pran Textile Ltd. presently pays a dividend of Tk. 16 per share and the market price per share is Tk. 300. The company expects a dividend growth rate of 12% annually during its lifetime. What is the stock's expected return on investment?

Solution

We know that -

$$r = \frac{D_1}{P_0} + g = \frac{16}{300} + 0.12 = 0.0533 + 0.12 = 0.1733 \quad \text{or, } \underline{17.33\%}$$

Review Questions

A. Short Questions

1. What is bond return? How it can be measured?
2. How are returns from perpetual bonds measured? Explain.
3. What is stock return? How it can be measured if the stock is held for one year only?

Broad Questions

1. How can returns from maturity bonds be measured with (i) Zero coupon bonds and (ii) Coupon bonds?
2. Examine the dividend discount model. How can dividend valuation be shifted to P/E ratio valuation?

Review Problems

Problem – 1

It is now January 1, 2000, and you are considering the purchase of an outstanding Puckett Corporation bond that was issued on January – 1, 1998. The Puckett bond has a 9.5 percent annual coupon and a 30 – year original maturity (it matures on December 31, 2027). Interest rate have declined since the bond was issued, and the bond now is selling at 116.575 percent of par, or $1,165.75. You want to determine the yield to maturity for this bond.

a) Approximate the yield to maturity for the Puckett bond in 2000.

b) What is the actual yield to maturity in 2000 for the Puckett bond?

RISK AND RETURN

5

Unit Highlights

- **Lesson -1:** Risks and Return
- **Lesson -2:** Capital Asset Pricing Model (CAPM) and Expected Return and Risk (ERR)

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson–1: Risks and Return

After successful completion of the lesson 1, you should be able to–

- *Grasp the concept of return and expected return;*
- *Grasp the concept of risk and uncertainty, drawing clear differences between them;*
- *Identify the major elements of risks and uncertainties;*
- *Know the significance of risk;*
- *Identify and explain the different types of risk*
- *Know the techniques of measuring the risks;*

Concept of Return:

Simply stated, return means outcome of an investment. If an investor invests money in real assets or financial assets; then he may get return from real assets or from financial assets. When Returns express as in terms of money it is called money return and if money or taka return to percentage (%) it is called rate of return. Generally return means rate of return. Again return may be actual or expected. Return is the reward from undertaking the investment. Return on a typical investment consists of two components viz., yield and capital gain. Yield is the income component of a security's returns. Capital gain is the change in price on a security over some period of time.

Algebraically the expected return can be expressed as:

$$\overline{R} = \sum_{i}^{N} P_i R_i$$

Where :

$\overline{R}$ = the expected return on the stock

N = the number of states

p_i = the probablity of state i

R_i = the return on the stock in state i

Concepts of Risks and Uncertainties and their Distinctions:

Risk is defined in Webster's Dictionary as " a hazard, a peril, exposure to loss or injury". Thus, risk refers to the chance that some unfavorable events will occur. If you engage in skydiving, you are taking a chance with your life, because skydiving is risky. If you bet on the horses, you are risking your money. If you invest in speculative stock (or really any stock), you are taking a risk in the hope of making an appreciable return.

The term risk with reference to investment decisions may, therefore, be defined as the variability in the actual returns emanating from a project in future over its working life in relation to the estimated return as forecasted at the time of the initial, capital budgeting decision.

The decision situations with reference to risk analysis in capital budgeting decisions can be broken up into three types: (i) uncertainty, (ii) risk, and (iii) certainty. The risk situation is one in which the probabilities of a particular event occurring are known. These probabilities are not known under the uncertainty situation. The difference between risk and uncertainty, therefore, lies in the fact that the variability is less in risk than in the uncertainty. In other words, in a strict mathematical sense, there is a distinction between the two:

"Risk refers to the set of unique outcomes for a given event which can be assigned probabilities while uncertainty refers to the outcomes of a given event which are too unsure to be assigned probabilities".

That is, risk exists when the decision-maker is in a position to assign probabilities to various outcomes (i.e. a probability distribution is known to him). This happens when the decision-maker has some historical data on the basis of which he assigns probabilities to other projects of the same type. Uncertainty exists when the decision-maker has no historical data from which to develop a probability distribution and must make intelligent guesses in order to develop a subjective probability distribution. For example, if the proposed project is completely new to the firm, the decision-maker, through research and consultation with others, may be able to subjectively assign probabilities to various outcomes. Throughout this lesson, however, the terms risk and uncertainty will be used interchangeably to refer to an uncertain decision-making situation.

In brief, risk with reference to capital budgeting, results from the variation between the estimated and the actual returns. The greater the variability between the two, the more risky the project.

From the above discussions, the following elements of risks as well as uncertainties can be derived:

Major Elements of Risks:

i. Risk can be measured up to a specific level;
ii. The decision makers are aware of the probabilities of estimated income;
iii. The events are generally subject to repetition and
vi. Variability in actual income is less.

Major Elements of Uncertainties:

i. Variability in actual income is more,
ii. Uncertainty is not measurable.
iii. Fails to provide sufficient information on alternative course of actions.

Significance of Risk:

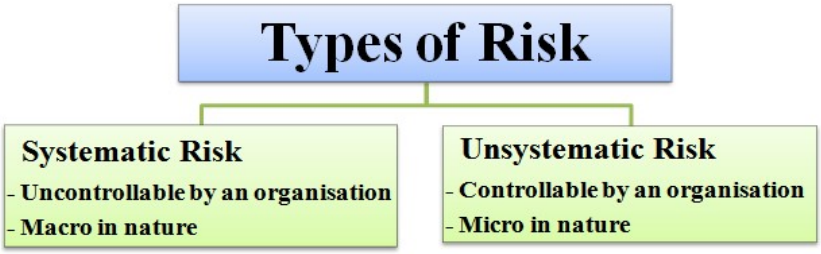
Corporate risk is also important for the following three reasons:

i. Undiversified stockholders, including the owners of small businesses are more concerned about corporate risk than about market risks.
ii. Empirical studies find that both market and corporate risks affect stock prices. This suggests that investors, even those who are well diversified, consider factors other than market risks when the established required returns.
iii. The firm's stability is important to its managers, workers, consumers, suppliers, and creditors as well as to the community in which it operates. Firms that are in serious danger of bankruptcy or even of suffering low profits and reduced output have difficulty, attracting and retaining good managers and workers. Also, both suppliers and customers are reluctant to depend on weak firms and such firms have difficulty in borrowing money at reasonable interest rates. These factors tend to reduce risky firm's profitability and hence their stock prices and this makes corporate risk significant.

For the above three reasons, corporate risk is important even if a firm's stock holders are well diversified.

Types of Risk:

In finance, different types of risk can be classified under two main groups is depicted below.



Systematic risk

The portion of a security's risk that cannot be eliminated is called non-diversifiable or market or systematic risk. Market risks are associated with economic or market factors that systematically affect most firms. Systematic risk is a macro in nature as it affects a large number of organizations operating under a similar stream or same domain. Ex: Economic & political instability, economic recession, macro policy of the government etc.

Systematic risk is classified as:

- Interest-rate risk arises due to variability in the interest rates from time to time.
- Market risk is associated with consistent fluctuations seen in the trading price of any particular shares or securities.
- Purchasing power risk is also known as inflation risk. It is so, since it emanates (originates) from the fact that it affects a purchasing power adversely.

Unsystematic risk

The portion of a security's risk that can be eliminated is called diversifiable or firm-specific or unsystematic risk. Unsystematic risk is a micro in nature as it affects a specific organizations. Ex: Raw material scarcity, Labor strike, management efficiency etc.

Unsystematic risk are classified as:

- Business risk emanates (originates) from the sale and purchase of securities affected by business cycles, technological changes, etc.
- Financial risk refers to the chance a business's cash flows are not enough to pay creditors and fulfill other financial responsibilities. Taking on higher levels of debt or financial liability therefore increases a business's level of financial risk.
- Operational risks are the business process risks failing due to human errors. This risk will change from industry to industry. It occurs due to breakdowns in the internal procedures, people, policies and systems

Techniques of Measuring Risks

The techniques of measuring risks are as follows:

(i) Sensitivity Analysis; (ii) Standard Deviation and (iii) Co-efficient of variation. The following sub–sections deal with each of the techniques.

Sensitivity Analysis

One measure which expresses risk in more precise terms is sensitivity analysis. It provides information as to how sensitive the estimated project parameters, namely, the expected cash flow, the discount rate and the project life are to estimation errors. The analysis on these lines is important as the future is always uncertain and there will always be estimation errors. Sensitivity

analysis takes care of estimation errors by using a number of possible outcomes in evaluating a project. The method adopted under the sensitivity analysis is to evaluate a project using a number of estimated cash flows to provide to the decision-maker an insight into the variability of the outcomes. Let us illustrate the use of sensitivity analysis for estimated cash flows.

The sensitivity analysis provides different cash flow estimates under three assumptions: (i) the worst (i.e. the most pessimistic), (ii) the expected (i.e. the most likely), and (iii) the best (i.e. the most optimistic) outcomes associated with the project.

The quantification of variability of returns involves two steps. First, depending on the chance of occurrence of a particular cash flows estimate, probabilities are assigned. The assignment of probabilities can be *objective or subjective*. Objective probability refers to the assignment of a probability, which is based on a large number of observations, under independent and identical situations, on the basis of the experience of happening or not happening of the event. However, objective probability is not of much use in capital budgeting situations because they do not satisfy the requirement of independent observations repeated over time. They are rather based on single event. Probability assignments which are not based objective evidence of a large number of trials of identical events are called subjective or personal probability assignments. The assignment of probabilities to cash flow estimates is subjective.

The second step is to estimate the expected return on the project. The returns are expressed in terms of expected monetary values. The expected value of a project is a weighted average return, where the weights are the probabilities assigned to the various expected events, i.e. the expected monetary values of the estimated cash flows multiplied by the probabilities.

Standard Deviation

Standard deviation is a statistical technique and it is an absolute measure of risks which can be applied when the projects involve the same outlay. lf the projects to be compared involve different outlays, the coefficient of variation is the correct choice, being a relative measure. In statistical terms, standard deviation is defined as the square root of the mean of the squared deviations, where deviation is the difference between, an outcome and the expected mean value of all outcomes. Further, to calculate the value of standard deviation by its probability of occurrence.

Algebraically, $\sigma = \sqrt{\sum_{i=1}^{N} P_i (R_i - \overline{R_i})}$

Where:
N = the number of states
p_i = the probability of state i
R_i = the return on the stock in state i

E[R] = the expected return on the stock

The greater the standard deviation of a probability distribution, the greater is the dispersion of outcomes around the expected value. Standard deviation is a measure that indicates the degree of uncertainty (or dispersion) of expected return and is one measure of risk. If the two projects have the same expected value (mean), then one which has the greater **σ** will be said to have the higher degree of uncertainty or risk.

Co–efficient of Variation

This is another statistical technique of risk measurement and it is relative measure. The standard deviation can be misleading in comparing the uncertainty of the alternative projects, if they differ

in size. In such cases co – efficient of variation (CV) is a correct measure which can be calculated as follows:

$$CV = \frac{\text{Standard deviation}}{\text{Expected return}} \text{ or } \frac{\sigma}{\bar{R}}$$

The co–efficient of variation is a better measure of risk involved in cash flow return then the standard deviation. This is because, the co-efficient of variation adjusts for the size of the cash flow, whereas the standard deviation does not.

Problems and Solutions:

Problem:

State	Probability	Returns (%)	
		Stock A	Stock B
1	20%	5	50
2	30%	10	30
3	30%	15	10
4	20%	20	-10

You are required to calculate (a) The expected return of the securities, (b) Standard deviation of return for each security. (c) The co-efficient of variation.

Solution:

(a) In this example, the expected return for stock A would be calculated as follows:

$E[R]_A = .2(5\%) + .3(10\%) + .3(15\%) + .2(20\%) = 12.5\%$

The expected return for stock B:

$E[R]_B = .2(50\%) + .3(30\%) + .3(10\%) + .2(-10\%) = 20\%$

(b) The standard deviation is calculated as the positive square root of the variance:

$Var(R) = s^2 = S\ p_i(R_i - E[R])^2$

The variance and standard deviation for stock A is calculated as follows:

$s^2_A = .2(.05 - .125)^2 + .3(.1 - .125)^2 + .3(.15 - .125)^2 + .2(.2 - .125)^2 = .002625$

$SD(R) = s = s^2 = (s^2)^{1/2} = (s^2)^{0.5}$

$s_A = (.002625)^{0.5} = .0512 = 5.12\%$

Var(R) for B = $s^2 = S\ p_i(R_i - E[R])^2$

$s^2_B = .2(.50 - .20)^2 + .3(.30 - .20)^2 + .3(.10 - .20)^2 + .2(-.10 - .20)^2 = .042$

$s_B = (.042)^{0.5} = .2049$

$= 20.49\%$

(c) $CV_A = 5.12\% \div 12.5\% = 0.4096$

$CV_B = 20.49\% \div 20\% = 1.0245$

A higher coefficient of variation means that an investment has more volatility relative to its expected return. Thus Stock B is more risky than stock A.

Review Questions:

Short Questions

1. Explain the concept of return and expected return.
2. Explain the concepts of risk and uncertainty.
3. Point out the major elements of risk and uncertainty.
4. What is a sensitivity analysis? Point outs its merits and demerits.
5. How is risk assessed for a particular investment by using a probability distribution?

Broad Question

6. What are the techniques of measuring risk? Explain each of them.
7. Distinguish between standard deviation and coefficient of variation in the context of risk measurement. Which of these two is better and why?

Review Problems

Problem - 1

Calculate the expected return and risk for General Foods for 2003, given the following information**:**

Probabilities: 0.15 0.20 0.40 0.10 0.15

Possible Returns (%): 20 16 12 5 -5

Problem - 2

Securities X and Y have the following characteristics

Security X		**Security Y**	
Return	**Probability**	**Return**	**Probability**
30%	0.10	-20%	0.05
20%	0.20	10%	0.25
10%	0.40	20%	0.30
5%	0.20	30%	0.30
-10%	0.10	40%	0.10

You are required to calculate (a) The expected return of the securities, (b) Standard deviation of return for each security. (c) The co-efficient of variation.

Problem - 3

The X and Y Companies have the following probability distribution of returns:

Economic conditions	**Probability**	**Returns (%)**	
		Company X	**Company Y**
High growth	0.1	32	35
Normal growth	0.25	28	18
Slow growth	0.3	15	9
Stagnation	0.25	-7	-10
Decline	0.1	-12	-15

You are required (a) to determine the expected return of the companies, (b) standard deviation of return for each company. (c) The co-efficient of variation.

Lesson–2: Capital Asset Pricing Model (CAPM) and Expected Return and Risk (ERR)

After attentively studying this lesson 2, you should be able to-

- *Grasp the concept of Capital Asset Pricing Model (CAPM);*
- *Identify the assumptions of CAPM;*
- *Understand the concept of Beta and Beta Coefficient;*
- *Know portfolio Beta Coefficient and*
- *Know how to determine expected return and risk (ERR)*

Concept of Capital Asset Pricing Model (CAPM)

A model used to determine the required return on asset, which is based on the proposition that any asset's return should be equal to the risk–free rate of return plus a risk premium that reflects the asset's non-diversifiable risk.

Assumptions of CAPM

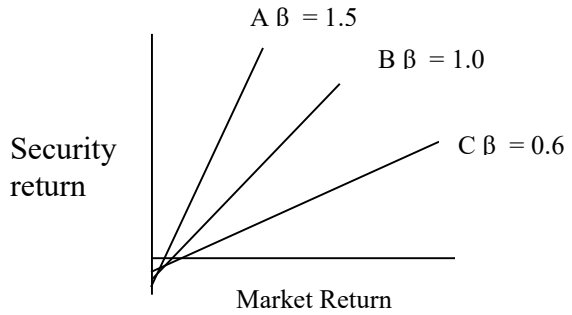
CAPM is based on a number of assumptions. The most important assumptions are:

(1) Market efficiency: The capital markets are efficient. The capital market efficiency implies that share prices reflect all available information.
(2) Risk aversion: Investors are risk averse. They evaluate a security's return and risk in terms of the expected return and variance or standard deviation respectively. They prefer the highest expected returns for a given level of risk.
(3) Homogeneous expectations: All investors have the same expectations about the expected return and risk of securities.
(4) Single time period: All investor's decisions are based on single time period.
(5) Risk-free rate: All investors can lend or borrow at a risk-free rate of interest.
(6) Individuals seek to minimize the expected utility of their portfolios over a single period planning horizon.
(7) The market is perfect: There are no taxes. There are no transaction costs. Securities are completely divisible, the market is competitive.
(8) The quantity of risky securities in the market is given.

The logic of CAPM can be extended to price individual securities and determine the required rate of return from individual securities.

Concept of Beta and Beta Co-efficient

Beta is a measure of the market risk or systematic risk of a security that cannot be avoided through diversification. Beta is a relative measure of risk of an individual stock in relation to the market portfolio of all stocks. Whereas, the measure of a security's sensitivity to market fluctuations is called Beta Coefficient and is generally designated with the Greek symbol for β (beta). Beta is the key element of the CAPM. Therefore, Beta Co-efficient (β) is a measure of the extent to which the return on a given security moves with the capital market. The following Figure presents betas of 1.5(A), 1.0 (B) and 0.6 (C).



If the security's returns move (less) than the market's returns as the latter changes, the security's return have more (less) volatility (fluctuations in price) than those of the market. For example, a security whose returns rise or fall on average 15 percent when the market returns rise or fall 10 percent is said to be an aggressive, or volatile security.

Securities with different slopes have different sensitivities to the returns of the market index. If the slope of this relationship for a particular security is a 45 degree angle, as shown for security B in the above figure, the beta is 1.0. This means that for every 1 percent change in the market's return, on average this security's returns change 1 percent. The market portfolio has a beta of 1.0.

In summary, the aggregate market has a beta of 1.0. More volatile (risky) stocks have betas larger than 1.0, and less volatile (risky) stocks have betas smaller than 1.0. As a relative measure of risk, beta is very convenient. Beta is useful for comparing the relative systematic risk of different stocks and, in practice, is used by investors to judge a stock's riskiness. Stocks can be ranked by their betas. Because the variance of the market is a constant across all securities for a particular period, ranking stocks by beta is the same as ranking them by their absolute systematic risk. Stock with high (low) betas are said to be high (low) risk securities.

Portfolio Beta Co-efficient

Using portfolio beta co-efficient, the expected return for an individual security of a portfolio can be measured. For the individual security, then, the relevant risk is not the standard deviation of the security itself (total risk), but the marginal effect the security has on the standard deviation of an efficiently diversified portfolio (systematic risk). As a result, a security's expected return should be related to its degree of systematic risk, not to its degree of total risk. Systematic risk is the thing that matters to an investors holding a well-diversified portfolio. If we assume that unsystematic risk is diversified away, the expected rate of return for stock j is

$$\overline{R}_j = R_f + (\overline{R}_m + R_f)\beta_j$$

where again R_f is the risk-free rate, $\overline{R}_m$ is the expected overall return for the market portfolio, and β_j is the beta coefficient for security j as defined earlier. The greater the beta of a security, the greater the risk and the greater the expected return required. By the same token, the lower the beta, the lower the risk, the more valuable it becomes, and the lower the expected return required.

Determination of Expected Return and Risk (ERR)

In earlier section, the formula for determining portfolio expected return of an individual security is explained. In earlier section, the formula for determining portfolio risk of an individual security is explained. In that section, formula for calculating portfolio risk of the two-security case and portfolio risk of the multiple security case are explained. The following problems relate to these returns and risks.

Problems and Solutions

Problem – 1

Consider a three stock portfolio consisting of stocks X, Y, and Z with expected returns of 12%, 20% and 17% respectively. Assume that 50% of investible funds is invested in stock X, 30% in Y and 20% in Z.

Calculate portfolio expected return.

Solution

We know that –

$$E(Rp) = \sum_{t=1}^{n} Wi\ E(Ri)$$

$= 0.5\ (12\%) + 0.3\ (20\%) + 0.2\ (17\%)$
$= 6\% + 6\% = 3.4\%$
$= \underline{15.4}\%$

Problem - 2

Four securities have the following expected returns:

A = 15%, B = 12%, C = 30% and D = 22%

Calculate the expected returns for a portfolio consisting of all four securities under the following conditions**:**

(a) The portfolio weights are 25% each;
(b) The portfolio weights are 10% in A with remainder equally divided among the other three securities and
(c) The portfolio weights are 25% in A, 28% in B, 22% in C and 25% in D.

Solution

(a) E (Rp) = .25 (15%) + .25 (12%) + .25 (30%) + .25 (22%)
= 3.75% + 3.00% + 7.50% + 5.50%
= $\underline{19.75}$%
(b) E (Rp) = .10 (15%) + .30 (12%) + .30 (30%) + .30 (22%)
= 1.50% + 3.60% + 9.00% + 6.60%
= $\underline{20.70}$%
(c) E (Rp) = .25 (15%) + .28 (12%) + .22 (30%) + .25 (22%)
= 3.75% + 3.36% + 6.60 + 5.50%
= $\underline{19.21}$%

Problem - 3

Stocks X and Y have the following historical returns:

Year	**Stock X's Returns**	**Stock Y's Returns**
1996	-19%	-14.50%
1996	33%	21.80%
1998	15%	30.50%
1999	0.50%	-7.60%
2000	27%	26.30%

Calculate the portfolio risk of the securities of 50% weights are placed in each stock A and B.

Solution

We know that in case of the two-security case,

$\sigma p = [W_1^2\sigma^2 + W_2^2\sigma_2 + 2(W_1)\ (W_2)\ (P_{12})\ \sigma_1\ \sigma_2]^{1/2}$

Therefore, first of all we are to find out σ of the individual security. The formula for calculating σ_R is explained in the previous Lesson – 4 which goes as follows:

$$\sigma R = \sqrt{\sum_{i=1}^{n} (R_{ix} - \overline{R}_x)^2\ p_i}$$

Table showing calculations of Standard Deviation $(\sigma)_2$

Year	Return (Rix)	(Rix - $\overline{R}x$	(Ri x – $\overline{R}x$)²	Return Y (Riy)	(Riy – $\overline{R}y$)	(Riy – $\overline{R}y$)²
1996	-18.00	-29.5	870.25	-14.50	-25.80	665.64
1997	33.00	21.5	462.25	21.80	10.50	110.25
1998	15.00	3.50	12.25	30.50	19.20	368.64
1999	0.50	-11.00	121.00	-7.60	-18.90	357.21
2000	27.00	15.50	24.25	26.30	15.00	256.00
Total	$\overline{R}x$ **= 11.50**		**1706**	$\overline{R}y$ **= 11.30**		**1757.74** = (Riy- $\overline{R}y$)²

$\sigma_{Rx} = \sqrt{1706.x\ 0.50} = 29.21$

$\sigma Ry = \sqrt{1757.74\ x\ 0.50} = 29.65$

$\sigma p=[(0.5)^2\ x(29.21)^2+(0.50)^2x(29.65)^2+2\ (0.50)\ (0.50)\ (29.21)\ (29.65)]^{1/2}$

$= [213.25 + 219.78 + 433.04]^{1/2}$

$= \underline{29.43}\%$

Problem - 4

A portfolio consists of three securities P, Q and R with the following information:

Particulars	P	Q	R	Correlation Co-efficient
Expected Return (%)	27	23	21	
Standard Deviation (%)	31	27	25	
Correlation Co-efficient				
PQ				-0.5
QR				+0.6
PR				0.7

If the securities are equally weighted, how much is the risk and return of the portfolio of these three securities.

Solution

The portfolio return is --

$E(Rp) = (27)\ (1/3) + (23)\ (1/3) + (21)\ (1/3)$

$= 9 + 7.67 + 7 = \underline{23.67}\%$

The portfolio risk is =

$\sigma p = [(31)^2\ (1/3)^2 + (27)^2\ (1/3)^2 + (25)^2\ (1/3)^2 + 2.(1/3)\ (1/3)\ (-0.5)\ (27)\ (31) + 2(1/3)\ (1/3)\ (0.6)(27)\ (25) + 2\ (1/3)\ (1/3)\ (0.7)(31)(25)]^{1/2}$

$= [106.67 +80.92 + 69.38 – 92.00 + 89.91 + 120.54]^{1/2}$

$= (375.54)^{1/2}$

$\therefore\ \sigma p = \sqrt{375.54} = \underline{19.38}\%$

Problem – 5

Corliss Services Inc., provides maintenance services to commercial buildings. Presently, the beta on its stock is 1.08. The risk – free rate is now 10%, the expected return for the market portfolio is 15%. Corliss is expected to pay a $2 per share dividend at the end of the year and to grow in

nominal terms at a rate of 11% per annum for many years to come. Based on the CAPM and other assumptions, what is the market price per share of the stock?

Solution

We know that according to CAPM, Return on Stock is --

$\overline{R}j$ = Rj + ($\overline{R}m$ – Rj) $\hat{\beta}j$

Where **:** $\overline{R}j$ = Return on Stock

Rj = Risk free rate

$\overline{R}m$ = Expected overall return for the market portfolio

$\hat{\beta}j$ = Beta Co-efficient for security.

$\therefore$ $\overline{R}j$ = 10% + (15% - 10%) 1.08

= 10% + 5.41% = <u>15.41</u>%

We use the perpetual dividend growth model, we would have **:**

$$P_0 = \frac{D_1}{R - g}$$

$$P0 = \frac{2}{.1541 - .110} = \frac{2}{0.0441} = \$45.35$$

Where **:**

P_0 = Market price per share;

D_1 = Expected dividend at the end of t period;

R = Return on Stock and

g = Dividend growth rate.

Review Questions

Short Questions

1. What is CAPM? What are its assumptions?
2. What are Beta and Beta Coefficient?
3. What is Portfolio Beta Coefficient?

Broad Questions

1. What is portfolio expected return and risk? How they can be measured? Explain.
2. What is the concept of Beta and Beta Coefficient? Explain Beta Coefficient graphically.
3. According to CAPM, how expected return for an individual security can be measured? Give example.
4. How are expected returns and risks are determined in cases of : (a) One security; (b) Two security and (c) Multiple security?

Review Problems

Problem – 1

Securities D, E and F have the following characteristics with respect to expected return, standard deviation, and the correlation between them:

Company	Correlation Coefficients				
	R	SD	D – E	D – F	E – F
D	.08	.02	.4	.6	
E	.15	.16	.4		.8
F	.12	.08		.6	.8

What is the expected return and standard deviation of a portfolio composed of equal investments in each?

LIQUIDITY AND WORKING CAPITAL MANAGEMENT

6

Unit Highlights

- **Lesson – 1:** Working Capital Planning
- **Lesson – 2:** Cash Management
- **Lesson – 3:** Inventory Management Principles
- **Lesson – 4:** Accounts Receivable Management and Factoring

Technologies Used for Content Delivery

- BOUTUBE
- BOU LMS
- WebTV
- Web Radio
- Mobile Technology with MicroSD Card
- LP+ Office 365
- BTV Program
- Bangladesh Betar Program

Lesson-1: Working Capital Planning

After careful reading of the lesson 1, you should be able to-

- *Grasp the concepts working capital*
- *Assess the importance for working capital for your firm;*
- *Identify the differences between permanent, temporary and balanced working capital;*
- *Identify the determinants of working capital requirements;*
- *Know about the techniques of working capital planning and*
- *Grasp the methods of estimating working capital requirements.*

Concepts of Working Capital and Working Capital Management

There are two concepts of working capital – gross and net.

- ***Gross working capital*** refers to the firm's investment in current assets. Current assets are the assets which can be converted into cash within an accounting year (or operating cycle) and include cash, short-term securities, debtors, (accounts receivable or book debts) bills receivable and stock (inventory).

- ***Net working capital*** refers to the difference between current assets and current liabilities. Current liabilities are those claims of outsiders which are expected to mature for payment within an accounting year. The examples are accounts payable, bills payable, bank overdrafts, bank loans and outstanding expenses. Net working capital may be positive or negative. A positive net working capital will arise when current assets exceeds current liabilities. A negative net working capital will occur when current liabilities exceed current assets.

It may be emphasized that both gross and net concepts of working capital are equally important for the efficient management of working capital. There is no precise way to determine the exact amount of gross or net working capital for any firm. The data and problems of each firm should be analyzed to determine the same.

The need for working capital to run the day-to-day business activities cannot be overemphasized. We will hardly find a business firm which does not require any amount of working capital. Indeed, firms differ in their requirements of the working capital. We know that a firm should aim at maximizing the wealth of its shareholders. In its endeavor to do so, a firm should earn sufficient return from its operations. Earning a steady amount of profit requires successful sales activity. The firm has to invest enough funds in current assets for generating sales. Current assets are needed because sales do not convert into cash instantaneously.

By working capital management principles we mean the principles followed in managing working capital. Working capital management refers mainly to the planning and control of working capital. By planning working capital we mean determination of working capital needs. By control of working capital we mean the proper utilization of working capital.

Importance of Working Capital

The need for working capital arises because of its significance in corporate firms. Working capital is needed because credit sales are not converted into cash instantaneously. There is always an operating cycle involved in the conversion of credit sales into cash.

Operating Cycle

Operating cycle is the time duration required to convert credit sales into cash after the conversion of resources into inventories. The operating cycle of a manufacturing firm involves three phases which are as follows**:**

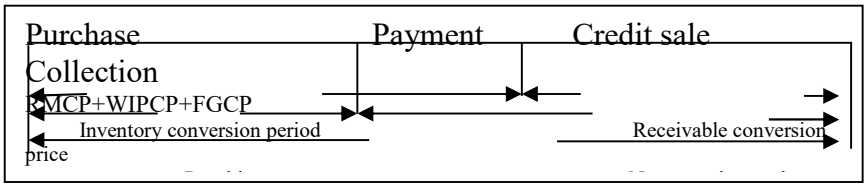
(i) Acquisition of resources such as raw materials, supplies, labors and other costs of production.

(ii) Manufacture of the product, which includes conversion of raw materials into working progress into finished goods.

(iii) Sale of the product either for cash or on credit. Credit sales create accounts receivables for collection.

These phases affect cash flows, which most of the time, are neither synchronized nor certain. Therefore, the firm is required to invest in current assets for smooth and uninterrupted functioning. The following Figure 1 shows the operating cycle of a manufacturing firm.

Figure –: Operating Cycle of a Manufacturing Firm



Permanent, Temporary and Balanced Working Capital

The operating cycle, thus, creates the need for current assets (working capital). However, the need does not come to an end after the cycle is completed. It will continue to exist. To explain this continuing need of current assets, a distinction should be drawn between permanent and temporary working capital.

The need for current assets arises, as already observed, because of the cash cycle. Business activity does not come to an end after the realization of cash from customers. For a company, the process is continuous and, hence, the need for a regular supply of working capital. However, the magnitude of working capital required will not be constant, but, will fluctuate. To carry on business a certain minimum level of working capital is necessary on a continuous and uninterrupted basis. For all practical purposes, this requirement will have to be met permanently as with other fixed assets. This permanent requirement is referred to as *permanent or fixed working capital.*

Any amount over and above the permanent level of working capital is temporary, fluctuating or variable working capital. This portion of the required working capital is needed to meet fluctuations in demand consequent upon changes in production and sales as a result of seasonal changes. The basic distinction of between permanent and temporary working capital is illustrated in Figure 2.

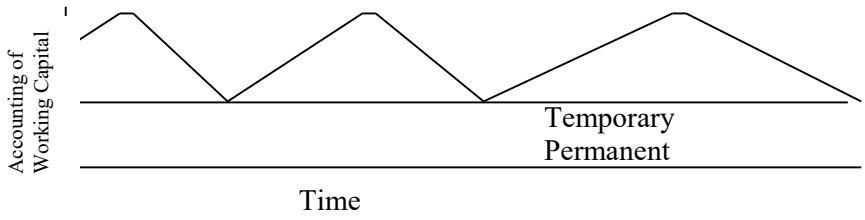


Figure : Permanent and Temporary Working Capital

Figure 2 shows that the permanent level is fairly constant, while temporary working capital is fluctuating – sometimes increasing and sometimes decreasing in accordance with seasonal demands. In the case of an expanding firm the permanent working capital line may not be horizontal. This is because the demand for permanent current assets might be increasing (or decreasing) to support a rising level of activity. In that case the line would be rising one as shown in Figure 3.

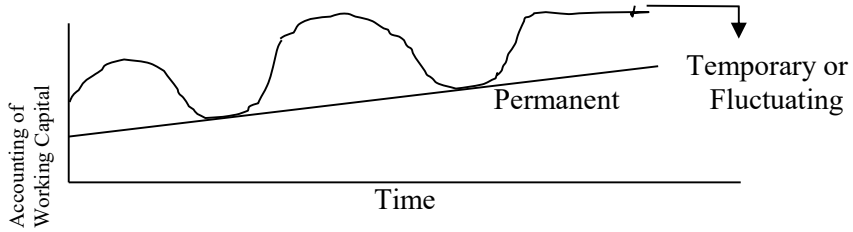


Figure : Permanent and Temporary Working Capital

Both kinds of working capital are necessary to facilitate the sales process through the operating cycle. Temporary working capital is created to meet liquidity requirements that are of a purely transient nature.

Changes in Working Capital : The changes in the level of working capital occur for the following three basic reasons **:** (i) changes in the level of sales and/or operating expenses, (ii) policy changes and (iii) changes in technology.

Balanced Working Capital Position:

A corporate firm should maintain a balanced working capital position, which means not excess of working capital nor shortage of working capital. Both excessive as well as shortage of working capital positions are dangerous for the firm. Excessive working capital means idle funds which earns no profit for the firms. Shortage of working capital not only impairs the firm's profitability but also results in production interruptions and inefficiencies.

The dangers of excessive working capital are as follows:

(i) Unnecessary accumulation of inventories;

(ii) Defective credit policy and slack collection period;

(iii) Managerial inefficiency and

(iv) Growing speculative profits.

Inadequate working capital has the following dangers:

(i) Stagnating growth;

(ii) Difficulty to implement operating plans and to achieve the profit target;

(iii) Creeping operating inefficiencies;

(iv) Under-utilization of fixed assets;

(v) Failure to avail attractive credit opportunities and

(vi) Tightening credit terms.

An efficient financial management should therefore, maintain the proper amount of working capital on a continuous basis.

Determinants of Working Capital Requirements

The importance of efficient working capital management, as an aspect of over-all financial management, has been highlighted in the preceding sections. A firm should plan its operations in such a way that it should have neither too much nor too little working capital. The total working capital requirement is determined by a wide variety of factors. It should be however, noted that these factors affect different enterprises differently. They also vary from time to time. In general, the following factors are involved in a proper assessment of the quantum of working capital required.

General Nature of Business

The working capital requirements of an enterprise are basically related to the conduct of the business. Enterprises fall into some broad categories depending on the nature of their business. For instance, public utilities have certain features which have a bearing on their working capital needs. At the other extreme are trading and financial enterprises. The manufacturing enterprises fall, in a sense, between these two extremes.

Production Cycle

Another factor which has a bearing on the quantum of working capital is the production cycle. The term "production" or "manufacturing cycle" refers to the time involved in the manufacture of goods. It covers the time-span between the procurement of raw materials and the completion of the manufacturing process leading to production of finished goods. Funds will have to be necessarily tied-up during the process of manufacture, necessitating enhanced working capital. In other words, there is some gap before raw materials become finished goods. To sustain such activities the need for working capital is obvious. The longer the time-span (i.e. the production cycle), the larger the working capital needed and vice-versa.

Business Cycle

The working capital requirements are also determined by the nature of the business cycle. Business fluctuations lead to cyclic and seasonal changes which, in turn, cause a shift in the working capital position, particularly for temporary working capital requirements. The variations in business conditions may be in two directions: (i) upward phase when boom conditions prevail and (ii) downswing phase when economic activity is marked by decline.

Production Policy

The quantum of working capital is also determined by production policy. In the case of certain lines of business, the demand for products is seasonal, i.e., they will be purchased during certain months of the year. What kind of production policy should be followed in such cases ? There are two options open to such enterprises: either they confine their production only to periods when goods are purchased or they follow a steady production policy throughout the year and produce goods at a level to meet the peak demand. In the former case, there will be serious production problems. During the slack season the firm will have to maintain its working force and physical facilities without adequate production and sale.

Credit Policy

The level of working capital is also determined by credit policy which relates to sales and purchases. The credit policy influences the requirement of working capital in two ways: (i) through credit terms granted by the firms to its customers/ buyers of goods; (ii) credit terms available to the firm from its creditors.

Growth and Expansion

As a company grows, it is logical to except that a larger amount of working capital will be required. It is, of course, difficult to determine precisely the relation between the growth in the volume of business of a company and the increase in its working capital in a going company also shifts with economic circumstances and corporate practices. Other things being equal, growth industries require more working capital than those that are static.

Vagaries in the Availability of Raw Materials

The availability or otherwise of certain raw materials on a continuous basis without interruption would sometimes affect the requirement of working capital. There may be some materials which cannot be procured easily either because their sources are few or they are irregular. To sustain

smooth production, therefore, the firm might be compelled to purchase and stock them far in excess of genuine production needs. This will result in an excessive inventory of such materials.

Profit Level

The level of profits earned differs from enterprise to enterprise. In general, the nature of the product, hold on the market, quality of management, and monopoly power would by and large determine the profit earned by a firm. The net profit is a source of working capital to the extent that it has been earned in cash. The cash profit can be found by adjusting non- cash items such as depreciation, outstanding expenses and losses written off, in the net profit. But, in practice, the net cash inflows from operations can not be considered as cash available for use at the end of the cash cycle.

The availability of internal funds for working capital requirements is determined not merely by the profit margin but also on the manner of appropriating profits. The availability of such funds would depend upon the profit appropriations for taxations, dividend, reserves and depreciations.

Level of Taxes

The first appropriation out of profits is payment or provision for tax. The amount of taxes to be paid is determined by the prevailing tax regulations. The management has no discretion in this respect. Very often taxes have to be paid in advance on the basis of the profit of the preceding year. Tax liability is, in a sense, short–term liability payable in cash. An adequate provision for tax payments is, therefore, an important aspect of working capital planning. If tax liability increases, it will lead to an increase in the requirement of working capital and vise - versa.

Dividend Policy

Another appropriation of profits which has a bearing on working capital is dividend payment. The payment of dividend consumes cash resources and, thereby, affects working capital to that extent. Conversely, if the firm does not pay dividend but retains the profit, working capital will increase. In planning working capital requirements, therefore, a basic question to be decided is whether profits will be retained or paid out to shareholders. In theory, a firm should retain profits to preserve cash resources and, at the same time, it must pay dividends to satisfy the expectations of investors. When profits are relatively small, the choice is between retention and payment. The choice must be made after taking account of all the relevant factors.

Depreciation Policy

Depreciation policy also exerts and influence on the quantum of working capital. Depreciation charges do not involve any cash outflow. The effect of depreciation policy on working capital is, therefore, indirect. In the first place, deprecation affects the tax liability and retention of profits. Depreciation is allowable expenditure in calculating net profits. Enhanced rates of depreciation will lower the profits and, therefore, The tax liability and, thus, more cash profits. Higher depreciation will also mean lower disposable profits and, therefore, a smaller dividend payment.

Price Level Changes

Changes in the price level also affect the requirements of working capital. Rising prices would necessitate the use of more funds for maintaining an existing level of activity. For the same level of current assets, higher cash outlays will be required. The effect of rising prices will be that a higher amount of working capital will be needed.

Operating Efficiency

The operating efficiency of management is also an important determinant of the level of working capital. Management can contribute to a sound working capital position through operating efficiency. Although management cannot control the rise in prices, it can ensure the efficient

utilization of resources by eliminating waste, improving co – ordination, and fuller utilization of existing resources, etc. Efficiency of operations accelerates the pace of the cash cycles and improves the working capital turnover. It releases the pressure on working capital by improving profitability and the internal generation of funds.

Techniques of Working Capital Planning

The important techniques that can be successfully used in working capital planning are: (i) projected funds flow statements; (ii) budget statements and (iii) proforma statements. The fund flow statement is made up of two parts viz., statement of movements of funds showing the sources and application of funds and a schedule of changes in working capital. Cash budget and revenue budget serve as a planning tool for working capital. The revenue budget is mainly composed of (i) sales budget; (ii) material budget, (iii) production budget; (iv) purchase budget; (v) working capital budget and the like. The cash budget is composed of cash inflows and cash outflows. The proforma statements are composed of proforma profit and loss statement and proforma balance sheet. All these cash budget, proforma profit and loss account, proforma balance sheet and fund flow statement have already been discussed in earlier lesson.

Methods of Estimating Working Capital Requirements

The most appropriate method of estimating the working capital needs of a firm is the concept of operating cycle discussed earlier. However, some other methods may be used to determine the working capital needs. These are discussed as follows:

(i) **Current assets holding period:** To estimate working capital requirement on the basis of average holding period of current assets and relating them to cost based on firm's experience in the previous years. This method is essentially based on the operating cycle concept.

(ii) **Ratio of sales:** To estimate working capital requirements as a ratio of sales on the assumption that current assets change with sales.

(iii) **Ratio of fixed investment:** In this case working capital requirements are estimated as a percentage of fixed investment.

A number of factors will govern the selection of the methods of estimating working capital. Factors such as seasonal variations in operations, accuracy of sales forecast, investment costs and variability in sales price would generally be considered. The production cycle and the production and collection policies would also have an impact on working capital requirements. Therefore, these should be given due weightage in projecting working capital requirements.

Problems and Solutions

Problem - 1

Bata Company is interested to purchase a business and has consulted you, as a financial analyst to advise them as regards the average amount of working capital required in the first year. You are given the following estimates and are advised to add 10% to your figure to allow for contingencies.

Estimates	Amount (Tk.)
Average amount backed up for finished products	5,000
Average amount backed up for materials etc.	8,000
Average credit given:	
Local sales - 6 weeks credits	3,12,000
Export sales- 1.5 weeks credit	78,000
Average time lag in payment of:	

Wages- 1.5 weeks	2,60,000
Stocks, materials etc.- 1.5 months	48,000
Rent, Royalties etc.- 6 months	10,000
Clerical staff- 0.5 month	62,400
Manager – 0.5 month	4,800
Other expenses- 1.5 months	48,000
Payment in advance:	
Sundry expenses- paid quarterly	8,000
Undrawn profits	11,000

Solution

Statement to determine Net Working Capital for Bata Company

(A) Current assets:	Amount (Tk.)
(i) Stock of finished product	5,000
(ii) Stock stores, materials, etc.	8,000
(iii) Debtors:	
Inland sales 6 weeks	
$= \frac{\text{Credit sales}}{\text{Debtors turnover}}$ $= \frac{\text{Tk. 3,12,000 x 6}}{52}$	36,000
Export sales 1.5 weeks	
$= \frac{\text{Tk. 78,000 x 3}}{104}$	2,250
(iv) Advance payment of sundry expenses:	
$= \frac{\text{Tk. 8,000 x 1}}{4}$	2,000
Total investment in current assets	53,250

(B) Current liabilities:

(i) Wages $\left(\frac{Tk.2,60,000}{104}\right)$	7,500
(ii) Stocks, materials etc. $\left(\frac{Tk.48,000x3}{24}\right)$	6,000
(iii) Rent, royalties, etc. $\left(\frac{Tk.10,000x6}{12}\right)$	5,000

(iv) Clerical staff $\left(\frac{Tk.62,400x1}{24}\right)$	2,600
(v) Manager $\left(\frac{Tk.4,800x1}{24}\right)$	200
(vi) Miscellaneous expenses $\left(\frac{Tk.48,000x3}{24}\right)$	6,000
Total estimate of current liabilities	27,300

(C) Net working capital:

(i) Current assets – Current liabilities (A - B)	25,950
(ii) Add 10% contingency allowance	2,595
Average amount of working capital required	28,545

Assumptions:

(i) For calculations a time period of 52 weeks/12 months has been assumed in a year.

(ii) Undrawn profit has been ignored in the working capital computation for the following reasons**:**
   (a) For the purpose of determining working capital provided by net profit, it is necessary to adjust the net profit for income tax and dividends/ drawing, etc.
   (b) Profit need not always be a source of financing working capital. It may be used for other purposes like purchase of fixed assets, repayment of long-term loans, etc.

(iii) Actual working capital requirement would be more than what is estimated here as in the question cash component of current assets is not given.

Problem - 2

While preparing a project report on behalf of a client you have collected the following facts. Estimate the net working capital required for that project. Add 10% to your computed figure to allow contingencies.

	Amount per unit (Tk.)
Estimated cost per unit of production is **:**	
Raw materials	80
Direct labor	30
Overheads (exclusive of depreciation)	60
Total cost	170
Additional information:	
Selling price	Tk. 200 per unit

Level of activity	1,04,000 units of production per annum
Raw materials in stock	average 4 weeks
Work in progress (assume 50% completion stage in respect of conversion costs)	average 2 weeks
Finished goods in stock	average 4 weeks
Credit allowed by suppliers	average 4 weeks
Credit allowed to debtors	average 8 weeks
Lag in payment of wages	average 1.5 weeks
Cash at bank is expected to be	Tk. 25,000

You may assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

Solution

	Amount (Tk.)
(A) Current assets **:**	
(i) Raw materials in stock, average 4 weeks **:**	
$\left(\frac{Tk.1{,}04{,}000 x Tk.80 x 4}{52}\right)$	6,40,000
(ii) Work in progress, average 2 weeks **:**	
(a) Raw material $\left(\frac{Tk.1{,}04{,}000 x Tk.80 x 2}{52}\right)$	3,20,000
(b) Direct labor $\left(\frac{Tk.1{,}04{,}000 x Tk.15 x 2}{52}\right)$	60,000
(c) Overheads $\left(\frac{Tk.1{,}04{,}000 x Tk.30 x 2}{52}\right)$	1,20,000
(iii) Finished goods stock, average 4 weeks **:**	
$\left(\frac{Tk.1{,}04{,}000 x Tk.170 x 4}{52}\right)$	13,60,000
(iv) Debtors, average 8 weeks **:**	
$\left(\frac{Tk.1{,}04{,}000 x Tk.170 x 8}{52}\right)$	27,20,000
(v) Cash at bank	25,000
Total investment in current assets	52,45,000
(B) Current liabilities **:**	
(i) Creditors, average 4 weeks $\left(\frac{Tk.1{,}04{,}000 x Tk.80 x 4}{52}\right)$	6,40,000

(ii) Lag in payment of wages, average 1.5 weeks : $\left(\frac{Tk.1,04,000 x Tk.30 x 3}{104}\right)$	90,000
Total current liabilities	7,30,000
(C) Net working capital :	
Current assets – Current liabilities = Tk. 52,45,000 – Tk. 7,30,000	45,15,000
Add 10% contingencies	4,51,500
	49,66,500

Assumptions: A full unit of raw material is required at the beginning of the manufacturing process and, therefore, total cost of the material, i.e., Tk. 80 per unit has been taken into consideration, while in the case of expenses, viz., direct labor and overheads, the unit has been finished only to the extent of 50%. Accordingly, Tk. 15 and Tk. 30 have been charged for direct labor and overheads respectively.

Review Questions

A. Short Questions

1. What is working capital? What is working capital management?
2. How would you assess the need for working capital of a corporate firm?
3. "Length of operating cycle is the main determinant of working capital needs of a firm". Explain.
4. Distinguish between operating cycle and production cycle of a manufacturing firm.
5. What are the three phases of operating cycle? Discuss.
6. Distinguish between permanent and temporary working capital.
7. What do you mean by balanced working capital?
8. What are the dangers of excessive working capital?
9. What are the adverse impacts of shortage of working capital?
10. What are the major techniques of working capital planning? Explain.
11. How would you estimate working capital needs of a firm?

B. Broad Questions

1. Describe the various factors which affect the working capital requirement of a manufacturing firm.

Review Problems

Problem - 1

A proforma cost sheet of a company provides the following data:

	Tk.
Cost (per unit):	
Raw materials	52.0
Direct labor	19.50
Overheads	39.0
Total cost (per unit)	110.50
Profit	19.50
Selling price	130.0

The following is the additional information available:

Average raw materials in stock: one month; average materials in process **:** half month. Credit allowed by suppliers: one month; credit allowed to debtors: two months. Time lag in payment of wages: One and half a weeks. Overheads: one month. One-fourth sales are on cash basis. Cash balance is expected to be Tk. 1, 20,000.

You are required to prepare a statement showing the working capital needed to finance a level of activity of 70,000 units of output. You may assume that production is carried on evenly throughout the year and wages and overheads accrue similarly.

Problem - 2

While preparing a project report on behalf of client you have collected the following facts. Estimate the net working capital required for that project. Add 10% to your computed figure to allow for contingencies.

	Amount per unit (Tk.)
Estimated cost per unit of production is**:**	
Raw material	42.4
Direct labor	15.9
Overheads (exclusive of depreciation)	31.8
Total cost	90.1
	Amount per unit (Tk.)
Additional information:	
Selling price	Tk. 106
Level of activity	1, 00,000 units of production annually
Raw material in stock	Average 4 weeks
Work in progress (50% completion)	Average 2 weeks
Finished goods in stock	Average 4 weeks
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors	Average 8 weeks
Lag in payment of wages	Average 1.5 weeks
Cash at bank (expected)	1, 25,000

Assume that all sales are on credit

Lesson-2: Cash Management

After successful completion of the lesson 2, you should be able to-

- *Understand the meaning, objectives and significance of cash management;*
- *Identify the motives for holding cash;*
- *Grasp the methods of determining cash requirements for a firm;*
- *Explain the basic strategies of cash management and*
- *Acquire the techniques/processes involved in cash management.*

Meaning, Objectives and Significance of Cash Management

Cash is the important current asset for the operations of the business. Cash is the basic input needed to keep the business running on a continuous basis; it is also the ultimate output expected to be realized by selling the service or product manufactured by the firm. The firm should keep sufficient cash, neither more nor less. Cash shortage will disrupt the firm's manufacturing operations while excessive cash will simply remain idle, without contributing anything towards the firm's profitability. Thus, a major function of the financial manager is to maintain a sound cash position.

The basic objectives of cash management are two-fold namely: (a) to meet the cash disbursements needs (payment schedule) and (b) to minimize funds committed to cash balances. These are conflicting and mutually contradictory and the task of cash management is to reconcile them.

(a) Meeting the Payments Schedule

In the normal course of business, firms have to make payments of cash on a continuous and regular basis to suppliers of goods, staffs and employees and the like. At the same time, there is a constant inflow of cash through collections from debtors. Cash is therefore, aptly described as the oil to lubricate the ever-turning wheels of business. A basic objective of cash management is therefore, to meet the payment schedule.

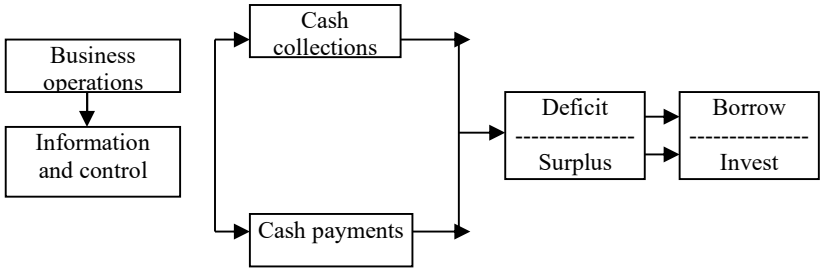
(b) Minimizing Funds Committed to Cash Balances

While minimizing cash balances two conflicting aspects have to be reconciled. A high level of cash balances will ensure prompt payment. But, it would lead to large funds remaining idle, as cash is a non-earning asset. On the contrary, a low level cash balances may mean failure to meet the payment schedule. The aim of cash management therefore, should be to have an optimal amount of cash balance.

One of the tasks of financial management is to manage cash effectively and efficiently. Because, poor cash management may have serious consequences. It is possible for a company to go bankrupt or to be taken over even it does well; since rapid increase in sales will involve heavy expenses on stocks and the extension of credits, thereby depleting cash resources. Alternatively, if idle cash reserves are built up, this suggests that investment opportunities are being missed and the business may be stagnating. Therefore, finding reasonable amount of funds for operating needs is a perennial pre-occupation for the firm's finance manager. Paucity of cash, even on a temporary phase, is a source of trouble to most enterprises. Nor, it is wise to have excess cash which is not a productive asset. Now, the question arises as to the reasonable amount of cash to be maintained by an enterprise. No standard answer can be provided for this question. Past trends, industry averages and inter-firm comparison can provide some useful indications in this regard. However, one author of financial management opines that management should project the future cash receipts and cash payments of the firm with various cash balances, deduct the payments from the receipts to determine the net cash flows and then select that cash balance which maximizes the present value of the net cash flows.

Cash management is concerned with the managing of **:** (i) cash flows into and out of the firm, (ii) cash flows within the firm, and (iii) cash balances held by the firm at a point of time by financing deficit or investing surplus cash. It can be represented by a cash management cycle as shown in Figure-31.1. Sales generate cash which has to be disbursed out. The surplus cash has to be invested while deficit has to be borrowed. Cash management seeks to accomplish this cycle at a minimum cost. At the same time, it also seeks to achieve liquidity and control. Cash management assumes more importance than other current assets because cash is the most significant and the least productive asset that a firm holds. It is significant because it is used to pay the firm's obligations. However, cash is unproductive. Unlike fixed assets or inventories, it does not produce goods for sale. Therefore, the aim of cash management is to maintain adequate control over cash position to keep the firm sufficiently liquid and use excess cash in some profitable way.

Figure – Cash Management Cycle



The management of cash is also important because it is difficult to predict cash flows accurately, particularly the inflows, and there is no perfect coincidence between the inflows and outflows of cash. During some periods, cash outflows will exceed cash inflows, because payments for taxes, dividends, or seasonal inventory may build up. At other times, cash inflow will be more than cash payments because there may be large cash sales and debtors may be realized in large sums promptly. Cash management is also important because cash constitutes the smallest portion of the total current assets, yet management's considerable time is devoted in managing it. In recent past, a number of innovations have been done in cash management techniques. An obvious aim of the firm now-a days is to manage its cash affairs in such a way as to keep cash balance at a minimum level and to invest the surplus cash in profitable investment opportunities.

The ideal cash management system will depend on the firm's products, organization structure, competition, culture and options available. The task is complex, and decisions taken can affect important areas of the firm. For example, to improve collections if the credit period is reduced, it may affect sales. However, in certain cases, even without fundamental changes, it is possible to significantly reduce cost of cash management system by choosing a right bank and controlling the collections properly.

Motives for Holding Cash

There are four primary motives for holding cash which are discussed below:

(i) Transaction Motive: A very important reason for maintaining cash balance is the transaction motive. The requirement of cash balances to meet routine cash needs is known as the transaction motive and such cash balances are called transaction balances. Thus, transaction motive refers to the holding of cash to meet anticipated obligations whose timing is not perfectly synchronized with cash receipts.

(ii) Precautionary Motive: A firm may have to pay cash for the purposes which cannot be predicted or anticipated. The unexpected cash needs at a short notice may arise due to **:** (a) any natural calamities and strikes and lockouts; (b) failure of important customers; (iii) unexpected slow down in collection of debtors; (iv) cancellation of some orders for goods; (v) sharp increase

in cost of raw materials etc. The cash balances held in reserve for such random and unforeseen fluctuations in cash flows are called precautionary balances. Hence, precautionary motive implies the need to hold the cash to meet unpredictable obligations.

(iii) Speculative Motive: It refers to the desire of a firm to take advantage of opportunities which present themselves at unexpected moments and which are typically outside the normal course of business. Such motive represents a positive and aggressive approach. Firms aim to exploit profitable opportunities keep cash in reserve to do so.

(iv) Compensation Motive: Customers of a bank are usually required to maintain a minimum cash balance at that bank for providing services to them. Since this balance cannot be utilized by the firms for transaction purposes, the banks themselves can use the amount to earn a return. Such balances are known as compensating balances. These balances are also required by some loan agreements between a bank and its customers.

Methods of Determining Cash Requirements

The factors that determine the required cash balances are **:**

Synchronization of Cash Flows

The need for maintaining cash balances arises from the non-synchronization of the inflows and outflows of cash **:** if the receipts and payments of cash perfectly coincide or balance each other, there would be no need for cash balances. The first consideration in determining the cash need is, therefore, the extent of non- synchronization of cash receipts and disbursements. For this purpose, the inflows and outflows have to be forecasted over a period of time.

Short Fall Costs

Another general factor to be considered in determining cash needs is the cost associated with a shortfall in the firm's cash needs. The cash forecast presented in the cash budget would reveal periods of cash shortages. In addition, there may be some unexpected shortfalls. Every shortage of cash – whether expected or unexpected – involves a cost "depending upon the severity, duration and frequency of the shortfall and how the shortage is covered. Expenses incurred as a result of shortfall are called short costs". Included in the short costs are:

(i) *Transaction costs* associated with raising cash to tide over the shortage. This is usually the brokerage incurred in relation to the sale of some short-term near-cash assets such as marketable securities.

(ii) *Borrowing Costs* associated with borrowing to cover the shortage. These include items such as interest on loan, commitment charges and other expenses relating to the loan.

(iii) Loss of trade-discount, i.e. a substantial loss because of a temporary shortage of cash.

(iv) Cost associated with deterioration of the firm's credit rating which is reflected in higher bank charges on loans, stoppage of supplies, demands for cash payment, refusal to sell, loss of firm's image and the attendant decline in sales and profits.

(v) Penalty rates by banks to meet a shortfall in compensating balances.

Excess Cash Balance Costs

Another consideration in determining cash needs is the cost associated with maintaining excess/idle cash. The cost of having excessively large cash balances is known as excess cash balance cost. If large funds are idle, the implication is that the firm has missed opportunities to invest those funds and has thereby lost interest which it would otherwise have earned. This loss of interest is primarily the excess cost.

Procurement and Management

These are the costs associated with establishing and operating cash management staff and activities. They are generally fixed and are mainly accounted for by salary, storage, handling of securities, etc.

Uncertainty and Cash Management

Finally the impact of uncertainty on cash management strategy is also relevant as cash flows cannot be predicted with complete accuracy. The first requirement is a precautionary cushion to cope with irregularities in cash flows, unexpected delays in collections and disbursements, defaults and unexpected cash needs.

Determining Cash Need – Cash Budget

After the examination of the pertinent considerations and cost that determine cash needs, the next questions deals with the determination of a firm's cash needs.

There are two approaches to derive an optional cash balance, namely, (a) Minimizing Cost Model and (b) Cash Budget.

Cash Budget: Cash Management Tool

A firm is well-advised to hold adequate cash balances but should avoid excessive balances. The firm has, therefore, to assess its need for cash properly. The cash budget is probably the most important tool in cash management. It is a device to help a firm to plan and control the use of cash. It is a statement showing the estimated cash income (cash inflow) and cash expenditure (cash outflow) over the firm's planning horizon. In other words, the net cash position (surplus or deficiency) of a firm as it moves from one budgeting sub-period to another is highlighted by the cash budget.

One of the primary responsibilities of the financial manager is to maintain a sound liquidity position of the firm so that the dues are settled in time. The firm needs cash to purchase raw materials and pay wages and other expenses as well as for paying dividend, interest and taxes. The test of liquidity is the availability of cash to meet the firm's obligations when they become due.

A firm maintains the operating cash balance for transaction purposes. It may also carry additional cash as a buffer or safety stock. The amount of cash balance will depend on the risk-return trade-off. If the firm maintains small cash balance, its liquidity position weakens, but its profitability improves as the released funds can be invested in profitable opportunities (marketable securities. When the firm needs cash, it can sell its marketable securities (or borrow). On the other hand, if the firm keeps a high cash balance, it will have a strong liquidity position but its profitability will be low. The potential profit foregone on holding large cash balance is an opportunity cost of the firm. The firm should maintain optimum – just enough, neither too much nor too little – cash balance. How to determine the optimum cash balance if cash flows are predictable and if they are not predictable?

Optimum Cash Balance under Certainty: Baumol's Model

The Baumol's cash management model provides a formal approach for determining firm's optimum cash balance under certainty. It considers cash management similar to an inventory management problem . As such, the firm attempts to minimize the sum of the cost of holding cash (inventory of cash) and the cost of converting marketable securities to cash.

The Baumol's model makes the following assumptions:

- The firm is able to forecast its cash needs with certainty.

- The firm's cash payments occur uniformly over a period of time.
- The opportunity cost of holding cash is known as and it doe not change over time.
- The firm will incur the same transaction cost whenever it converts securities to cash.

Basic Strategies of Cash Management

In order to resolve the uncertainty about cash flow prediction and lack of synchronization between cash receipts and payments, the firm should develop appropriate strategies for cash management. The firm should evolve strategies regarding the following four facets of cash management:

- ***Cash planning*** Cash inflows and outflows should be planned to project cash surplus or deficit for each period of the planning period.. Cash budget should be prepared for this purpose.
- ***Managing the cash flows*** The flow of cash should be properly managed. The cash inflows should be accelerated while, as far as possible, the cash outflows should be decelerated.
- ***Optimum cash level*** The firm should decide about the appropriate level of cash balances. The cost of excess cash and danger of cash deficiency should be matched to determine the optimum level of cash balances.
- ***Investing surplus cash*** The surplus cash balances should be properly invested to earn profits.

Cash Management: Basic Strategies

The cash budget, as a cash management tool, would throw light on the net cash position of a firm. After knowing the cash position, the management should work out the basic strategies to be employed to manage its cash. The present section attempts to outline the basic strategies of cash management.

It may be noted at the outset that the broad cash management strategies are essentially related to the cash turn-over process, i.e., the cash cycle together with the cash turn-over. The cash cycle refers to the process by which cash is used to purchase materials from which are produced goods, which are then sold to customers, who later pay bills. The firm receives cash from customers and the cycle repeats itself. The cash turn-over means the number of times firm's cash is used during each year.

Minimum Operating Cash

The higher the cash turn-over, the less cash the firm requires. The firm should, therefore, try to maximize the cash turn-over. But it must maintain a minimum amount of operating cash balance so that it does not run out of cash.

The cash management strategies are intended to minimize the operating cash balance requirement. The basic strategies that can be employed to do the needful are-

(i) Stretching accounts payable,

(ii) Efficient inventory – production management,

(iii) Speedy collection of accounts receivables and

(iv) Combined cash management strategy.

Each of the above strategies are discussed below briefly:

(i) Stretching accounts payable

One of the basic strategies of efficient cash management is to stretch the accounts payable. This means that a firm should make delay as far as possible in paying its accounts payable without its

credit standing. It should however take advantage of the cash discount available on prompt payment.

(ii) Efficient inventory – production management

Another important strategy is to increase the inventory turnover rate avoiding stock-outs. This can be done as follows:

(a) Increasing raw materials turn-over
(b) Decreasing production cycle

Year	2007	2008	2009	2010	2011	2012
Dividend per share	$2.25	2.37	2.46	2.60	2.76	2.87

(c) Increasing finished goods turn-over

(iii) Speedy collection of accounts receivables

Another strategy for efficient cash management is to collect accounts receivables as quickly as possible without loosing future sales. The average collection period can be reduced by bringing changes in credit terms, credit standards and collection policies.

(iv) Combined cash management strategy

In this strategy all the above mentioned strategies are combined together in order to bring efficiency of the cash management. These three strategies may lead to a reduction in the cash balance.

Techniques and Processes of Cash Management

The main techniques of cash management are discussed below:

(i) **Speedy cash collection**: In managing cash efficiently, the inflow process can be accelerated by encouraging the customers to pay as quickly as possible and converting the payment from the customers into cash without any delay. Speedy cash collection may also be ensured by decentralizing collection of accounts receivables.

(ii) **Slowing disbursement:** The operating cash requirement can be reduced by slowing disbursements of accounts payable. This can be done as follows: avoidance of early payments, centralized disbursements, creating floats and creating accruals.

Review Questions

Short Questions

1. What are the objectives of cash management?
2. What are the adverse consequences of poor cash management?
3. What are the goals of cash management strategies?
4. Examine the significance of speedy receivables collection.
5. What is the significance of slow payments of accounts payable?
6. Explain the deposit float and payment float?

Broad Questions

1. Examine the significance of cash management.
2. What are the factors that influence cash requirements of a firm? Explain.
3. What are the models that can be used in determining the cash needs of a firm? Discuss.
4. Describe the basic strategies of efficient cash management.
5. Narrate the processes of efficient cash management

Lesson-3: Inventory Management Principles

After successful completion of the lesson 3, you should be able to-

- *Understand the concepts and significance of inventory and inventory management;*
- *Realize the objectives of inventory management and*
- *Realize the benefits of holding optimum level of inventory.*

Concepts and Significance of Inventory and Inventory Management

The term 'inventory' refers to the stockpile of the product a firm is offering for sale and the components that make up the product. In other words, inventory is composed of assets that will be sold in future in the normal course of business operations. The assets which firm store as inventory in anticipation of need are (i) raw materials, (ii) work-in-process (semi finished goods) and (iii) finished goods. The raw material inventory contains items that are purchased by the firm from others and are converted into finished goods through the manufacturing (production) process. They are an important input of the final product. The work-in-process inventory consists of items currently being used in the production process. They are normally partially or semi-finished goods that are at various stages of production in a multi-stage production process. Finished goods represent final or completed products, which are available for sale. The inventory of such goods consists of items that have been produced but are yet to be sold.

Inventory, as a current asset, differs from other current assets. Because not only financial managers, but all the functional areas, finance, marketing, production, and purchasing, are involved. The views concerning the appropriate level of inventory would differ among the different functional areas. The job of the functional manager is to reconcile the conflicting viewpoints of the various functional areas regarding the appropriate inventory levels in order to fulfill the overall objective of maximizing the owner's wealth. Thus, inventory management, like the management of other current assets, should be related to the overall objective of the firm.

The question of managing inventories arises only when the company holds inventories. Maintaining inventories involves tying up of the company's funds and incurrence of storage and handling costs. If it is expensive to maintain inventories, why do companies hold inventories? There are three general motives for holding inventories.

- Transactions motive emphasizes the need to maintain inventories to facilitate smooth production and sales operations.
- Precautionary motive necessitates holding of inventories to guard against the risk of unpredictable changes in demand and supply forces and other factors.
- Speculative motive influences the decision to increase or reduce inventory levels to take advantage of price fluctuations.

A company should maintain adequate stock of materials for a continuous supply to the factory for an uninterrupted production. It is not possible for a company to procure raw materials whenever it is needed. A time lag exists between demand for materials and its supply. Also, there exists gap between demand for materials and its supply. Also there exists uncertainty in procuring raw materials in time on many occasions. The procurement of materials may be delayed because of such factors as strike, transport disruption or short supply. Therefore, the firm should maintain sufficient stock of raw materials at a given time to streamline production.

Work-in-process inventory builds up because of the production cycle. Production cycle is the time span between introduction of raw material into production and emergence of finished products at the completion of production cycle. Till production cycle completes, stock of work-in process has to be maintained. Efficient firms constantly try to make production cycle smaller by improving their production techniques.

Stock of finished goods has to be held because production and sales are not instantaneous. A firm cannot produce immediately when goods are demanded by customers. Therefore, to supply finished goods on a regular basis, their stock has to be maintained.

Financial managers are concerned with every aspect of inventory management that is controllable from the standpoint of reducing liquidity risks and increasing profits for the owners. Inventories are important to the management of an enterprise primarily because of the direct impact, which they have upon the firm's profits. Inventories affect firm's profits in several ways. Firstly, both over-investment and under-investment in inventories have harmful effects on the enterprises. Holding excessive stock immobilizes capital resources. The immediate consequence of over-investment is the freezing up of funds in excessive stocks and non-availability of these resources for meeting current obligations or pressing commitments. Moreover, too much inventory reduces the profit margin in that carrying costs viz., costs of handling, insurance, recording and inspection and, in turn, costs of doing business are increased for extra load of inventories. Again, under-investment in inventory i.e., too little inventory has also some adverse effects. Under-investment creates frequent production hold-ups or delays and failures to meet delivery commitments to customers. At the same time, the delays and shut-downs boost-up cost of production which, in turn, reduces profit margin. Secondly, the rate at which inventories move through the production and distribution processes also affects the cost of doing business.

It is therefore, important for financial management to determine the correct amount of working capital to invest in inventory at any one time. But the question is: what is the appropriate size of inventory? No standard set of rules can be formulated and offered as a ready solution for all enterprises and in all circumstances. The nature of the business activity, location of the sources of materials and services, as also of the sales outlets, reliability on the sources of supply, speed and efficiency of transport and communication facilities etc. influence the inventory levels.

Objectives of Inventory Management

In the context of the inventory management, the firm is faced with the problem of meeting two conflicting needs:

- To maintain a large size of inventory for efficient and smooth production and sales operations.
- To maintain a minimum investment in inventories to maximize profitability.

The aim of inventory management, thus, should be to avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for the smooth production and sales operations. Efforts should be made to place an order at the right time with the right source to acquire the right quantity at the right price and quality. An effective inventory management should -

- ensure a continuous supply of raw materials to facilitate uninterrupted production,
- maintain sufficient stocks of raw materials in periods of short supply and anticipate price changes,
- maintain sufficient finished goods inventory for smooth sales operation and efficient customer service,
- minimize the carrying cost and time, and
- control investment in inventories and keep it at an optimum level.

The basic responsibility of the financial manager is to make sure the firm's cash flows are managed efficiently. Efficient management of inventory should ultimately result in the maximization of the owner's wealth. It was indicated earlier that in order to minimize cash requirements, inventory should be turned over as quickly as possible, avoiding stock-outs that might result in closing down the production line or lead to a loss of sales. It implies that while the

management should try to pursue the financial objective of turning inventory as quickly as possible, it should at the same time ensure sufficient inventories to satisfy production and sales demands. In other words, the financial manager has to reconcile these two conflicting requirements. Stated differently, the objective of inventory management consists of two counterbalancing parts: (i) to minimize investments in inventory, and (ii) to meet demand for the product by efficiently organizing the production and sales operations. These two conflicting objectives of inventory management can also be expressed in terms of cost and benefit associated with inventory. That the firm should minimize investment in inventory implies that maintaining inventory involves costs, such that the smaller the inventory, the lower is the cost to the firm. But inventories also provides benefits to the extent that they facilitate the smooth functioning of the firm: the larger the inventory, the better it is from this viewpoint. Obviously, the financial mangers should aim at a level of inventory which will reconcile these conflicting elements. That is to say, an optimum level of inventory should be determined on the basis of the trade-off between costs and benefits associated with the levels of inventory.

Advantage of Holding Optimum Level of Inventory

The major benefits of holding inventory are the basic functions of inventory. In other words, inventories perform certain basic functions which are of crucial importance in the firm's production and marketing strategies.

The basic function of inventories is to act as a buffer to decouple or uncouple the various activities of a firm so that all do not have to be pursued at exactly the same rate. The key activities are: (i) purchasing, (ii) production, and (iii) selling. Inventories permit short-run relaxation so that each activity may be pursued efficiently. Stated differently, inventories enable firms in the short-run to produce at a rate greater than purchase of raw materials and vice-versa, or to sell at a rate greater than production and vice-versa.

Since inventory enables uncoupling of the key activities of a firm, each of them can be operated at the most efficient rate. This has several beneficial effects on the firm's operations. Another way of saying it is that the three types inventory, namely raw materials, work-in –process and finished goods, perform certain useful functions. Alternatively, rigid tying (coupling) of purchase and production to sales schedules is undesirable in the short-run as it will deprive the firms of certain benefits. The effects of uncoupling (maintaining inventory) are as follows:

Advantage in Purchasing

If the purchasing of raw materials and other goods is not tied to production/sales, i.e. a firm can purchase independently to ensure the most efficient purchase, several advantages would become available. In the first place, a firm can purchase larger quantities than is warranted by usage in production or the sales level. This will enable it to avail of discounts that are available in the bulk purchases. Moreover, it will lower the ordering cost as fewer acquisitions would be made. There will, thus, be a significant saving in costs. Second, firma can purchase goods before anticipated or announced price increases. This will lead to a decline in the cost of production. Inventory, thus, serves as a hedge against price increases as well as shortages of raw materials. This is a highly desirable inventory strategy.

Advantage in Work-in Process

The inventory of work-in-process performs two functions. In the first place, it is necessary because production processes are not instantaneous. The amount of such inventory depends upon technology and the efficiency of production. The larger the steps involved in the production process, the larger the work-in process inventory and vice-versa. By shortening the production time, efficiency of the production process can be improved and the size of this type of inventory reduced. In a multi-stage production process, the work-in process inventory serves a second

purpose also. It uncouples the various stages of production so that all of them do not have to be performed at the same rate. The stages involving higher set-up costs may be most efficiently performed in batches with a work-in process inventory accumulated during a production run.

Advantage in Production

Finished goods inventory serves to uncouple production and sale. This enables production at a rate different from that of sales. That is, production can be carried on at a rate higher or lower than the sales rate. This would be of special advantage to firms with a seasonal sales pattern. In their case, the sales rate will be higher than the production rate during a part of the year (peak season) and lower during the off-season. Thus, inventory helps a firm to co-ordinate its production scheduling so as to avoid disruptions and the accompanying expenses. In brief, since inventory permits least cost production scheduling, production can be carried on more efficiently.

Advantage in Sales

The maintenance of inventory also helps a firm to enhance its sales efforts. For one thing, if there are no inventories of finished goods, the level of sales will depend upon the level of current production. A firm will not be able to meet demand instantaneously. There will be a lag depending upon the production process. If the firm has inventory, actual sales will not have to depend on lengthy manufacturing processes. Thus, inventory serves to bridge the gap between current production and actual sales. A related aspect is that inventory serves as a competitive marketing tool to meet customer demands. Moreover, in the case of firms having a seasonal pattern of sales, there should be a substantial finished goods inventory prior to the peak sales season. Failure to do so may mean loss of sales during the peak season.

Finally, the inventory of work-in-process performs two functions. In the first place, it is necessary because production processes are not instantaneous. The amount of such inventory depends upon technology and the efficiency of production. The larger the steps involved in the production process, the larger the work-in-process inventory and vice-versa. By shortening the production time, efficiency of the production process can be improved and the size of this type of reduced inventory.

Review Questions

Short Questions

1. What do you mean by inventory and inventory management? Explain.
2. Discuss the various types of inventory held by a manufacturing enterprise.
3. State the significance of inventory management.
4. Explain the necessity of holding inventory.

Broad Questions

1. What are the objectives of inventory management? Explain.
2. What is an optimum level of inventory? Discuss the benefits of holding optimum level of inventory.
3. “The management of inventory must meet two opposite needs”. What are they? How is a balance made in these two opposite needs?

Lesson-4: Accounts Receivable Management

After successful completion of the lesson 4, you should be able to-

- *Form a clear cut concept on accounts receivable and its management;*
- *Realize the objectives and significance of accounts receivable management;*
- *Understand how an optimum credit policy can be formulated;*
- *Identify and explain the credit and collection policies and procedures and*
- *Get acquainted with the concept and costs and benefits involved in factoring.*

Concept of Accounts Receivable and Its Management

Accounts receivables arise when a firm sells its products or services on credit and does not receive cash at the time of sale. It is an essential marketing tool which acts as a bridge for the movement of goods through production and distribution stages to customers. A firm grants trade credit to protect its sales from the competitors and to attract the potential customers to buy its products services on favorable terms and conditions. Trade credit creates accounts receivables which the firm expects to collect in the near future. Such accounts receivables have three characteristics which are as follows:

(i) They involve an element of risk which should be carefully analyzed.
(ii) They are based on economic value. To the buyer, the economic value in goods and services passes immediately at the time of sale; while the seller expects an equivalent value to be received in near future.
(iii) They imply future period since the collection of receivables will be made in the near future.

Accounts receivables management refers to taking decisions regarding credit and collection policy of a firm. The management of investment of funds in accounts receivables is also known as receivable management. The general liquidity management goal of a firm is to use cash resources as economically as possible in expanding receivables, without impairing sales and the chance for increasing profits. Credit and collection policies significantly influence requirements. Sound and proper credit and collection policies are the pre-requisites to a good accounts receivables policy. Therefore, accounts receivable management deals with the formulation and implementation of sound credit and collection policy.

Objective and Significance of Accounts Receivable Management

The main objective of receivables management is to promote sales and profits until that point is reached where the return on investment in further funding of receivables is less than the cost of funds raised to finance the additional credit (cost of capital). The specific costs and benefits which are relevant to the determination of the objectives of receivables management are briefly discussed below:

Relevant Costs The major types of cost associated with the extension of credit and accounts receivables are collection costs, capital costs, delinquency costs and default cost. Collection costs are the administrative costs incurred in collecting the receivables from the customers to whom credit sales have been made. Capital costs are the cost of financing the investment made in accounts receivables. Delinquency cost arises out of the failure of the customers to meet their obligations when payment on credit sales becomes due. Finally, default cost arises due to non-recovery of the overdue of the customers because of their inability to pay.

Relevant Benefits The benefits arises from credit sales are the increased sales and profits anticipated because of a more liberal policy. Thus, it is clear that investment in receivables involves both costs and benefits. The extension of trade credit has a major impact on sales, costs and profitability. It is to be remembered here that the costs and benefits to be compared are

marginal costs and benefits. The firm should only consider the incremental (additional) benefits and costs that result from a change in the receivables or trade credit policy.

Accounts receivables management is very much significant mainly in case of manufacturing as well as service rendering concerns where credit sales cannot be avoided. This is because of the fact that a proper and sound accounts receivables policy of a firm tends to reduce the need for working capital for operations, boost up sales promotion, reduce the cost of doing business and maintain good customer relations. Funds locked up in accounts receivables have opportunity costs. Over-investment in accounts receivables will amount to denial of funds for more productive uses. Moreover, excessive credits for an unusually long period are open invitations to incompetence and the consequent failure of customers. Therefore, proper and sound receivable management is a must for a firm.

Credit Policy and Its Formulation

Definition of a Credit Policy

The term credit policy is used to refer to the combination of the three decision variables namely – (i) Credit standard, (ii) Credit terms and (iii) Collection efforts, on which the financial manager of a firm has influence.

(i) Credit Standard: These are the criteria to decide the types of customers to whom goods and services could be sold on credit terms. If a firm has more slow paying customers, its investment in accounts receivables will be higher. In that case, the firm will also be exposed to higher risk of default.

(ii) Credit Terms: These refer to the duration of credit and terms of payments by customers. Investment in accounts receivables will be higher if customers are allowed more period for making payments.

(iii) Collection Efforts: These determine the actual collection period. The lower the collection period the lower the investment in accounts receivables and vice-versa

Goals of Credit Policy

A firm may follow a lenient or a stringent credit policy. The firm following a lenient credit policy tends to sell on credit to customers on very liberal terms and standards; credits are granted for longer periods even to those customers whose credit worthiness is not fully known or whose financial position is doubtful. In contrast, a firm following a stringent credit policy sells on credit on a highly selective basis only to those customers who have proven credit worthiness and who are financially strong. Therefore, the goals of credit policy is to trade-off the lenient credit policy and stringent credit policy. That means the firms should follow credit policies ranging between stringent and lenient.

Formulation of an Optimum Credit Policy

Optimum credit policy is one which maximizes the value of the firm. The value of the firm is maximized when the incremental rate of return, also called the marginal rate of return of an investment is equal to the incremental cost of firm, also called the marginal cost of capital used to finance the investment. The incremental rate of return can be calculated as incremental operating profit divided by the incremental investment in receivables. The incremental cost of funds is

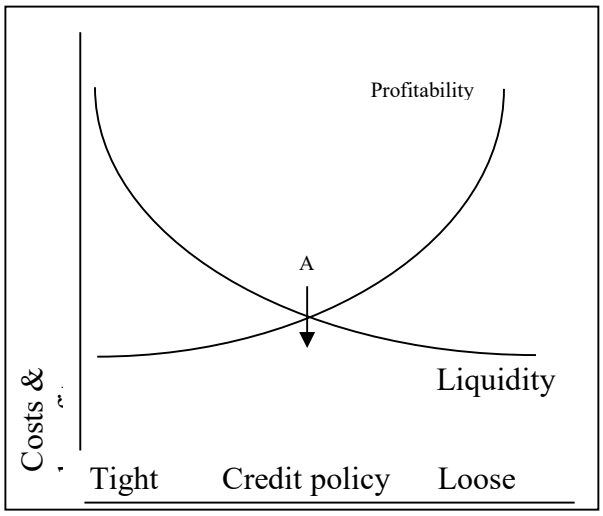


Figure – 1 : Costs of Credit Policy necessarily the optimum credit policy.

the rate of return required by the suppliers of funds, given the risk of investment in accounts receivables. It is to be noted here that the required rate of return is not equal to the borrowing rate. Higher the risk of investment, higher the required rate of return.

a) An Optimum Credit Policy: A Cost Benefit Analysis

A firm's operating profit is maximized when total cost is minimized for a given level of revenue. Credit policy at point A in Figure-1 represents the maximum operating profit (since total cost is minimum). But it is not

As the firm loosens its credit policy, its investment in accounts receivable becomes more risky because of increase in slow-paying and defaulting accounts. Thus the required rate of return is an upward sloping curve.

In sum, we may state that the goal of the firm's credit policy is to maximize the value of the firm. To achieve this goal, the evaluation of investment in accounts receivable should involve the following four steps:

- Estimation of incremental operating profit
- Estimation of incremental investment in accounts receivable
- Estimation of incremental rate of return of investment
- Comparison of the incremental rate of return with the required rate of return.

b) Credit Policy Variables

In establishing an optimum credit policy, the financial manager must consider the important decision variables which influence the level of receivables. The major controllable decision variables include the following:

- Credit standards and analysis
- Credit terms
- Collection policy and procedures

Credit Standards

Credit standards are the criteria, which a firm follows in selecting customers for the purpose of credit extension. The firm may have tight credit standards; that is, it may sell mostly on cash basis, and may extend credit only to the most reliable and financially strong customers. Such standards will result in no bad-debt losses, and less cost of credit administration. But the firm may not be able to expand sales. The profit sacrificed on lost sales may be more than the costs saved by the firm. On the contrary, if credit standards are loose, the firm may have larger sales. But the firm will have to carry larger receivable. The costs of administering credit and bad-debt losses will also increase. Thus, the choice of optimum credit standards involves a trade-off between incremental return and incremental costs.

Credit Analysis

Credit standards influence the quality of the firm's customers. There are two aspects of the quality of customers **:** (i) the time taken by customers to repay credit obligation and (ii) the default rate. The *average collection period* (ACP) determines the speed of payment by customers. It measures the number of days for which credit sales remain outstanding. The longer the average collection period, the higher the firm's investment in accounts receivable. *Default rate* can be measured in terms of bad-debt losses ratio – the proportion of uncollected receivable. Bad-debt losses ratio indicates *default risk*. Default risk is the likelihood that a customer will fail to repay the credit obligation. On the basis of the past practice and experience, the financial or credit manager should be able to form a reasonable judgment regarding the chances of default. To estimate the probability of default, the financial or credit manager should consider five C's viz.**,** (i)character, (ii) collateral, (iii) capital, (iv) capacity and (v) condition.

- ***Character*** **:** It refers to the customer's willingness to pay. The financial or credit manager should judge whether the customers will make hones efforts to honor their credit obligations. The moral factor is of considerable importance in credit evaluation in practice.
- ***Collateral :*** Here collateral refers to the security given by the loan applicants in favor of the loan giving agency. Generally, collateral in the form of inventories or any other fixed assets are pledged against loan. The loan giving agency while appraising loan application also examines the security.
- ***Capital :*** Capital refers to the total amount of both the fixed and working capital invested by a businessman in his business. Such capital may be either owned capital or debt capital or both. The question of capital arises in case of an existing business.
- ***Capacity*** **:** It refers to the customer's ability to pay. Ability to pay can be judged by assessing the customer's capital and assets which he may offer as security. Capacity is evaluated by the financial position of the firm which is indicated by analysis of ratios and trends in firm's cash and working capital position.
- ***Condition :*** It refers to the prevailing economic and other conditions which may affect the customer's ability to pay. Adverse economic conditions can affect the ability or willingness of a customer to pay. An experienced financial or credit manager will be able to judge the extent and genuineness to which the customer's ability to pay is affected by the economic conditions.

Credit Terms

The stipulations under which the firm sells on credit to customers are called *credit terms*. These stipulations include **:** (a) the credit period and (b) the cash discount.

Credit Period The length of time for which credit is extended to customers is called the credit period. It is generally stated in terms of a net date. A firm's credit period may be governed by the industry norms. But depending on its objective, the firm can lengthen the credit period. On the other hand, the firm may tighten its credit period if customers are defaulting too frequently and bad-debt losses are building up.

Cash Discounts A cash discount is reduction in payment offered to customers to induce them to repay credit obligations within a specified period of time, which will be less than the normal credit period. It is usually expressed as a percentage of sales. Cash discount terms indicate the rate of discount and the period for which it is available. If the customer does not avail the offer, he must make payment within the normal credit period.

In practice, credit terms would include **:** (i) the rate of cash discount, (b) the cash discount period, and (c) the net credit period. For example, credit terms may be expressed as '2/10, net 30'. This means that a 2 percent discount will be granted if the customer pays within 10 days; if he does not avail the offer he must make payment within 30 days.

A firm uses cash discount as a tool to increase sales and accelerate collections from customers. Thus the level of receivable and associated costs may be reduced. The cost involved is the discounts taken by customers.

Credit Policy Effects

In evaluating credit policy, there are five basic effects to consider **:**

1. *Revenue effects*. If the firm grants credit, then there will be a delay in revenue collections as some customers take advantage of the credit offered and pay later. However, the firm may be able to charge a higher price if it grants credit and it may be able to increase the quantity sold. Total revenues may thus increase.
2. *Cost effects*. Although the firm may experience delayed revenues if it grants credit, it will still incur the costs of sales immediately. Whether the firm sells for cash or credit, it will still have to acquire or produce the merchandise (and pay for it).
3. *The cost of debt*. When the firm grants credit, it must arrange to finance the resulting receivables. As a result, the firm's cost of short-term borrowing is a factor in the decision to grant credit.
4. *The probability of nonpayment*. If the grants credit, some percentage of the credit buyers will not pay. This can't happen, of course, if the firm sells for cash.
5. *The cash discount*. When the firm offers a cash discount as part of its credit terms, some customers will choose to pay early to take advantage of the discount.

Credit Collection Policy and Procedure

A collection policy is needed because all customers do not pay the firm's bills in time. Some customers are slow-payers while some are non-payers. The collection efforts should, therefore, aim at accelerating collections from slow-payers and reducing bad-debt losses. A collection policy should, therefore, ensure prompt and regular collection. Prompt collection is needed for fast turnover of working capital, keeping collection costs and bad debts within limits and maintaining collection efficiency. Regularity in collections keeps debtors alert, and they tend to pay their dues promptly.

The collection policy should lay down clear-cut collection procedures. The collection procedures for past dues or delinquent accounts should also be established in unambiguous terms. The slow-paying customers are needed to be handled very tactfully. Some of them may be permanent customers. The collection process initiated quickly, without giving any chance to them, may antagonize them, and the firm may lose them to competitors.

Monitoring Accounts Receivable

A firm needs to continuously monitor and control its receivable to ensure the success of collection efforts. Two traditional methods of evaluating the management of receivable are : (1) average collection period (ACP) and (2) aging schedule. These methods have certain limitations to be useful in monitoring receivable. A better approach is the *collection experience matrix*.

Average Collection Period

Average collection period is found as under -

$$\text{ACP} = \frac{Debtors \quad x \quad 360}{Credit \quad Sales}$$

The average collection period so calculated is compared with the firm's stated credit period to judge the collection efficiency. An extended collection period delays cash inflows, impairs the firm's liquidity position and increases the chances of bad-debt losses. The average collection period measures the quality of receivable since it indicates the speed of their collectability.

There are two limitations of this method. *First*, it provides an average picture of collection experience and is based on aggregate data. For control purposes, there is no need of specific information about the age of outstanding receivables. Second, it is susceptible to sales variations and the period over which sales and receivables have been aggregated. Thus, average collection period cannot provide a very meaningful information about the quality of outstanding receivable.

Aging Schedule

The aging schedule removes one of the limitations of the average collection period. It breaks down receivables according to the length of time for which they have been outstanding. Aging schedule provides more information about the collection experience. It helps to spot out the slow-paying debtors. However, it also suffers from the problem of aggregation, and does not relate receivables to sales of the same period.

Collection Experience Matrix

The major limitations of the traditional methods are that they are based on aggregated data and fail to relate outstanding receivables of a period with the credit sales of the same period. Thus, using the traditional methods, two analysts can come up with entirely different signals about the status of receivables if they aggregate sales and receivables data differently. This problem can be eliminated by using disaggregated data for analyzing collection experience. The key is to relate receivables to sales of the same period. When sales over a period of time are shown horizontally and associated receivables vertically in a tabular form, a matrix constructed. Therefore,, this method of evaluating receivables is called *collection experience matrix*.

Concepts, Costs and Benefits of Factoring

Factoring is a popular mechanism of managing, financing and collecting receivables in developed countries like USA and UK and has extended to a number of other countries in the recent past, including India and Bangladesh.

Concepts of Factoring

Factoring is a unique financial innovation. It is both a financial as well as a management support to a client. It is a method of converting a non-productive, inactive asset (i.e. receivable) into a productive asset (viz. cash) by selling receivables to a company that specializes in their collection and administration.

One can define factoring as "business involving a continuing legal relationship between a financial institution (the factor) and a business concern (the client) selling goods or providing services to trade customers (the customers) whereby the factors purchase the client's accounts receivable and in relation thereto, control the credit, extended to customers and administers the sales lodger." Factoring may also be defined as "a contract between the suppliers of goods/services and the factor under which (a) the supplier and its customers (debtors) other than those for the sale of goods bought primarily for their personal; family or household use; (b) the factor is to perform at least two of the following functions – (i) finance for supplier, including loans and advance payments; (ii) maintenance of accounts (ledgering relating to the receivables); (iii) collection of accounts (ledgering relating to the receivables) and (iv) protection against default in payment by debtors and (c) notice of assignment of the receivables is to be given to debtors". The agreement between the suppliers and the factor specifies the factoring procedure.

Review Questions

Short Questions

1. What do you mean by accounts receivables and accounts receivables management?
2. What is the basic objective of account receivable management?
3. Explain the specific costs and benefits relevant to the determination of accounts receivables policy.
4. What are the goals of a credit policy?
5. What is a credit policy? What are its elements?
6. What is an optimum credit policy?
7. Examine the role of cost benefit analysis in the formulation of an optimum credit policy.
8. What is a credit period?
9. What is cash discount? Give an example.
10. What is credit collection policy?
11. What is credit analysis? Explain.

Broad Questions

1. Explain the major credit policy variables.
2. What are the basic factors considered in evaluating a credit policy of a firm? Explain.
3. What is meant by monitoring of accounts receivables? Explain its main methods.