OTC Virtual's

FINANCIAL MANAGEMENT

Simplified

Let's Make FM Easy

[CA Intermediate: Group II Paper 6]

As per

New ICAI Syllabus

23e

Prof. Om Trivedi

IIM-C Alumnus,
External Subject Expert at the BOS of ICAI,
Guest Faculty of LVC and Visiting Faculty of NIRC
and WIRC of ICAI, Google Certified Data Analyst and
Renowned Author

Edited by:

Eesha Narang

Assistant Professor, Deptt. of English,
DAV College, Abohar (Punjab)
Visiting Faculty at NIRC of ICAI
M.A., M.Phil. (English), Delhi University
UGC Net and JRF Qualified

E-mail: analyzer.ca@gmail.com
www.otceducation.com

Carvinowledge
P R E S S

Financial Management: Simplified, *23e*

23rd Edition 2023-24

Published by Prathama Trivedi for Carvinowledge Press

Carvinowledge Press

B-8/GM-4, DLF Colony, Dilshad Extn.-II
Bhopura, Ghaziabad-201005
Mobile: +91-9953922272
E-mail: analyzer.ca@gmail.com

www.otceducation.com

Composition Services:

Babra Design

House No. 43, Rajeev Garden,
Loni, Ghaziabad - 201102
Mobile: +91-9015729698
E-mail: babradesign@gmail.com

Expert Comments

(words of praise from eminent academicians and students)

"This ambitious book will reset trends in the field of teaching of 'financial management'. This is a forward-looking and accessible guide to help CA students understand and tackle theories and problems of their most challenging subject financial management."

– Prashant Mishra, Professor, Indian Institute of Management Calcutta, Kolkata

"It is informative, well organized, very enjoyable to read, has many interesting, memorable and useful examples and illustrations."

– Dr. Dhanesh Khatri, Professor and Head (Finance), Institute of Management Studies, BJS Rampuria Jain College, Bikaner

"An exceptionally lucid and engaging book. It explains the core concepts of financial management and illustrates them with a remarkably wide range of prominent examples. It is a modern treatment of the topic with no equal. It is rare to have a book on this topic delivered with such wit and style."

– Dr. S.S. Shantha Kumari Associate Professor, Finance, PSG Institute of. Management, Coimbatore

"Written in a style that engages the learning process of each and every CA student."

– B.P. Singh, Professor (Finance), T.M. Bhagalpur University, Bhagalpur

"This is an excellent book on financial management in today's dynamic changing financial environment. Prof. Om Trivedi explains theoretical concepts, examples, problems and solutions in an easy understandable manner. For instructors, this book would assist you in explaining advanced theories and solving typical problems. It's an excellent book that every CA student should read."

– Arvind K. Mishra , Professor, JNU , New Delhi

"Financial management by Om Sir belongs at the top of the reading list CA students, faculty and finance professionals."

– CA Pradeep Rohilla, Chartered Accountant, Finance Manager - ITC

"An important, insightful and a long awaited work by Om Sir. It's an excellent book that every CA student should read."

– CA Aman Rajput, Chartered Accountant

"I found it original and absolutely one of the finest piece of writing on this subject."

– CA Shubham Agarwal, Chartered Accountant, All India 15th Rank-2023

"It is rare to have a book on this topic delivered with such wit and style."

– Sanjeev Jain, All India 47th Rank-2022

"This book is a contribution by our highly experienced and respectable teacher, Om Sir and a bible for Intermediate students. This is a must read book for every CA student."

– Rohit Bhatt, All India 22nd Rank-2021

"Prof. Om Trivedi's compelling new book on financial management offers an intriguing blueprint for how to make the concepts simpler and solve problems with more command."

– CA Nikhil , Chartered Accountant

Editorial Board

Financial Management: Simplified has benefited from an extensive development process. Over 100 faculty reviewers, students and industry professionals provided feedback about the accuracy and relevance of the content as well as suggestions for its improvements. Though we could not incorporate every one's suggestion, we do acknowledge that their feedback was invaluable in our attempt at creating the best possible *Financial Management: Simplified* book.

Consultant Board

The consultant board provided us with a detailed and critical analysis of each chapter and worked with us throughout the development of the book. We would like to thank the following for their time and commitment:

Dr. Prashant Mishra
Indian Institute of Management
Kolkata

Dr. B.P. Singh
T.M. Bhagalpur University
Bhagalpur

Dr. Arvind K. Mishra
JNU
New Delhi

CA Pradeep Rohilla
Chartered Accountant
New Delhi

Dr. S.S. Shantha Kumari
PSG Institute of. Management
Coimbatore

CA Parimal Jhaa
Partner, Chaturvedi & Shah
Mumbai

Dr. Dhanesh Khatri
Head, Department of Finance
Institute of Management Studies
BJS Rampuria Jain College
Bikaner

Eesha Narang
Assistant Professor
DAV College
Abohar, Punjab

CA Aman Rajput
Chartered Accountant
Ajmer

Student Reviewers

We took the help of many students who class-tested the manuscript, evaluated it for clarity, and assessed each feature. Their comments helped us expand the book's content, improved the pedagogical features, and strengthened the assessment features. We are thankful to the following:

Deepanshu Sharma	**Sanjhi Aggarwal**	**Reena Prajapati**	**Prince Pandey**
Amit Goyal	**Shweta Lahiri**	**Abhishek Kathuriya**	**Deepak Kumar Jhaa**
Satyam Kumar	**Bharat Gautam**	**Anuskha Sharma**	**Shaikat Ghose**
Nuzaif Akthar	**Nanda Chaturvedi**	**Deepanshi Jain**	**Preetam Bhatt**
Ankit Jain	**Sanchit**	**Tanya Bansal**	**Chirag Jain**
Paras Bansal	**Sushant Arora**	**Kshitiz Tayal**	**Neelaish Jaiswal**
Komal Sanwal	**Ashutosh Kumar**	**Aryan Meratwal**	**Kaushal Arora**
Mayuri Pramod	**Sonu Agarwal**	**Nitesh Lahu**	**Rajshree Goyanka**
Govind Murarka	**Yash Jain**	**Chirusha Yadav**	**Romil Khaitan**
Prateek Gupta	**Mehul Garg**	**Arsh Gulati**	**Sumit Chopra**
Vishwadeep Gorai	**Deepak Jindal**	**Harsh Gupta**	**Monika Ahuja**

Preface

Financial Management: Simplified is a comprehensive book explaining concepts, theories, problems and solutions of Financial Management in a lucid and informative manner. It has been developed exclusively for the students of CA Intermediate Course, Group – II Paper – 6 and other professional examinations like CS, CMA, MBA, etc.

The text continues to stress a balanced approach to Financial Management by including the coverage of ratios, short-term and long-term investment decisions, management of cash, management of receivables and payable and several sources of finance.

The following special features of this book will aid the students in there exam preparation:

- Besides comprehensive coverage of the ***syllabus of 'Financial Management'*** as prescribed by the Institute of Chartered Accountants of India, it provides extra inputs to students to give them a cutting edge in examinations.
- Complex concepts have been described in an easy-to-understand manner with simple presentation through ***annotations, author's notes, examples, things to remember boxes, explanations, 500 plus solved problems.***
- Special care has been taken to maintain an appropriate balance between ***theoretical concepts and solved practical questions.***
- By exclusively discussing ***problem solving techniques,*** the book effectively addresses the queries pertaining to problem solving often raised by students.
- Each chapter begins with ***'Learning Objectives and Chapter Analysis Chart'*** to help students know, at a glance, what they would learn in the chapter and where their focus is required most.
- ***'Finance Snapshot'*** recapitulate the concept for revision purposes.

Acknowledgements

First of all I would like to thank my '*Teachers*' for providing me such an opportunity to share my knowledge and experience with the students. I am grateful to my esteemed colleagues, friends and students who have contributed to this book by advising me and by giving constructive feedback.

This book would not have taken its present shape without the continuous support and encouragement from the editorial and production team of Carvinowledge Press and it has been a real pleasure working in coordination with their extremely professional set up. I have immensely benefitted from referring to several books and publications. I extend my heartfelt gratitude to my parents and family members for their support and patience during the writing of this book.

I hope this book serves the purpose of its readers. Their valuable suggestions and constructive feedback will be greatly acknowledged. Please feel free to e-mail your feedback, problems or suggestion to us on **analyzer.ca@gmail.com**.

Let's Simplify FM

Prof. Om Trivedi

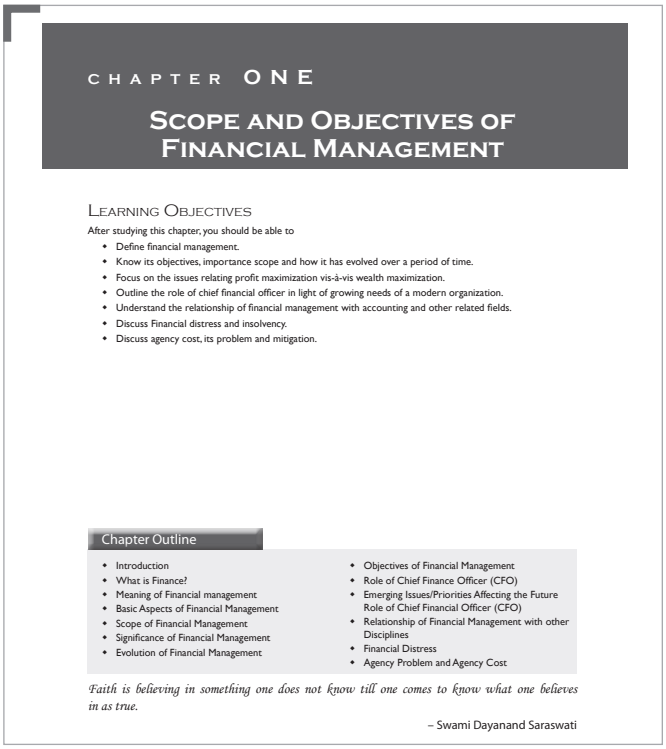
It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.

– Charles Darwin

Visual Walk-through

Learning Objective

Each chapter opens with a set of learning objectives, summarizing what readers should learn from each chapter.



CHAPTER ONE

SCOPE AND OBJECTIVES OF FINANCIAL MANAGEMENT

LEARNING OBJECTIVES

After studying this chapter, you should be able to

- Define financial management.
- Know its objectives, importance scope and how it has evolved over a period of time.
- Focus on the issues relating profit maximization vis-à-vis wealth maximization.
- Outline the role of chief financial officer in light of growing needs of a modern organization.
- Understand the relationship of financial management with accounting and other related fields.
- Discuss Financial distress and insolvency.
- Discuss agency cost, its problem and mitigation.

Chapter Outline

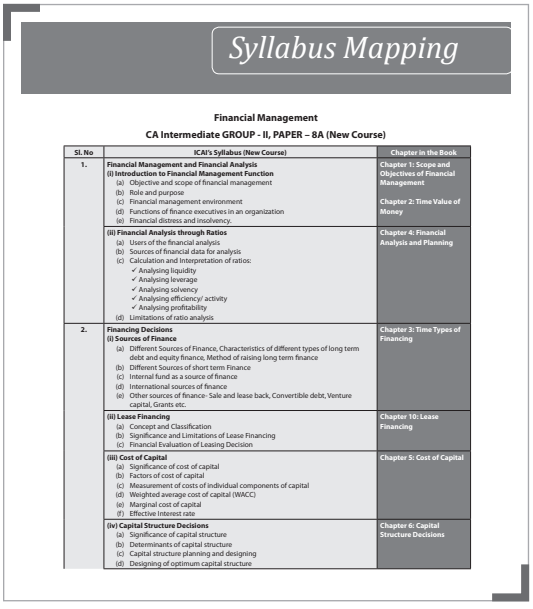
- Introduction
- What is Finance?
- Meaning of Financial management
- Basic Aspects of Financial Management
- Scope of Financial Management
- Significance of Financial Management
- Evolution of Financial Management
- Objectives of Financial Management
- Role of Chief Finance Officer (CFO)
- Emerging Issues/Priorities Affecting the Future Role of Chief Financial Officer (CFO)
- Relationship of Financial Management with other Disciplines
- Financial Distress
- Agency Problem and Agency Cost

Faith is believing in something one does not know till one comes to know what one believes in as true.

– Swami Dayanand Saraswati

Chapter Outline

'Chapter Outline' through graphical presentation indicates the recent trends of the questions (theoretical and practical) being asked in the examinations.



Syllabus Mapping

Financial Management

CA Intermediate GROUP - II, PAPER – 8A (New Course)

Sl. No	ICAI's Syllabus (New Course)	Chapter in the Book
1.	**Financial Management and Financial Analysis** **(i) Introduction to Financial Management Function** (a) Objective and scope of financial management (b) Role and purpose (c) Financial management environment (d) Functions of finance executives in an organization (e) Financial distress and insolvency.	Chapter 1: Scope and Objectives of Financial Management Chapter 2: Time Value of Money
	(ii) Financial Analysis through Ratios (a) Users of the financial analysis (b) Sources of financial data for analysis (c) Calculation and Interpretation of ratios: ✓ Analysing liquidity ✓ Analysing leverage ✓ Analysing solvency ✓ Analysing efficiency/ activity ✓ Analysing profitability (d) Limitations of ratio analysis	Chapter 4: Financial Analysis and Planning
2.	**Financing Decisions** **(i) Sources of Finance** (a) Different Sources of Finance, Characteristics of different types of long term debt and equity finance, Method of raising long term finance (b) Different Sources of short term Finance (c) Internal fund as a source of finance (d) International sources of finance (e) Other sources of finance- Sale and lease back, Convertible debt, Venture capital, Grants etc.	Chapter 3: Time Types of Financing
	(ii) Lease Financing (a) Concept and Classification (b) Significance and Limitations of Lease Financing (c) Financial Evaluation of Leasing Decision	Chapter 10: Lease Financing
	(iii) Cost of Capital (a) Significance of cost of capital (b) Factors of cost of capital (c) Measurement of costs of individual components of capital (d) Weighted average cost of capital (WACC) (e) Marginal cost of capital (f) Effective Interest rate	Chapter 5: Cost of Capital
	(iv) Capital Structure Decisions (a) Significance of capital structure (b) Determinants of capital structure (c) Capital structure planning and designing (d) Designing of optimum capital structure	Chapter 6: Capital Structure Decisions

Syllabi Coverage

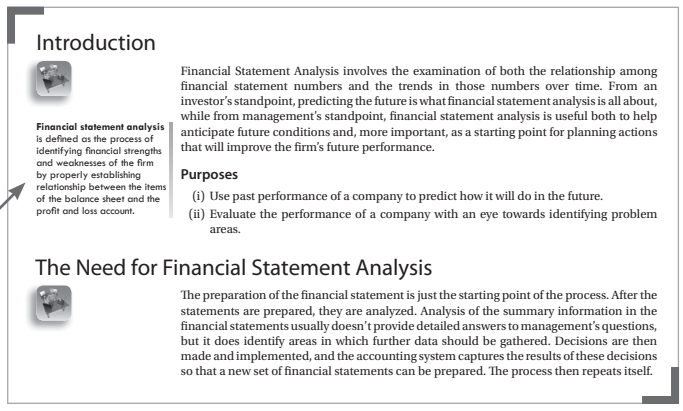
The book covers the latest syllabi of 'Financial Management' for CA – Intermediate (Group-II Paper-6) as issued by ICAI.

Theory

It is a compilation of frequently asked theoretical questions. It also provides solution to all questions to assist students in learning how to crack the questions in the examination hall.

Margin Notes

The marginalia, or margin notes, along with the text recreate some of the student-teacher interaction that takes place in the classroom and provide material that is complementary to the matter contained in the text.



Introduction

Financial statement analysis is defined as the process of identifying financial strengths and weaknesses of the firm by properly establishing relationship between the items of the balance sheet and the profit and loss account.

Financial Statement Analysis involves the examination of both the relationship among financial statement numbers and the trends in those numbers over time. From an investor's standpoint, predicting the future is what financial statement analysis is all about, while from management's standpoint, financial statement analysis is useful both to help anticipate future conditions and, more important, as a starting point for planning actions that will improve the firm's future performance.

Purposes

(i) Use past performance of a company to predict how it will do in the future.

(ii) Evaluate the performance of a company with an eye towards identifying problem areas.

The Need for Financial Statement Analysis

The preparation of the financial statement is just the starting point of the process. After the statements are prepared, they are analyzed. Analysis of the summary information in the financial statements usually doesn't provide detailed answers to management's questions, but it does identify areas in which further data should be gathered. Decisions are then made and implemented, and the accounting system captures the results of these decisions so that a new set of financial statements can be prepared. The process then repeats itself.

Visual Walk-through

Example 2:
A person lends ₹ 10,000 to a corporation by purchasing a bond from the corporation. Simple interest is computed quarterly at the rate of 3 per cent per quarter, and a cheque for the interest is mailed each quarter to all bondholders. The bonds expire at the end of 5 years and the final cheque includes the original principal plus interest earned during the last quarter. Compute the interest earned each quarter and the total interest which will be earned over the 5-year life of the bonds.

Solution:
In this problem, principal = ₹ 10,000, interest = 3 per cent per quarter and the period of loan is 5 years. Since the time period for interest is a quarter of a year, we must consider 5 years as 20 quarters. And since we are interested in the amount of interest earned over one quarter, the period is 1 quarter. Therefore, quarterly interest equals ₹ 10,000 × 0.03 × 1 = ₹ 300

Examples

Each chapter includes examples illustrating the concepts you need to know and the techniques you need to learn.

Things to Remember

These points in boxes introduce you to the topics to remember, revise, follow and ground the chapter concepts in real life terms. These points have been drawn keeping CA Intermediate questions, being asked in the examinations in mind.

Things to Remember

With shareholder's wealth maximized, shareholders can adjust their cash flows in such a way as to optimise their consumption. From the shareholders' point of view, the wealth created by a company through its actions is reflected in the market value of the company's shares.

A Shareholder's wealth is shown by:

Shareholder's Wealth= Number of shares owned × Current share price

Higher the share price, greater will be the shareholder's wealth.

Example:
There is great demand for the shares of LML Ltd. This is evident from the market price of LML shares. This also reflects the shareholders' perception about the quality of LML's financial decisions. It becomes clear to everyone that LML is performing well. The market price of its shares indicates the firm's performance. Clearly, LML follows the wealth maximization principle implying that its fundamental objective is to maximize it.

Author's **Note**

Redemption of preference share: For redemption of preference share the company may transfer a balance equal to face value of preference share from reserves to CRR or it has to issue new share or both transfer to CRR and issue of new share.

When we are given debtors (gross) and provision for doubtful debts and finally the net debtors. There is additional information about bad debts written off against provision. Then all these things will be ignored. We will consider net debtors under changes of working capital.

Similarly, if there is stock and provision for obsolete stock, we take net stock figure under charges in working capital.

Author's Note

Sometimes it is not possible for the students to understand the complexity of the concepts and problems in the examination hall. The author has tried to explain those complexities through 'Author's Note' Boxes.

Problems and Solutions

Concepts, algorithms and procedures for solving numerical problems have been given in each chapter. Solutions have specially been designed keeping the CA Intermediate examinations in mind. It reflects author's unique and different style of solving Financial Management problems.

Problems and Solutions

Problem 1: (i) Find out operating leverage from the following data:

Sales	₹ 50,000
Variable Costs	60%
Fixed Costs	₹ 12,000 **(i)**

(ii) Find out the financial leverage from the following data:

Net Worth	₹ 25,00,000
Debt/Equity	3:1
Interest rate	12%
Operating Profit	₹ 20,00,000

Solution

(i) Calculation of Operating Leverage = Contribution/Operating Profit

Particulars	Amount (₹)
Sales	50,000
Less: Variable cost (60% of sales)	(30,000)

FM in a **Nutshell**

Leverage Techniques

1. **Operating Leverage**
   - It is the relationship between the sales and EBIT.
   - It reflects the business risks associated with an organization.
   - Higher will be the OL, Higher will be the operating risk and Vice-Versa.
2. **Financial Leverage**
   - It is the relationship between the EBIT and EPS.
   - It reflects the financial risks associated with an organization.

FM in a Nutshell

Sometimes it is not possible for the students to understand the complexity of the concepts and problems in the examination hall. The author has tried to explain those complexities through 'In a Nutshell' Boxes.

Glossary and Tables

A complete glossary of financial management concepts has been provided in the book for quick recap of the important topics discussed throughout.

Appendix I

Glossary

Account Receivable: A balance due from a customer.
Accounting Profit: A firm's net income as reported on its income statement.
Accrued Liabilities: Continually recurring short-term liabilities, especially accrued wages and accrued taxes.
Acquiring Company: A company that seeks to acquire another firm.
Actual Realized Rate of Return, ks: The rate of return on a
Assets Management Ratios: A set of ratios that measure how effectively a firm is managing its assets.
Balance Sheet: A statement of the firm's financial position at a specific point in time.
Base Case: An analysis in which all of the input variables are set at their most likely values.
Base-Case NPV: The NPV when sales and other input variables are set equal to their most likely (or base-case) values.

Syllabus Mapping

Financial Management

CA Intermediate Group - II, Paper – 6A (New Course)

Sl. No	ICAI's Syllabus (New Course)	Chapter in the Book
1.	**Financial Management and Financial Analysis** **(i) Introduction to Financial Management Function** Objective and scope of financial management. Profit Maximisation, Wealth Maximisation and Value Creation. Role of Financial Manager and Financial Controller. Financial management environment. Functions of finance executives in an organization. Financial distress and insolvency.	**Chapter 1: Scope and Objectives of Financial Management**
	(ii) Financial Analysis through Ratios: Users of the financial analysis. Sources of financial data for analysis. Calculation and Interpretation of ratios. Limitations of ratio analysis.	**Chapter 6: Financial Analysis and Planning – Ratio Analysis**
2.	**2. Financing Decisions and Cost of Capital:** **(i) Sources of Finance:** Different Sources of Finance, Characteristics of different types of long-term debt and equity finance, Method of raising long term finance. Different Sources of short-term Finance. Contemporary sources of funding- P2P lending, Equity funding, Crowd funding, Start-up funding, etc. Internal fund as a source of finance. International sources of finance. Other sources of finance- Lease Financing, Sale and lease back, Convertible debt, Venture capital, Grants etc.	**Chapter 2: Types of Financing**
	(ii) Cost of Capital: Significance of cost of capital. Factors of cost of capital. Measurement of costs of individual components of capital. Weighted average cost of capital (WACC). Marginal cost of capital.	**Chapter 5: Cost of Capital**
	(iii) Capital Structure Decisions: Significance of capital structure. Determinants of capital structure. Capital structure planning and designing. Designing of optimum capital structure. Theories of Capital Structure and value of the firm-relevancy and Irrelevancy of capital structure. Under/ Over Capitalisation. EBIT- EPS Analysis, Breakeven- EBIT Analysis.	**Chapter 9: Financing Decisions –Capital Structure** **Chapter 7: Financing Decisions - EBIT-EPS Analysis**
	(iv) Leverages: Types of Leverages- Operating, Financial and Combined. Analysis of leverages.	**Chapter 8: Financing Decisions - Leverages**
3.	**3. Capital Investment and Dividend Decisions:** **(i) Capital Investment Decisions:** **OObjective of capital investment decisions. Methods of Investment appraisal:** • Payback period, Discounted payback period.- Accounting Rate of Return (ARR). • Net Present Value (NPV) - The meaning of NPV, Strengths and limitations of NPV method, The working capital adjustment in NPV analysis, Capital rationing, Equivalent Annual Costs.- Internal Rate of Return (IRR)- Limitations of the IRR method, Multiple IRRs. - Modified Internal Rate of Return (MIRR)- Definition and explanation of MIRR, Process for calculating MIRR, Strengths of the MIRR approach. - Profitability Index.	**Chapter 10: Investment Decisions – Capital Budgeting**

Syllabus Mapping

	(ii) Dividend Decisions: Basics of Dividends. Cash dividend, stock dividend/ bonus share, stock-splits, share buy-back. Determinants of dividend. Relevancy and Irrelevancy of Dividend Policies- Traditional Approach,Walter's model, Gordon's model, Modigliani and Miller (MM) Hypothesis.	**Chapter 11: Dividend Decisions**
4.	**4. Management of Working Capital:** The management of working capital- Liquidity and Profitability. The Working capital financing decisions-Primary and Secondary Sources of Liquidity. The Working Capital Cycle (Operating Cycle), Effectiveness of Working Capital based on its operating and cash conversion cycles. Assessment of working capital requirement. Management of Accounts Receivables (Debtors). Factoring and Forfaiting. Credit Management: - Credit granting.- Monitoring accounts receivables.- Debt collection. Management of Accounts Payables (Creditors). Management of Cash, Treasury management. Banking norms of working capital finance.	**Chapter 12: Management of Working Capital** • Unit I: Management of Working Capital • Unit II: Treasury and Cash Management • Unit III: Management of Inventory • Unit IV: Management of Receivables • Unit V: Management of Payables (Creditors) • Unit VI: Financing of Working Capital

Contents

Preface ..... *iii*

Visual Walk-through ..... *iv*

Syllabus Mapping ..... *vii*

[Volume 1]

1. Scope and Objectives of Financial Management 1.1–1.12

- Introduction 1.2
- What is Finance? 1.2
- Meaning of Financial management 1.2
- Definition 1.3
- Basic Aspects of Financial Management 1.3
- Importance of Financial Management 1.3
- Objectives of Financial Management 1.5
- Role of Chief Finance Officer (CFO) 1.8
- Relationship of Financial Management with other Disciplines 1.9
- Financial Distress 1.10
- Agency Problem and Agency Cost 1.11

2. Types of Financing 2.1–2.18

- Introduction 2.2
- Financial Needs and Sources of a Business 2.2
- Basic Principles for Funding Various Needs 2.2
- Sources of Finance of a Business 2.3
- Risk-Return Considerations in financing current assets 2.3
- Owners Capital or Equity Capital 2.4
- Preference Share Capital 2.4
- Bond 2.5
- Debt Securitization 2.8
- Lease Financing 2.9
- Short-term Sources of Finance 2.11
- Other Sources of Financing 2.14
- Euro Issues by Indian Companies 2.15
- Different Types of Packing Credit 2.17
- Contemporary Sources of Funding 2.17
- Yankee Bond 2.18

Contents

3. Time Value of Money 3.1–3.16

- Introduction 3.2
- Annuities 3.6
- Future Value of Annuity (Regular or Ordinary Annuity) 3.7
- Future Value of Annuity (Due) 3.7
- Present Value of Annuity (Regular or Ordinary Annuity) 3.9
- Future and Present Value of Uneven Cash Flows 3.11
- Loan Amortization 3.12
- Finding Interest or Growth Rates 3.13
- Relevance of Time Value of Money in Financial Decisions 3.13
- Single-payment (loan repayment) 3.15
- Present value calculation 3.15
- Time value and discount rates 3.16
- Cash flow investment decision 3.16
- Future value of an annuity 3.16
- Present value of an annuity 3.17
- Calculating the number of periods 3.17
- Perpetuities 3.17
- Value of a mixed stream 3.17
- Value of mixed streams 3.18
- Funding budget shortfalls 3.18
- Changing compounding frequency 3.18
- Compounding frequency, time value, and effective annual rates 3.18
- Continuous compounding 3.19
- Rate of return 3.19
- Rate of return and investment choice 3.19
- Rate of return: Annuity 3.19

4. Valuation of Securities 4.1–4.68

- Introduction 4.1
- Key Inputs Required for Valuation 4.2
- Valuation of Straight Coupon Bond (Definite Period) 4.2
- Valuation of Redeemable Bond 4.3
- Valuation of Irredeemable Bond or Perpetual Bond (Constant Interest) 4.3
- Value of Self Amortization Bond 4.3
- Valuation of Equity (Definite Period and Constant Dividends or Equal Cash Flows) 4.4
- Valuation of Equity (Definite Period and Variable Dividends or Unequal Cash Flows) 4.4
- Valuation of Equity (Indefinite Period and Constant Dividend or Equal Cash Flows) 4.4

Contents

- Valuation of Equity (Indefinite Period and Growing Dividend) 4.5
- Valuation of Redeemable Preference Share
- (Definite Period and Constant Dividend or Equal Cash Flows) 4.5
- Valuation of Irredeemable Preference Shares or Perpetual Preference Shares
- (Indefinite Period and Constant Dividend) 4.5

5. Cost of Capital 5.1–5.64

- Introduction 5.2
- Basic Definitions 5.2
- Cost of Debt, k_d (1-T) 5.3
- Cost of Debentures 5.4
- Cost of Preference Share, k_p 5.6
- Cost of Equity 5.8
- Cost of Retained Earnings, k_s 5.14
- Cost of New Equity, k_e 5.15
- Value of Bond 5.16
- Composite, or Weighted Average Cost of Capital (WACC) 5.17
- Factors that affect the Composite Cost of Capital 5.19
- Determination of Post-Tax Average Cost of additional Debt 5.19
- Treatment of Short-Term Debt 5.21
- Zero Coupon Bonds (ZCB) 5.22
- Cost of Debt 5.23
- Cost of Redeemable Debentures 5.23
- Cost of Irredeemable Debentures 5.25
- Cost of Redeemable Preference Shares 5.27
- Cost of Irredeemable Preference Shares 5.28
- Cost of Equity Shares – Dividend Price Approach 5.28
- Cost of Equity Shares – Dividend Price plus Growth Approach 5.29
- Cost of Preference Shares 5.31
- Cost of Equity Shares – Realized Yield Approach (Holding Period Return - HPR) 5.32
- Cost of Equity Capital (CAPM) 5.33
- Weighted Average Cost of Capital 5.35
- Marginal Cost of Capital [MCC] 5.48
- Levered Firm & Unlevered Firm 5.54
- Miscellaneous Problems for Practice 5.54
- Present Values of Growth Opportunities 5.67
- Current Price of Shares 5.67
- Price Per Share 5.68

Contents

- Equilibrium Price Per Share 5.68
- Expected Return on Market Portfolio 5.68
- Miscellaneous 5.69
- Beta and Cost of Equity Capital 5.75
- Marginal Cost of Capital 5.76
- Optimum Debt Equity Mix Using Cost of Capital 5.78
- Holding Period Return – Realized Yield Approach 5.79
- Zero Coupon Bonds 5.80
- Calculation of Prevailing Interest Rate 5.82
- WACC Computation when different Capital Structure are Given. 5.83
- Cost of Preference Share Using YTM Method 5.84

6. Financial Analysis and Planning – Ratio Analysis 6.1–6.72

- Introduction 6.2
- The Need for Financial Statement Analysis 6.2
- Horizontal and Vertical Analysis of Financial Statement 6.2
- Format of Trading, P & L A/c and Balance Sheet 6.3
- Financial Ratios 6.4
- Long term Solvency/Leverage Ratio 6.6
- Coverage Ratio 6.8
- Activity / Turnover / Performance / Efficiency Ratio 6.9
- Profitability Ratio 6.11
- Dividend and Earning Yield 6.15
- Limitations of Financial Ratios 6.16
- Profitability Ratios 6.26
- Liquidity Ratios 6.26
- Activity/Efficiency/Performance/Turnover Ratios 6.28
- Study of Financial Positions 6.29
- Preparation of Trading & Profit and Loss and Balance Sheet 6.31
- Debtor's Collection Period 6.33
- Profitability and Turnover Ratios 6.33
- Capital Gearing Ratio 6.34
- Solvency Ratio 6.35
- Coverage Ratio 6.36
- Interest Coverage Ratio 6.37
- Calculation of Fixed Assets and Proprietary Fund 6.38
- Statement of Proprietary Fund 6.39
- Proprietary Ratio 6.40

Contents

- Du-pont Chart 6.41
- Working Capital Efficiency Related Ratios 6.44
- Preparation of Balance Sheet and Calculation of Working Capital 6.45
- Preparation of Balance Sheet 6.47
- Preparation of P & L A/c and Balance Sheet 6.68
- Preparation of Tarding and P & L A/c 6.74
- Preparation of Tarding, P & L A/c and Balance Sheet 6.75
- Affect of Proposal on Key Ratios 6.80
- Reserve and Surplus and Net Cash Flow 6.81
- Miscellaneous Ratios for Practice 6.83

7. Financing Decisions - EBIT-EPS Analysis 7.1–7.42

- Introduction 7.2
- Financial Break-even and Indifference Analysis 7.2
- Earnings Per Share 7.7
- EPS Under Different Financial Mix and Plans 7.7
- Selection of Best Financial Plan 7.9
- EPS Under Different Borrowing Schemes 7.11
- PAT and Earnings Per Share 7.14
- Indifference Level 7.16
- EPS and Indifference Level 7.20
- Indifference Point 7.28
- Market Value of Shares 7.29
- Selection of Financial Plan (EPS Bond) 7.30
- Interest Coverage Ratio 7.33
- NET Fund Flow 7.34
- EBIT - EPS Indifference Point 7.36

8. Financing Decisions - Leverages 8.1–8.90

- Introduction 8.2
- Business and Financial Risk 8.2
- Debt Versus Equity Financing 8.4
- Leverage 8.5
- Margin of Safety (MOS) and Operating Leverage (OL) 8.8
- Financial Leverage Analysis 8.15
- Operating Leverage and Beta 8.15
- Return on Equity 8.16

Contents

- EPS and Leverage Using Total Assets Turnover Ratio and Variable Operating Cost Ratio. 8.16
- Earnings after Tax 8.22
- Return on Equity and Operating Leverage 8.23
- Operating Leverage and Financial Leverage 8.24
- Leverage and Risk 8.25
- Calculation of Leverages 8.26
- Calculation of Leverage 8.27
- Operating, Financial and Combined Leverage 8.30
- Analysis of Leverage 8.33
- Increase in Sales, Operating Leverage and impact on Increase in Profit 8.34
- Determination of EBIT on the basis of EPS 8.35
- Leverage and Level of Sales at which EBT will be zero 8.38
- Determination of Leverage? 8.41
- Preparation of Income Statements 8.42
- Profitability Statement 8.44
- Selection of Capital Structure? 8.45
- Depreciation and Net Fund Flow 8.47
- Leverage [% change method] 8.49

Appendix I: *Glossary* A.1–A.8

Appendix II: *Tables* A.9–A.12

[Volume 2]

9. Financing Decisions – Capital Structure

10. Investment Decisions – Capital Budgeting

11. Dividend Decisions

12. Management of Working Capital

Unit I: Management of Working Capital
Unit II: Treasury and Cash Management
Unit III: Management of Inventory
Unit IV: Management of Receivables
Unit V: Management of Payables (Creditors)
Unit VI: Financing of Working Capital

VIRTUALS

Congratulations!

The League of Champions

MEENAKSHI	ROHIT	SHUBHAM	ANUSHKA	CHERRY	SANJEEV
AIR 20	AIR 22	AIR 23	AIR 36	AIR 37	AIR 47

OTC VIRTUALS

SATYAM KUMAR	87 MARKS	SUSHANT ARORA	83 MARKS
BHARAT GAUTAM	80 MARKS	PRADEEP ROHILLA	79 MARKS
ANUSHKA SHARMA	78 MARKS	KSHITIZ TAYAL	78 MARKS
SAIKAT GHOSH	77 MARKS	NILESH JAISWAL	76 MARKS
NUZAIF AKTHAR	76 MARKS	KOMAL SANWAL	75 MARKS
SHALINI SONI	75 MARKS	ASHUTOSH KUMAR	74 MARKS
NANDA CHATURVEDI	74 MARKS	ARYAN MERATWAL	73 MARKS
DEEPANSHI JAIN	73 MARKS	KAUSHAL ARORA	73 MARKS
PREETHAM BHAT	73 MARKS	SONALI VIJ	73 MARKS
ANKIT JAIN	72 MARKS	MAYURI PRAMOD	72 MARKS
SANCHIT	72 MARKS	SONU AGRAWAL	72 MARKS
TANYA BANSAL	72 MARKS	ANURAG AGGRAWAL	71 MARKS
CHIRAG JAIN	70 MARKS	NITESH LAHU	70 MARKS
PARAS BANSAL	70 MARKS	RAJSHREE	70 MARKS
RAJVI DILIP	70 MARKS	YASH JAIN	70 MARKS

2500+ Exemptions
3000+ Above 50 Marks

FM - SM
FINANCIAL MANAGEMENT * STRATEGIC MANAGEMENT

APP

GET IT ON Google Play

Available on the App Store

9953922272

www.otceducation.com

Volume 1

Financial Management: Simplified

(Chapter 1 to 8)

Chapter 1: Scope and Objectives of Financial Management

Chapter 2: Types of Financing

Chapter 3: Time Value of Money

Chapter 4: Valuation of Securities

Chapter 5: Cost of Capital

Chapter 6: Financial Analysis and Planning – Ratio Analysis

Chapter 7: Financing Decisions - EBIT-EPS Analysis

Chapter 8: Financing Decisions - Leverages

CHAPTER ONE

Scope and Objectives of Financial Management

Learning Objectives

After studying this chapter, you should be able to

- Define financial management and discuss Financing decision.
- Know its objectives, importance scope and how it has evolved over a period of time.
- Focus on the issues relating profit maximization vis-à-vis wealth maximization.
- Outline the role of chief financial officer in light of growing needs of a modern organization.
- Understand the relationship of financial management with accounting and other related fields.
- Discuss Financial distress and insolvency.
- Discuss agency cost, its problem and mitigation.

Chapter Outline

- Introduction
- What is Finance?
- Meaning of Financial management
- Definition
- Basic Aspects of Financial Management
- Importance of Financial Management
- Objectives of Financial Management
- Role of Chief Finance Officer (CFO)
- Relationship of Financial Management with other Disciplines
- Financial Distress
- Agency Problem and Agency Cost

Faith is believing in something one does not know till one comes to know what one believes in as true.

– Swami Dayanand Saraswati

Introduction

The present age is the age of industrialization. Large industries are being established in every country. It is very necessary to arrange finance for building, plant and machinery, working capital, etc. for the establishment of these industries. How much of capital will be required, from what sources this much of finance will be collected and how will it be invested, all this is the matter of financial management. In short:

- Financial management is all about **managing the finances of a business.**
- It involves financial planning, financial control and **financial decision-making.**
- The management of a firm needs to ensure that **enough funding is available at the right time** to meet the needs of the business.
- Financial management ensures that the **assets are secure and being used efficiently.**
- The key aspects of financial decision-making relate to **investment, financing and dividends.**

The source of funds may be share capital, reserves (i.e. internal finance) and debts. The application of funds may be fixed assets, investments in securities and current assets.

Under the area of *'Financial Management'*, we check the source and application of funds. The source of funds may be share capital, reserves (i.e. internal finance) and debts. The application of funds may be fixed assets, investments in securities and current assets. The current assets include cash/bank kept for meeting daily expenses, inventory in the form of raw material, work-in-progress, finished goods and debtors.

The objective is to **raise funds from various sources** in **such a way that the overall cost will be minimum** and to apply the funds in various assets in a balanced way so that funds would be best utilized to generate sales and ultimately maximum profit.

An Entrepreneur's Decision-Making Process

Stage 1 →	***Stage 2*** →	***Stage 3*** →	***Stage 4***
Decide **which assets to buy.**	Determining **what is total investment required** for buying assets.	Determining **how much cash he would need** to run the daily operations. (WCM)	Determining the **sources of the finance it's activities.**

What is Finance?

Finance can be defined as the **art and science of managing money.** Virtually, all individuals and organizations earn or raise money and spend or invest money. Finance is concerned with the process, institutions, markets and instruments involved in the transfer of money among individuals, business and governments.

Meaning of Financial management

Financial management is that managerial activity which is **concerned with the planning and controlling of the firm's financial resources.** It was a branch of economics till 1890, and as a separate discipline, it is of recent origin. Still, it has no unique body of knowledge of its own, and **draws heavily on economics for its theoretical concepts even today.**

In general financial management is the effective & efficient utilization of financial resources. It means creating balance among financial planning, procurement of funds, profit administration & sources of funds.

Financial management is concerned with acquiring, financing and managing assets to accomplish the overall goal of a business enterprise (mainly to the **shareholders' wealth maximization).**

Definition

Financial management is concerned with the efficient use of an important economic resource, namely, capital funds."

"Financial management comprises the forecasting, planning, organizing, directing, coordinating and controlling of all activities relating to acquisition and application of the financial resources of an undertaking in keeping with its financial objective."

- Raymond Chambers

"Financial Management is concerned with the managerial decisions that result in the acquisition and financing of short term and long term credits for the firm."

- Phillippatus

"Financial management is concerned with the efficient use of an important economic resource, namely, capital funds."

- Solomon

"Financial management is an area of financial decision making harmonizing individual motives & enterprise goals."

- Weston & Brigham

Basic Aspects of Financial Management

Exam Focus...

Nov. - 2009	2 Marks

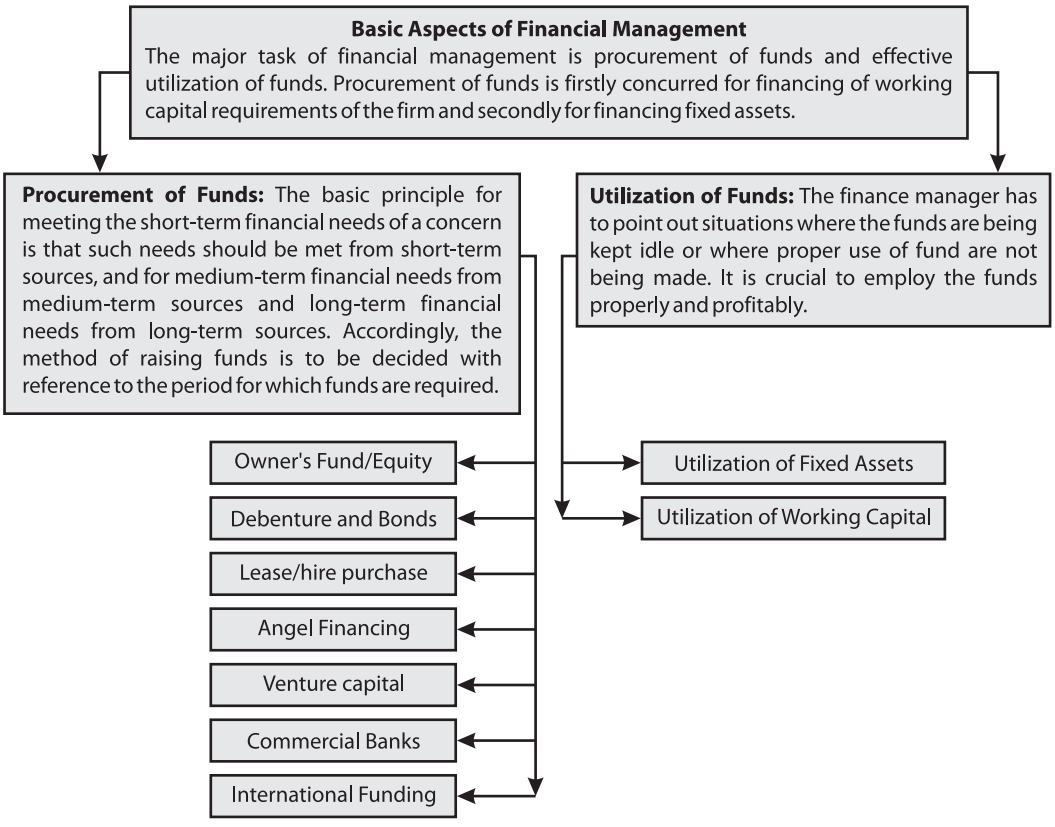


Figure 1.1

An overview of the basic aspects of financial management

Importance of Financial Management

1. **Taking care** not to over-invest in fixed assets.
2. **Balancing** cash-outflow with cash-inflows.
3. **Ensuring** that there is a sufficient level of short-term working capital.
4. **Setting** sales revenue targets that will deliver growth.

5. **Increasing** gross profit by setting the correct pricing for products or services.
6. **Controlling** the level of general and administrative expenses by finding. more cost-efficient ways of running the day-to-day business operations.
7. **Tax planning** that will minimize the taxes a business has to pay.

Exam Focus...

Nov. - 2017	4 Marks
May 2018	2 Marks
Nov. - 2019	3 Marks

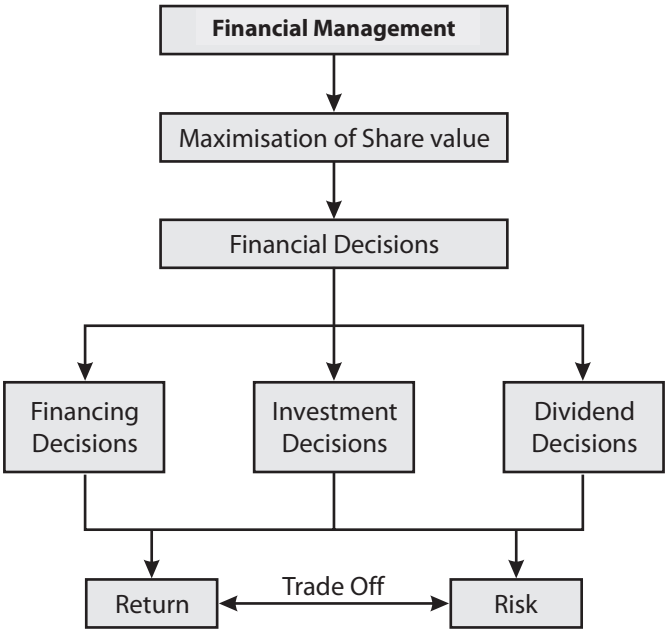
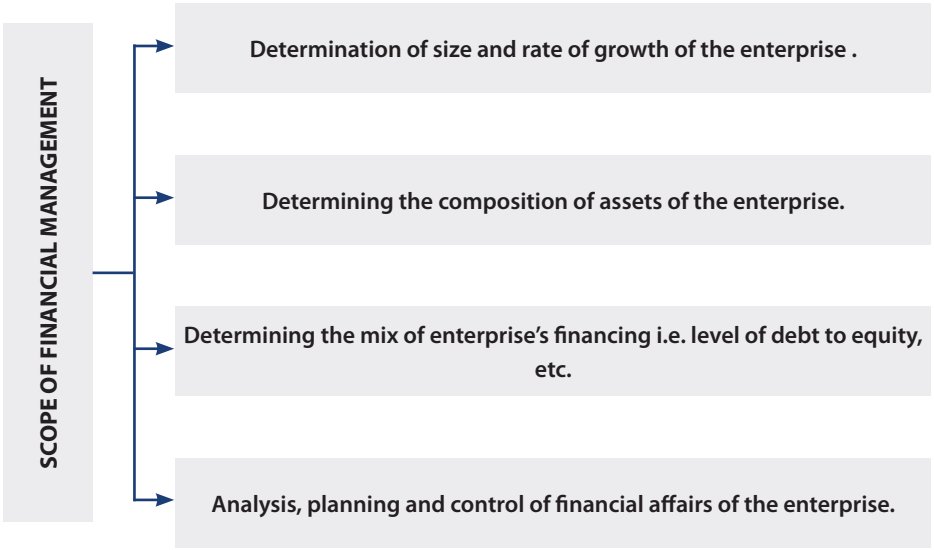


Figure 1.2

An Overview of Financial Management

Scope of Financial Management



Evolution of Financial Management

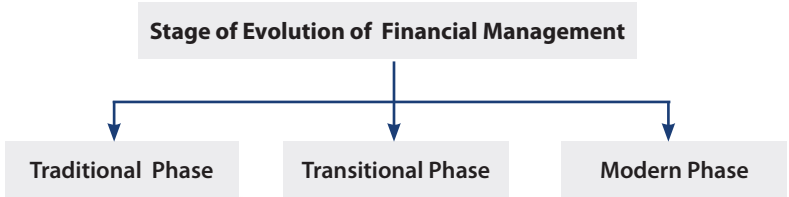


Figure 1.3

Phases of evolution of financial management

Exam Focus...	
Dec. 2021	2 Marks

i. **Traditional Phase:** It has been traditionally argued that **the objective of a company is to earn profit.** This means that the finance manager has to make decision in a manner that the profit is maximized. Each alternative, therefore, is to be seen as to whether or not it gives maximum profit.

During this phase, financial management was considered necessary only during occasional events such as takeovers, mergers, liquidation; etc.

ii. **Transitional Phase:** During this phase, **the day-to-day problems that financial managers faced were given importance.** The general problems related to funds analysis, planning and control were given more attention in this phase.

iii. **Modern Phase:** The current phase is known as '*modern phase*'. The scope of financial management has greatly increased during this phase. It is **important to carry out financial analysis for a company.** This analysis **helps in decision making.** During this phase, many theories have been developed regarding efficient markets, **capital budgeting, option pricing, valuation** models and also in several other important fields in financial management.

Objectives of Financial Management

Exam Focus...	
Nov. - 2002	4 Marks
Nov. - 2018	2 Marks
July 2021	2 Marks

Financial management is concerned with procurement and use of funds. Its main aim is to use business funds in such a way that the firm's value/earnings are maximized. Financial management provides a frame work for selecting a proper course of action and deciding a viable commercial strategy.

The main objective of a business is to maximize the owner's economic welfare. This objective can be achieved by:

1. Profit Maximization, and
2. Wealth Maximization.

Profit Maximization

The main aim of every economic activity is to earn maximum profits. A business being an economic institution must earn profit to cover its costs and provide funds for growth. Profit is also a measure of efficiency of a business enterprise. Profits serve as a protection against risks which cannot be ensured. The accumulated profits enable a business to face risks like fall in prices, competition from other units, adverse government policies etc. Thus, profit maximization is considered as the main objective of business.

Profit Maximization implies that a firm either produces maximum output for a given amount of input, or uses minimum input for producing a given output.

Profit Maximization implies that a firm either produces maximum output for a given amount of input, or uses minimum input for producing a given output. The underlying logic of profit maximization is **efficiency.** It is assumed that profit maximization causes the efficient allocation of resources under competitive market conditions, and profit is considered as the most appropriate measure of a firm's performance.

Arguments in favour of profit maximization:

- The profit maximization should be the obvious objective.
- Profitability is a barometer for measuring efficiency and economic prosperity of a business enterprise.
- Economic and business conditions do not remain same at all times. There may be adverse business conditions like recession, depression, severe competition etc. A business will be able to survive under unfavorable situation, only if it has some past earnings to rely upon. Therefore, a business should try to earn more and more when situation is favorable.
- Profits are the main sources of finance for the growth of a business. It enables its growth and development.

- Profitability is essential for fulfilling social goals also.

Arguments against profit maximization:

- The **term 'profit' is vague** and it cannot be precisely defined.
- Profit maximization objective ignores the time value of money and **does not consider the magnitude and timing of earnings.**
- **It does not take into consideration the risk** of the prospective earnings stream.
- The **effect of dividend policy** on the market price of shares is also **not considered** in the objective of profit maximization.
- Profit maximization as an objective is **too narrow.**

Shareholder's Wealth Maximization

The alternative to profit maximization is wealth maximization. This is also known as **Value maximization or Net Present Worth maximization.** Value is represented by the market price of the company's equity shares.

Prices in the share market at a given point of time are the result of many factors like general economic outlook, particularly if the companies are under consideration, technical factors and even mass psychology. However, taken on a long-term basis, the share market prices of a company's shares do reflect the value, which the various parties put on a company.

Normally, the value is a function of two factors —

1. The likely rate of earnings per share (EPS) of a company and
2. The capitalization rate

Net present value (NPV) or wealth of a course of action is the difference between the present value of its benefits and the present value of its costs. A financial action that has a positive NPV creates wealth for shareholders and, therefore, is desirable. A financial action resulting in negative NPV should be rejected since it would destroy shareholders' wealth. Between **mutually exclusive projects** the one with the highest NPV should be adopted. NPVs of a firm's projects are additive in nature.

That is:

$$NPV(A) + NPV(B) = NPV(A + B)$$

Things to Remember

With maximization of wealth, shareholders can adjust their cash flows in such a way as to optimize their consumption. From the shareholders' point of view, the wealth created by a company through its actions is reflected in the market value of the company's shares.

A Shareholder's wealth is shown by:

Shareholder's Wealth= Number of shares owned × Current share price

Higher the share price, greater will be the shareholder's wealth.

Example:

There is great demand for the shares of LML Ltd. This is evident from the market price of LML shares. This also reflects the shareholders' perception about the quality of LML's financial decisions. It becomes clear to everyone that LML is performing well. The market price of its shares indicates the firm's performance. Clearly, LML follows the wealth maximization principle implying that its fundamental objective is to maximize it.

Exam Focus...

Nov. - 6	4 Marks
Nov. - 12	4 Marks
May 2022	2 Marks

Arguments in favour of Wealth Maximization

It helps to:

- Achieve a higher growth rate
- Attain a large market share
- Gain leadership in the market in terms of products and technology

- Promote employee welfare
- To increase customer satisfaction
- Improving community life, supporting education and research, solving societal problems, etc.

Arguments against Wealth Maximization

The wealth maximization objective has also been criticized by certain financial theorists mainly on following accounts:

- It is a prescriptive idea. The objective is not descriptive of what the firms actually do.
- The objective of wealth maximization is not necessarily socially desirable.
- There is some controversy as to whether the objective is to maximize the stockholders wealth or the wealth of the firm which includes other financial claim holders such as debenture holders, preferred stockholders, etc.,
- The objective of wealth maximization may also face difficulties when ownership and management are separated as is the case in most of the large corporate form of organizations

Things to Remember

The Rationale of Wealth Maximization

There is a controversy regarding the precise objectives of financial management. Many people argue that the finance manager should always attempt to maximise the profits of enterprise. Therefore, the main objective of financial management is profit maximization. In other words, while considering all financing, investment and other relevant decisions, the finance manager should examine each alternative with reference to whether or not would maximise profits. There is another view that profit maximization can at best be a limited objective and that, in many situations, maximization of profits may not get be conducive to long term interests of the company. **This is because of following reasons:**

(i) **Maximization of profits,** as an objective, **ignores the risk factor.** There is a direct relationship between risk and profit. **Higher the risk higher** is the **possibility of returns.** The financial manager must, therefore, consider the risk factor. Actually, he must attempt to optimize risk and return.

(ii) **Profit maximization, as an objective is too narrow,** since it fails to-take into account the social considerations, as also the obligations of the enterprise to various stakeholders like workers, consumers and the society at large. Similarly, maximization of the profits, without any regard for ethical practices, can never be the objective of the business. It is quite obvious that if a business concern ignores its social or moral obligations, it cannot hope to survive for long.

(iii) **Profit maximization in absolute terms ignores the time pattern of returns.** In view of the arguments given above, many authors argue that the finance manager should keep wealth maximization as his objective.

In other words, the finance manager should attempt to maximize the value of the enterprise to its shareholders. **"Value", according to Van Horne, "is represented by the market price of the company's common stock".** This price takes into account the present and prospective future' earnings per share, the timing and the risk of these earnings, the dividend policy of the enterprise and many other factors. It is thus an overall reflection of the investment, financing and dividend decisions of the enterprise. According to Van Horne, the market price of a company's shares represents the focal judgement of all participants in the market as to what is the value of the particular company. **The finance manager should attempt to maximize this value.** In this context, it would be interesting to mention that, whereas in the short run the prices on the share market are the result of a mixture of factors, on the long-term basis, the share market value is a function of two basic factors:

(a) The likely rate of earnings or earnings per share of the company; and

(b) The capitalization rate

The capitalization rate reflects the likeness of the investors for the company. It shows the amount of risk that the investors attach to its shares this in turn depends upon a large number of factors and on the various policies of the company. It can thus, be seen that wealth maximization includes in itself the element of profit and also takes into account a large number of other factors.

Profit Maximization Vs Wealth Maximization

Exam Focus...	
Nov. - 2006	5 Marks
May - 2003	5 Marks
Nov. - 2007	6 Marks
Nov. - 2010	4 Marks
Nov. - 2015	4 Marks
Nov. - 2017	4 Marks

Profit maximization is considered as the main objective of business while, wealth maximization objective is a widely recognized criterion with which the performance a business enterprise is evaluated.

PROFIT MAXIMIZATION **Objective= large amount of profits** **It does not consider risk and uncertainty**	**WEALTH MAXIMIZATION** **Objective=Highest market value of shares.** **It considers both risk and uncertainty.**
Advantages 1) Easy to calculate profits 2) Easy to determine the link between financial decision and profits. 3) Must for survival of business, else capital is lost. 4) Essential for growth and development of business 5) Only profit–marketing firms can pursue social obligations	**Advantages** 1) Emphasizes on the long-term objectives 2) Recognizes risk and uncertainty 3) Recognizes the timing of returns 4) Considers shareholders' return
Disadvantages 1) Emphasize on the short-term objectives 2) Ignores risk and uncertainty 3) The term "profit" is vague 4) Ignores the timing 5) Ignores social and moral obligations of business returns 6) Requires immediate resources	**Disadvantages** (i) Offers no clear relationship between financial decisions and share price. (ii) Can lead to management anxiety and frustration.

Role of Chief Finance Officer (CFO)

Broadly, the functions are divided into two parts.

- Treasury function
- Control function

Treasury function (headed by financial manager) is commonly responsible for handling financial activities, such as financial planning and fund raising, making capital expenditures decisions, managing cash, managing credit activities, managing the pension fund and managing foreign exchange.

The control function (headed by Chief Accountant/Financial Controller) typically handles the accounting activities such as corporate accounting, tax management, financial accounting and cost accounting.

The treasurer's focus tends to be more external, the controllers' focus is more internal.

"Recipes tell you nothing. Learning techniques is the key."

– Tom Colicchio

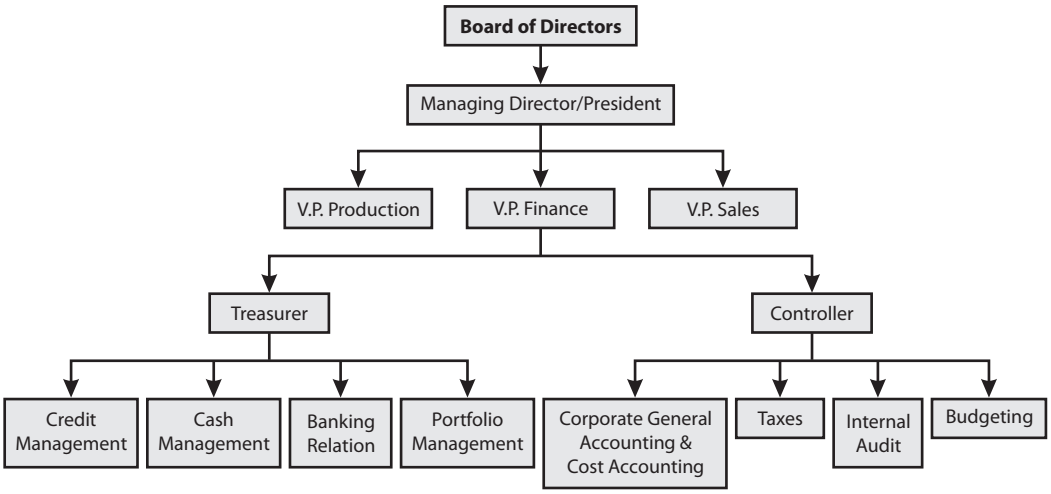


Figure 1.4

Organization Chart of Finance Function

Roles of CFO

Exam Focus...	
Nov. - 2007	5 Marks
May - 2010	3 Marks
Nov. - 2011	4 Marks
May. - 2014	4 Marks
Nov. - 2016	4 Marks
May. - 2018	2 Marks
Nov. - 2020	4 Marks

Today's CFOs are expected to play diverse and challenging roles.

Traditional CFO's Roles:

- **Steward**: Preserving the assets of the organization by minimizing risk and getting the books right, and
- **Operator**: Running a tight finance operation that is efficient and effective.

Modern CFO's Roles:

Strategists: Helping to shape overall strategy and direction.

- Financial analysis and planning
- Investment decisions
- Financing and capital structure decisions
- Management of financial resources
- Risk management

Catalysts: Instilling a financial approach and mind set throughout the organization to help other parts of the business perform better.

Relationship of Financial Management with other Disciplines

Financial Management and Accounting

Exam Focus...	
Nov. - 2009	2 Marks

Financial management and accounting are closely related, still they differ in the treatment of funds and with regards to decision making.

1. **Treatment of Funds:** In accounting, the **measurement of funds** is based on the accrual principle i.e., revenue is recognised at the point of sale and not when collected and expenses are recognised when they are incurred rather than when actually paid. The accrual-based accounting data do not reflect fully the financial conditions of the organisation.

   The treatment of **funds in financial management** is based on cash flows. The revenues are recognised only when cash is actually received (i.e. cash inflow) and expenses are recognised on actual payment (i.e. cash outflow). This is so because the finance manager is concerned with **maintaining solvency** of the organisation by providing the cash flows necessary to satisfy its obligations and acquiring and financing the assets needed to achieve the goals of the organisation.

The treatment of funds in financial management is based on cash flows. The revenues are recognised only when cash is actually received (i.e. cash inflow) and expenses are recognised on actual payment (i.e. cash outflow).

2. **Decision–making:** The purpose of accounting is to collect and present **financial data of the past, present and future operations** of the organization. The **financial manager uses these data** for financial decision making. Thus, in a way it can be stated that **financial management begins where accounting ends.**

Financial Management and Other Functions

Manufacturing Function

- Manufacturing function necessitates a large investment. **Productive use of resources ensures a cost advantage for the firm.**
- **Optimum investment in inventories improves profit margin.**
- Many parameters of the production cost having effect on production cost are possible to control through internal management thus improving profits.
- Important production decisions like make or buy can be taken only after financial implications have been considered.

Marketing Function

- Many aspects of marketing management have financial implications e.g., hold inventories to provide off the shelf service to customers and thus increase sales; extension of credit facility to customers to increase sales.
- **Marketing strategies to increase sales have additional cost impact, which needs to be weighed carefully against incremental revenue.**

Personnel Function

In the global competitive scenario, business firms are moving to leaner and flat organizations. Investments in Human Resource Development are also bound to increase. Restructuring of remuneration structure, voluntary retirement schemes, sweat equity etc., has become major financial decisions in the area of human resource management.

Strategic Planning Function

Finance function is an important tool in the hands of management for strategic planning and control on two counts:

- The **decision variables** when converted into monetary terms are easier to grasp.
- Finance function **has strong inter-linkages with other functions.** Controlling other functions through finance route is possible.

Financial Distress

Financial distress is a situation where a firm's operating cash flows are not sufficient to satisfy current obligations (such as trade credits or interest expenses) , typically due to high fixed costs, illiquid assets or revenues sensitive to economic downturns, and the firm is forced to take corrective action.

The variety of events befalling firms under financial distress is almost endless, but here are some examples:

(a) Dividend reductions (c) Losses (e) CEO resignations

(b) Plant closings (d) Layoffs (f) Plummeting stock prices

Financial distress may lead a firm to default on a contract, and it may involve financial restructuring between the firm, its creditors, and its equity investors.

Financial distress may **lead a firm to default on a contract,** and it may involve **financial restructuring** between **the firm, its creditors,** and its equity investors. Usually the firm is forced to take actions that it would not have taken if it had sufficient cash flow.

A company under financial distress can incur costs related to the situation, such as **more expensive financing, opportunity costs of projects and less productive employees.**

Insolvency

A business can be cash-flow insolvent but balance-sheet solvent if it holds market liquidity assets, particularly against short term debt that it cannot immediately realize if called upon to do so.

Technical insolvency OR Balance Sheet insolvency occurs when an individual or a firm is unable to meet their financial obligations. Accounting insolvency happens when total liabilities exceed total assets (negative net worth).

Cash flow insolvency involves a lack of liquidity to pay debts as they fall due. Balance sheet insolvency involves having negative net assets—where liabilities exceed assets. Insolvency is not a synonym for bankruptcy, which is a determination of insolvency made by a court of law with resulting legal orders intended to resolve the insolvency.

A business can be cash-flow insolvent but balance-sheet solvent if it holds market liquidity assets, particularly against short term debt that it cannot immediately realize if called upon to do so.

Conversely, a business can have negative net assets showing on its balance sheet, making it balance-sheet insolvent, but still be cash-flow solvent if ongoing revenue is able to meet debt obligations, and thus avoid default: for instance, if it holds long term debt. Some large companies operate permanently in this state.

Difference between Financial Distress and Insolvency

The difference between Financial Distress and Insolvency is the difference between illness and death.

The difference between Financial Distress and Insolvency is the **difference between illness and death.**

A permanent financial distress may lead an organisation to the chaotic financial insolvency state.

Financial distress is **a tight cash situation** in which a business cannot pay the owed amounts on the due date. If prolonged, this situation can force the organisation into bankruptcy or forced liquidation.

Financial insolvency means the organization can no longer meet its financial obligations with its lender or lenders as debts become due. Insolvency can lead to insolvency proceedings, in which legal action will be taken against the insolvent entity, and assets may be liquidated to pay off outstanding debts.

Agency Problem and Agency Cost

In general, managers should act in the best interest of shareholders, however in reality, managers may try to maximize their individual goal like salary, perks etc. **So, there is a principal agent relationship between managers and owners, which is known as Agency Problem.**

Generally, Agency Costs are of four types:
(i) Monitoring
(ii) Bonding
(iii) Opportunity
(iv) Structuring

- **Agency Problem** is the chances that managers ***may place personal goals ahead of the goal of owners.***

  Agency Problem leads to Agency Cost.
- **Agency cost** is the additional cost borne by the shareholders to monitor the manager and control their behaviour so as to maximize shareholders' wealth.

Addressing the agency problem

The agency problem arises if manager's interests are not aligned to the interests of the debt lender and equity investors.

- The agency problem arises if manager's interests are not aligned to the interests of the debt lender and equity investors.
- The agency problem of debt lender would be addressed by imposing negative covenants i.e. the **managers cannot borrow beyond a point.**
- Agency problem between the managers and shareholders can be addressed if the **interests of the managers** are aligned **to the interests of the share- holders.**

The following efforts have been made to address these issues:

- Managerial **compensation is linked to profit of the company** to some extent and also with the long term objectives of the company.
- Employee is also designed to address the issue with the underlying assumption that maximisation of the stock price is the objective of the investors.
- **Effecting monitoring** can be done.

"It is what we know already that often prevents us from learning."

– Claude Bernard

CHAPTER TWO

Types of Financing

Learning Objectives

After studying this chapter, you should be able to

- Learn about the Different sources of finance available to a business.
- Differentiate between the various long term, medium term and short term sources of finance.
- Understand in detail some of the important sources of financing. This would include Venture Capital financing, lease financing and financing of export trade by banks.
- Understand the concept of Securitization.
- Discuss the financing in the International Market by understanding various financial instruments prevalent in the International Market.

Chapter Outline

- Introduction
- Financial Needs and Sources of a Business
- Basic Principles for Funding Various Needs
- Sources of Finance of a Business
- Risk-Return Considerations in financing current assets
- Owners Capital or Equity Capital
- Preference Share Capital
- Bond
- Debt Securitization
- Lease Financing
- Short-term Sources of Finance
- Other Sources of Financing
- Euro Issues by Indian Companies
- Different Types of Packing Credit
- Contemporary Sources of Funding
- Yankee Bond

Obstacles are those frightful things you see when you take your eyes off your goal.

– Henry Ford

Introduction

There are several sources of finance/funds available to any company. Among the various sources of funds available to a company an effective mechanism is required to evaluate risk, tenure and cost of each and every source of fund. The selection of the fund source is dependent on the financial strategy pursued by the company, the leverage planned by the company, the financial conditions prevalent in the economy and the risk profile of both viz., the company as well as the industry in which the company operates. Each and every source of funds has some merits and demerits.

Some of the parameters that need to be considered while selecting a source of fund are:

- Cost of Source of fund
- Tenure
- Leverage planned by the company
- Financial conditions prevalent in the country
- Risk profile of both the company as well as the industry

Financial Needs and Sources of a Business

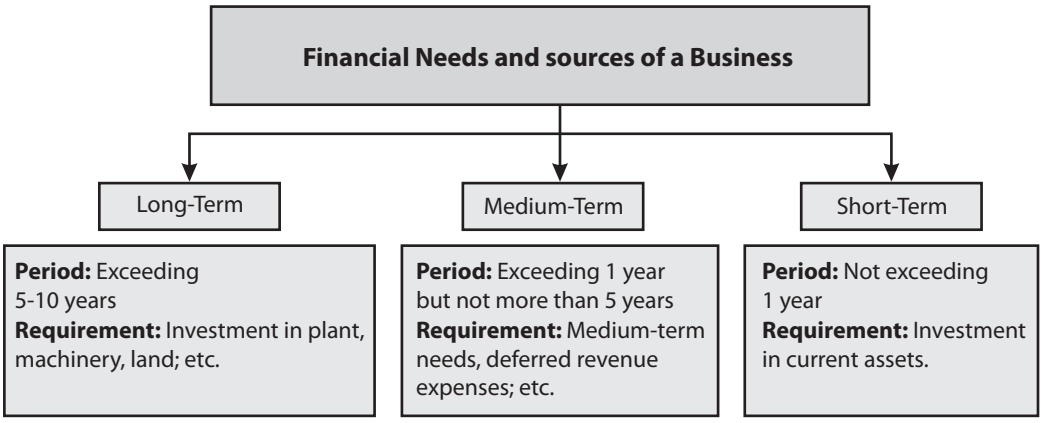


Figure 2.1

Basic Principles for Funding Various Needs

Exam Focus...

May 2016	4 Marks

Three principles relating to selection of marketable securities are as follows:

(*i*) Safety: Return and risks go hand in hand. As the objective in this investment is ensuring liquidity, minimum risk is the criterion of selection.

(*ii*) Maturity: Matching of maturity and forecasted cash needs is essential. Prices of long term securities fluctuate more with changes in interest rates and are therefore, more risky.

(*iii*) Marketability: It refers to the convenience, speed and cost at which a security can be converted into cash. If the security can be sold quickly without loss of time and price it is highly liquid or marketable.

Stage	*Nature of Business*	*Sources of Fund*
Early stage	*High Uncertainty*	*Equity; mainly Angel fund*
	High to moderate Uncertainty	Equity; Venture capital; Debt
Growth Stage	Moderate to Low Uncertainty	Debt; Venture Capital; Private Equity
Stable stage	Low Uncertainty	Debt

Sources of Finance of a Business

Financial sources of a business can also be classified as follows by using different basis:

According to period	*According to ownership*	*According to source of generation*
(i) Long term sources	(i) Owners capital or equity capital, retained earnings etc.	(i) Internal sources e.g. retained earnings and depreciation funds etc.
(ii) Medium term sources	(ii) Borrowed capital such as debentures, public deposits, loans etc.	(ii) External sources e.g. debentures, loans etc.
(iii) Short term sources		

Long-term	*Medium-term*	*Short-term*
(i) Share capital or Equity share	(i) Preference shares	(i) Trade credit
(ii) Preference shares	(ii) Debentures/Bonds	(ii) Accrued expenses and deferred income
(iii) Retained earnings	(iii) Public deposits/fixed deposits for duration of three years	(iii) Commercial banks
(iv) Debentures/Bonds of different types	(iv) Commercial banks	(iv) Fixed deposits for a period of 1 year or less
(v) Loans from financial institutions	(v) Financial institutions	(v) Advances received from customers
(vi) Loans from State Financial Corporation	(vi) State financial corporations	(vi) Various short-term provisions
(vii) Loans from commercial banks	(vii) Lease financing/Hire-Purchase financing	
(viii) Venture capital funding	(viii) External commercial borrowings	
(ix) Asset securitization	(ix) Euro-issues	
(x) International financing like Euro-issues, foreign currency loans	(x) Foreign Currency bonds	

However for the sake of convenience, the different sources of funds can also be classified into following categories:

(i) Security financing – financing through shares and debentures
(ii) Internal financing – financing through retained earning, depreciation
(iii) Loans financing – this includes both short-term and long-term loans
(iv) International financing
(v) Other sources

Risk-Return Considerations in financing current assets

The financing of current assets involves a trade off between risk and return. A firm can choose from short or long term sources of finance. **Short term financing is less expensive than long term financing but at the same time, short term financing involves greater risk than long term financing.**

Exam Focus...

Nov 2015	4 Marks

Depending on the mix of short term and long term financing, the approach followed by a company may be referred as **matching approach, conservative approach and aggressive approach.**

In **matching approach,** long-term finance is used to finance fixed assets and permanent current assets and short term financing to finance temporary or variable current assets. Under the **conservative plan,** the firm finances its permanent assets and also a part of temporary current assets with long term financing and hence less risk of facing the problem of shortage of funds.

Exam Focus...

Nov 2015	4 Marks

An **aggressive policy** is said to be followed by the firm when it uses more short term financing than warranted by the matching plan and finances a part of its permanent current assets with short term financing.

Owners Capital or Equity Capital

Characteristics

- Source of Permanent Capital.
- Highest Risk.
- Entitled to dividend after other stakeholder's claim satisfied.
- In the event of winding up last claim on assets.
- Highest cost.
- Provides security to other suppliers of long-term funds.

Advantages	*Disadvantages*
• Permanent source of finance. • Increases company's financial base. • Not obliged legally to pay dividend. • Further issue through right issue.	• Dividends are not tax deductible. • Highest floatation cost. • Riskier for investors. • New issue can reduce ownership and control.

Preference Share Capital

Preference Share Capital is a special kind of shares. The **holders of such shares enjoy priority,** both as regards to the payment of a fixed amount of dividend and repayment of capital on winding-up of the company.

Exam Focus...

May - 2008	2 Marks

Characteristics

- Long-term funds can be raised through public issue.
- Generally, cumulative dividend.
- Stipulated period for redemption.
- Attributes of both capital and debt.
- Conversion in equity share capital possible.

Advantages	Disadvantages
• No dilution of EPS on enlarged capital base. • Payment of preference dividend is not necessary. • No risk of takeover. • Preference dividend is fixed and pre-decided. • Redeemable after a specific period.	• Preference dividend is not tax deductible, hence costlier than debt. • Preference dividends are cumulative in nature. Although, these dividends may be omitted, they shall need to be paid later

Retained Earning

Long-term funds may also be provided by accumulating the profits. Such **funds belong to the ordinary shareholders and entail almost no risk.** Control of present owners is also not diluted by retained earnings.

Debentures or Bonds

Public limited companies can raise loan by issuing debentures or bonds.

Characteristics:

Debenture: A long-term bond that is not secured by a mortgage on a specific property.

- Issued in different denominations.
- Issued on the basis of debenture trust deed which lists terms and conditions on which debentures are floated.
- Either secured or unsecured.
- Cost of capital raised is quite low due to tax benefit.
- More attractive for investors.

Classifications of Debentures

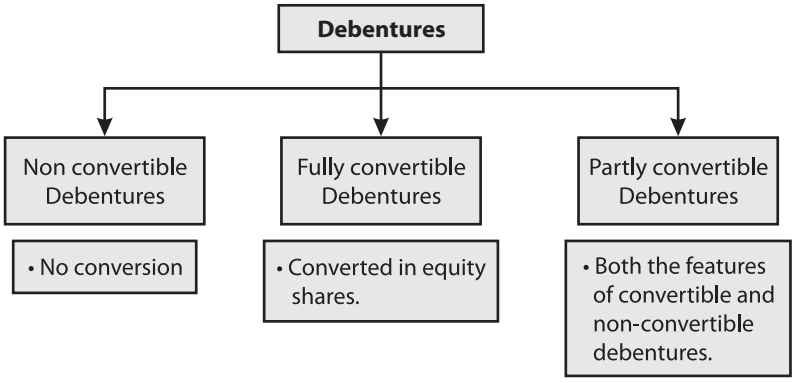


Figure 2.2

Advantages	*Disadvantages*
• Lower cost • No dilution of control.	• Payment of debenture interest and principle amount is compulsory. • Restrictive in nature. • Enhances the financial risk. • Large amount of Cash-flow at the time of maturity.

Bond

Exam Focus...

Jan 2021	2 Marks

Bond is fixed income security created to raise fund. **Bonds can be raised through Public Issue and through Private Placement.**

Types of Bonds Based on call, Bonds can be categorized as:

(i) Callable bonds: A callable bond has a call option which gives the issuer the right to redeem the bond before maturity at a predetermined price known as the call price (Generally at a premium).

(ii) Puttable bonds: Puttable bonds give the investor a put option (i.e. the right to sell the bond) back to the company before maturity.

Various Bonds with their salient features are as follows:

Foreign Bonds

S.No.	*Name of Bond*	*Salient Features*
1.	**Foreign Currency Convertible Bond (FCCB)**	• This bond comes at a **very low rate of interest.** • The advantage to the issuer is that the issuer can **get foreign currency at a very low cost.** • The risk is that in case the bond has to be redeemed on the date of maturity, the issuer has to make the payment and at that time the issuer may not have the money.
2.	**Plain Vanilla Bond**	• The issuer would pay the principal amount along with the interest rate. • This type of bond would not have any options. • This bond can be issued in the form of discounted bond or can be issued in the form of coupon bearing bond.

3.	**Convertible Floating Rate Notes (FRN)**	• A convertible FRN is issued by giving its holder an option to convert it into a longer term debt security with a specified coupon. • It protects an investor against falling interest rate. • The long- term debt security can be sold in the market and the investor can earn profit. • **Capital gain is not applicable to FRN**
4.	**Drop Lock Bond**	• It is a Floating Rate Note **with a normal floating rate** • The floating rate bond would be automatically converted into fixed rate bond if interest rate falls below a predetermined level. • The new fixed rate stays till the drop lock bond reaches its maturity. • The difference between the convertible floating rate note and drop lock bond is that the former is a long option structure and the later one is a short option structure.
5.	**Variable Rate Demand Obligations**	• A normal floating rate note with a nominal maturity. • The holder of the floating rate note can sell the obligation back to the trustee at par plus accrued interest. • It gives the investor an option to exit, so it is more liquid than the normal FRN.
6.	**Yield Curve Note (YCN)**	• It is a structured debt security. • Yield increases when prevailing interest rate declines. • Yield decreases when prevailing interest rate increases. • This is used to hedge the interest rate. • This works like inverse floater.
7.	**Euro Bond** *Exam Focus...* **May - 2006** — **3 Marks** **Nov. - 2011** — **2 Marks**	• Euro bonds are issued or traded in a country using a currency other than the one in which the bond is denominated. This means that the bond uses a certain currency, but operates outside the jurisdiction of the Central Bank that issues that currency. • Eurobonds are issued by multinational corporations, for example, a British company may issue a Eurobond in Germany, denominating it in U.S. dollars. • It is important to note that the term has nothing to do with the euro, and the prefix "euro-" is used more generally to refer to deposit outside the jurisdiction of the domestic central bank.

Indian Bonds

S.No.	***Name of Bond***	***Salient Features***
1.	Masala Bond *Exam Focus...* **May - 2018** — **2 Marks** **Nov. - 2011** — **2 Marks**	Masala (means spice) bond is an Indian name used for Rupee denominated bond that Indian corporate borrowers can sell to investors in overseas markets. • These bonds are issued outside India but denominated in Indian Rupees. • NTPC raised ₹ 2,000 crore via masala bonds for its capital expenditure in the year 2016.
2.	Municipal Bonds	Municipal bonds are used to finance urban infrastructure are increasingly evident in India. • Ahmedabad Municipal Corporation issued a first historical Municipal Bond in Asia to raise ₹100 crore from the capital market for part financing a water supply project.

3.	Government or Treasury Bonds	Government or Treasury bonds are bonds issued by Government of India, Reserve Bank of India, any state Government or any other Government department.

Loan from Financial Institutions

Following specialized institutions provide long term loans to companies:

(i) Industrial Finance Corporation of India.
(ii) LIC of India.
(iii) National Small Industries Corporation of India.
(iv) Industrial Credit and Investment Corporation
(v) IDBI.
(vi) Industrial Reconstruction Corporation of India.

Characteristics

(i) Different Rates under different schemes.
(ii) Stipulates a number of conditions regarding the management and financial policies.

Loan from Commercial Banks

Primary role of a bank is to cater short term requirements of industry. Banks also provide long term finance in the following ways:

(i) For expansion and setting-up of new units.
(ii) For long term working capital requirements.

Bridge Finance

Bridge finance refers to loans taken by a company normally from commercial banks for a short period because of pending disbursement of loans sanctioned by financial institutions.

Bridge finance refers to loans taken by a company normally from commercial banks for a short period because of pending disbursement of loans sanctioned by financial institutions. Though it is a of short term nature but since it is an important step in the facilitation of long term loan, therefore it is being discussed along with the long term sources of funds. Normally, it takes time for financial institutions to disburse loans to companies. However, once the loans are approved by the term lending institutions, companies, in order not to lose further time in starting their projects, arrange short term loans from commercial banks.

The **bridge loans are repaid/ adjusted out of the term loans** as and when disbursed by the concerned institutions. Bridge loans are **normally secured by hypothecating movable assets, personal guarantees** and **demand promissory notes.** Generally, the rate of interest on bridge finance is higher as compared with that on term loans.

Exam Focus...

May - 2006	**3 Marks**
Nov. - 2011	**2 Marks**
Nov. - 2016	**2 Marks**

Venture capital Financing

The **venture capital financing** refers to financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas.

The venture capital financing refers to financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas.

Characteristics

- Basically equity finance in new companies.
- Long term investment in growth oriented small / medium firms.
- Apart from funds other supports e.g. Sales Strategy, management expertise is also provided.

Common Methods of venture Capital Financing

Exam Focus...	
May - 2005	2 Marks
May - 2012	4 Marks
Nov - 2020	4 Marks

(i) Equity Financing
(ii) Conditional loan
(iii) Income Note
(iv) Participating Debentures

Factors to be considered by a venture capitalist before financing:

(i) Level of expertise of companies management
(ii) Level of expertise in production
(iii) Nature of new product or service
(iv) Future prospects
(v) Competition
(vi) Risk borne by entrepreneur
(vii) Exit route
(viii) Board membership.

Debt Securitization

Securitization is a process in which liquid assets are pooled into marketable securities that can be sold to investors.

Exam Focus...	
May - 2006	3 Marks
May - 2011	4 Marks
May - 2019	4 Marks

- Securitization is a process in which **liquid assets are pooled into marketable securities** that can be sold to investors.
- The **process leads to the creation of financial instruments** that represent ownership interest in or secured by a segregated income producing asset or pool of assets.
- These assets are generally secured by personal or real property.

Step 1	Step 2	Step 3	Step 4
SPV (Special Purpose Vehicle) is created to hold title to assets underlying securities as a repository of the assets or claims being securitized.	The originator i.e. the primary financier or the legal holder of assets sells the assets (existing or future) to the SPV.	The SPV, with the help of an investment banker, issues securities which are distributed to investors in form of pass through or pay through certificates.	The SPV pays the originator for the assets with the proceeds from the sale of securities.

- Process of securitization is generally without recourse (investor bears the credit risk or risk of default).
- Issuer has a right to legal recourse in the event of default.
- The risk run by investors can be further reduced through credit. Enhancement facilities like insurance, letter of credit and guarantees.

Advantages of Debt. Securitisation

Exam Focus...	
Nov-2016	4 Marks

Advantages of Debt Securitisation: Debt securitisation is a method of recycling of funds and is especially beneficial to financial intermediaries to support lending volumes.

Benefits to the Originator

Exam Focus...	
Nov 2016	4 Marks

- Off balance sheet funding.
- Better balance sheet management.
- Converts liquid assets to liquid portfolios.
- Originator's credit rating enhances.

Lease Financing

Leasing is a general **contract between the owner and user of the asset over a specified period of time.** The asset is purchased initially by the lessor (leasing company) and thereafter leased to the user (lessee company) which pays a specified rent at periodical intervals. Thus, **leasing is an alternative to the purchase of an asset out of own or borrowed funds.** Moreover, lease finance can be arranged much faster as compared to raising/getting loans from financial institutions.

Advantages

Exam Focus...	
Nov. - 2018	4 Marks

- **Shifting the risk of technological obsolescence** to the owner (lessor); the leasing company.
- **Easy source of finance:** A lessee (user of the machine) avoids many of the restrictive covenants that are normally included in the long-term loan agreements while borrowing from financial institutions or commercial banks.
- **Enhanced liquidity:** A firm having shortage of working capital or forecasting liquidity problem may exercise the option of selling the owned asset to a lesser (leasing company) and take it back on lease basis (the transaction is known as sale cum lease back).
- **Conserving borrowing capacity** through off the balance-sheet financing.
- **Improved performance** as reflected through improved turnover of assets.
- **Governance and flexibility** - by adjusting the term based on losses) requirements.
- **Maintenance and specialized services:** Under a full service lease, the lessee receives maintenance and other specialized services. Even in other types of lease, it is generally common to have maintenance provided by the lessor, thus absolving the lessee of the maintenance arrangement.
- **Lower administrative cuts** as compared to other source of finance.

Disadvantages

Exam Focus...	
May - 2019	2 Marks

- **Risk of being deprived of the use of equipment of the lessors** (owners) financial condition worsens, or if the leasing company is worried up, the lessee may be deprived of the use of the equipment thus disrupting normal manufacturing operations.
- **Alteration/change in the asset:** Under the lease, the lessee is generally prohibited from making alterations/improvements on the leased asset without the prior approval of the lessor (the owner).
- **Terminal value of the asset:** In case of assets (such as land and buildings), which have high terminal value at the end of the lease term, it would be more appropriate to own the asset than to lease it.
- **To make lease payments even if the asset has become obsolete:** If a lessee leases an asset that subsequently becomes obsolete, it still must make lease payments over the remaining term of the lease. This is true even if the asset is unsalable.
- **Reduced Return for Equity Holders:** Given that lease expenses reduce the net income without any appreciation in value, it means limited returns or reduced returns for an equity shareholder. In such case, the objective of wealth maximization for shareholders is not achieved.
- **Limited Access of Other Loans:** Although lease doesn't appear on the balance sheet of a company, investors still consider long-term lease as debt and adjust their valuation of a business to include leases.

Given that investors treat long-term leases as debt, it might become difficult for a business to tap capital markets and raise further loans or other forms of debt from the market.

- **Processing and Documentation:** Overall, to enter into a lease agreement is a complex process and requires thorough documentation and proper examination of an asset being leased.
- **No Ownership:** At the end of the leasing period, the lessee doesn't end up becoming the owner of the asset though quite a good sum of payment is being done over the years towards the asset. He is thus deprived of the residual value of assets. He is not even entitled to any improvement done by him. On the expiry of the lease period, the leased equipment reverts to the Lessor.

Type of Lease Contracts

Operating Lease

Operating lease: A lease under which the lessor maintains and finances the property; also called a service lease.

A lease is classified as an operating lease **if it does not secure for the lessor the recovery of capital outlay plus a return on the funds invested** during the lease term. Normally, these are callable lease and are **cancelable with proper notice.**

The term of this type of lease is shorter than the asset's economic life. The lessee is obliged to make payment until the lease expiration, which approaches useful life of the asset.

Exam Focus...

Nov - 2017	**2 Marks**

An operating lease is particularly attractive to companies that continually update or replace equipment and want to use equipment without ownership, but also want to return equipment at lease end and avoid technological obsolescence.

Finance Lease

In contrast to an operating lease, a financial lease is **longer term in nature and non-cancelable.** In general term, a finance lease can be regarded as any leasing arrangement that is to finance the use of equipment for the major part of its useful life. The lessee has the right to use the equipment while the lessor retains legal title. It is also called capital lease, at it is nothing but a loan in disguise.

Thus it can be said, a contract involving payment over an obligatory period of specified sums sufficient in total to amortize the capital outlay of the lessor and give some profit.

Exam Focus...

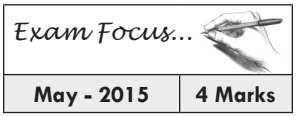
Nov. - 2011	**4 Marks**
Nov. - 2014	**2 Marks**

Comparison between Financial Lease and Operating Lease

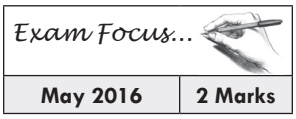
Finance Lease	***Operating Lease***
1. The risk and reward **incident to ownership are passed on to the lessee.** The lessor only remains the legal owner of the asset.	1. The lessee is only provided **the use of the asset for a certain time.** Risk incident to ownership belong wholly to the lessor.
2. The lessee bears the **risk of obsolescence.**	2. The lessee is only provided the use of the asset for a certain time. **Risk incident to ownership belong wholly to the lessor.**
3. The lessor is interested in his rentals and not in the asset. He must get his principal back along with interest. Therefore, the lease is **non-cancellable by either party.**	3. As the lessor does not have difficulty in leasing the same asset to other willing lessor, the **lease is kept cancelable by the lessor.**
4. The lessor enters into the transaction only as financier. He does not bear the cost of repairs, maintenance or operations.	4. Usually, the lessor bears cost of repairs, maintenance or operations.

5. The **lease is usually full pay out,** that is, the single lessee repays the cost of the asset together with the interest.	5. The **lease is usually non-payout,** since the lessor expects to lease the same asset over again to several users.

Other Types of Leases



(1) **Sales and Lease Back:** Under this type of lease, the owner of an asset sells the asset to a party (the buyer), who in turn leases back the same asset to the owner in consideration of a lease rentals. Under this arrangement, the asset is not physically exchanged but it all happen in records only. The main advantage of this method is that the lessee can satisfy himself completely regarding the quality of an asset and after possession of the asset convert the sale into a lease agreement.



(2) **Leveraged Lease:** Under this lease, a third party is involved beside lessor and lessee. The lessor borrows a part of the purchase cost (say 80%) of the asset from the third party i.e., lender and asset so purchased is held as security against the loan. The lender is paid off from the lease rentals directly by the lessee and the surplus after meeting the claims of the lender goes to lessor. The lessor is entitled to claim depreciation allowance.

(3) **Sales-aid Lease:** Under this lease contract, the lessor enters into a tie up with a manufacturer for marketing the latter's product through his own leasing operations, it is called a sales-aid-lease. In consideration of the aid in sales, the manufacturers may grant either credit or a commission to the lessor. Thus, the lessor earns from both sources i.e. from lessee as well as the manufacturer.

(4) **Close-ended and open-ended Leases:** In the close-ended lease, the assets get transferred to the lessor at the end lease, the risk obsolescence, residual value etc., remain with the lessor being the legal owner of the asset. In the open-ended lease, the lessee has the option of purchasing the assets at the end of the lease period.

In recent years, leasing has become a popular source of financing in India. From the lessee's point of view, leasing has the attraction of eliminating immediate cash outflow, and the lease rentals can be deducted for computing the total income under the Income tax Act. As against this, buying has the advantages of depreciation allowance (including additional depreciation) and interest on borrowed capital being tax-deductible, thus, an evaluation of the two alternatives is to be made in order to take a decision. Practical problems for lease financing are covered at Final level in paper of Strategic Financial Management.

Short-term Sources of Finance

(i) **Trade Credit –** It represents credit granted by supplier of goods. The usual duration of such credit is 15 – 90 days.

(ii) **Accrued expenses and deferred income**

(iii) **Advances from customers**

Commercial Paper: Unsecured, short-term promissory notes of large firms, usually issued in denominations of ₹ 100,000 or more and having an interest rate somewhat below the prime rate.

(iv) **Commercial Paper**

A Commercial Paper is an unsecured money market instrument issued in the form of a promissory note. The Reserve Bank of India introduced the commercial paper scheme in the year 1989 with a view to enabling highly rated corporate borrowers to diversify their sources of short term borrowings and to provide an additional instrument to investors. Subsequently, in addition to the Corporate, Primary Dealers and All India Financial Institutions have also been allowed to issue Commercial Papers.

All eligible issuers are required to get the credit rating from Credit Rating Information Services of India Ltd, (CRISIL), or the Investment Information and Credit Rating Agency of India Ltd (ICRA) or the Credit Analysis and Research Ltd (CARE) or the FITCH Ratings India Pvt Ltd or any such other credit rating agency as is specified by the Reserve Bank of India.

Eligibility Criteria for Issue of Commercial Paper

The companies satisfying the following conditions are eligible to issue commercial paper:

- The tangible net worth of the company is ₹ 5 crores or more as per audited balance sheet of the company.
- The fund base working capital limit is not less than ₹ 5 crores.
- The company is required to obtain the necessary credit rating from the rating agencies such as CRISIL, ICRA etc.
- The issuers should ensure that the credit rating at the time of applying to RBI should not be more than two months old.
- The minimum current ratio should be 1.33:1 based on classification of current assets and liabilities.
- For public sector companies there are no listing requirement but for companies other than public sector, the same should be listed on one or more stock exchanges.
- All issue expenses shall be borne by the company issuing commercial paper.

(v) **Bank advances –**

(a) Short term loans.
(b) Overdrafts.
(c) Clean overdrafts.
(d) Cash credit.
(e) Advance against goods.
(f) Bills purchased or discounted.
(g) Advance against documents of title to goods.
(h) Advance against supply of bills.

Seed Capital Assistance

The seed capital assistance has been designed by IDBI for professionally or technically qualified entrepreneurs. All the projects eligible for financial assistance from IDBI, directly or indirectly through refinance are eligible under the scheme. The project cost should not exceed ₹ 2 crores and the maximum assistance under the project will be restricted to 50% of the required promoters contribution or ₹ 15 lacs whichever is lower.

The seed capital assistance is interest free but carries a security charge of one percent per annum for the first five years and an increasing rate thereafter.

Exam Focus...

May - 2012	2 Marks

Deep Discount Bonds vs. Zero Coupon Bonds

Deep Discount Bonds (DDBs) are in the form of zero interest bonds. These bonds are sold at a discounted value and on maturity face value is paid to the investors. In such bonds, there is no interest payout during lock-in period.

IDBI was first to issue a Deep Discount Bonds (DDBs) in India in January 1992. The bond of a face value of Rs.1 lakh was sold for ₹ 2,700 with a maturity period of 25 years.

A zero coupon bond (ZCB) does not carry any interest but it is sold by the issuing company at a discount. The difference between discounted value and maturing or face value represents the interest to be earned by the investor on such bonds.

Secured Premium Notes (SPNs)

Secured premium notes are issued along with detachable warrants and are redeemable after a notified period of say 4 to 7 years. This is a kind of NCD attached with warrant. It was first introduced by TISCO, which issued the SPNs to existing shareholders on right basis.

Subsequently the SPNs will be repaid in some number of equal instalments. The warrant attached to SPNs gives the holder the right to apply for and get allotment of equity shares as per the conditions within the time period notified by the company.

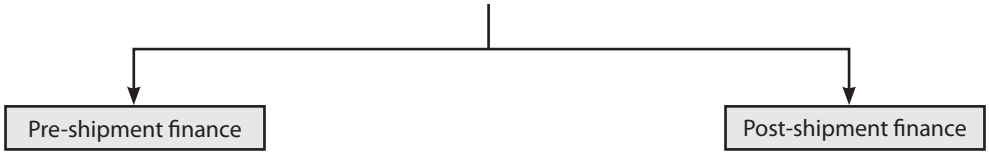
Features of Deep Discount Bonds

Deep discount bonds are a form of zero-interest bonds. These bonds are sold at discounted value and on maturity; face value is paid to the investors. In such bonds, there is no interest payout during the lock- in period. The investors can sell the bonds in stock market and realise the difference between face value and market price as capital gain.

IDBI was the first to issue deep discount bonds in India in January 1993. The bond of a face value of ₹ 1 lakh was sold for ₹ 2700 with a maturity period of 25 years.

Figure 2.3

Financing of Export Trade by Banks



Packing credit-advance extended by banks to an exporter for the purpose of buying, manufacturing, processing packing shipping goods to overseas buyers.

Types:

(a) Clean packing credit
(b) Packing credit against hypothecation of goods
(c) Packing credit against pledge of goods
(d) ECGC guarantee
(e) Forward exchange contract

Documents required for partnership firm

(i) Pronote signed by partner on behalf of the firm and individually
(ii) Letter of continuity
(iii) Letter of pledge or agreement of hypothecation
(iv) Letter of authority to operate the account
(v) Declaration of partnership

Exam Focus...	
July 2021	4 Marks

(a) Purchase/discounting of documentary export bills.
Documents to be obtained:
(i) Letter of hypothecation covering the goods; and
(ii) General guarantee of directors or partners of the firm as the case may be.

(b) ECGC Guarantee: Post-shipment finance, given to an exporter by a bank through purchase, negotiation or discount of an export bill against an order, qualifies for post-shipment export credit guarantee. It is necessary, however, that exporters should obtain a shipment or contracts risk policy of ECGC

(c) Advance against export bills sent for collection: Finance is provided by banks to exporters by way of advance against export bills forwarded through them for collection, taking into account the creditworthiness of the party, nature of goods exported, usance, standing of drawee, etc. appropriate margin is kept.
Documents to be obtained:
(i) Demand promissory note.
(ii) Letter of continuity.
(iii) Letter of hypothecation covering bills.
(iv) General Guarantee of directors or partners of the firm (as the case may be).

(d) Advance against duty draw backs, cash subsidy etc.: To finance export losses sustained by exporters, bank advance against duty draw-back, cash subsidy, etc., receivable by them against export performance. Such advances are of clean nature; hence necessary precaution should be exercised.

Conditions: An advance so availed of by an exporter is required to be liquidated within 180 days from the date of shipment of relative goods.
Documents to be obtained:
(i) Demand promissory note.
(ii) Letter of continuity.
(iii) General Guarantee of directors of partners of the firm as the case may be.
(iv) Undertaking from the borrowers that they will deposit the cheques/payments received from the appropriate authorities immediately with the bank and will not utilise such amounts in any other way.

Other Sources of Financing

(i) Seed Capital Assistance: The Seed Capital Assistance scheme is designed by IDBI for professionally or technically qualified entrepreneurs and/or persons possessing relevant experience, skills and entrepreneurial traits but lack adequate financial resources. All the projects eligible for financial assistance from IDBI, directly or indirectly through refinance are eligible under the scheme. The Seed Capital Assistance is interest free but carries a service charge of one per cent per annum for the first five years and at increasing rate thereafter. However, IDBI will have the option to charge interest at such rate as may be determined by IDBI on the loan if the financial position and profitability of the company so permits during the currency of the loan. The repayment schedule is fixed depending upon the repaying capacity of the unit with an initial moratorium up-to five years.

(ii) Internal Cash Accruals: Existing profit-making companies which undertake an expansion/ diversification programme may be permitted to invest a part of their accumulated reserves or cash profits for creation of capital assets. In such cases, past performance of the company permits the capital expenditure from within the company by way of disinvestment of working/invested funds. In other words, the surplus generated from operations, after meeting all the contractual, statutory and working requirement of funds, is available for further capital expenditure.

(iii) Unsecured Loans: Unsecured loans are typically provided by promoters to meet the promoters' contribution norm. These loans are subordinate to institutional loans. The rate of interest chargeable on these loans should be less than or equal to the rate of interest on institutional loans and interest can be paid only after payment of institutional dues. These loans cannot be repaid without the prior approval of financial institutions. Unsecured loans are considered as part of the equity for the purpose of calculating debt equity ratio.

(iv) Deferred Payment Guarantee: Many a time suppliers of machinery provide deferred credit facility under which payment for the purchase of machinery can be made over a period of time. The entire cost of the machinery is financed and the company is not required to contribute any amount initially towards acquisition of the machinery. Normally, the supplier of machinery insists that bank guarantee should be furnished by the buyer. Such a facility does not have a moratorium period for repayment. Hence, it is advisable only for an existing profit-making company.

(v) Capital Incentives: The backward area development incentives available often determine the location of a new industrial unit. These incentives usually consist of a lump sum subsidy and exemption from or deferment of sales tax and octroi duty. The quantum of incentives is determined by the degree of backwardness of the location. The special capital incentive in the form of a lump sum subsidy is a quantum sanctioned by the implementing agency as a percentage of the fixed capital investment subject to an overall ceiling. This amount forms a part of the long-term means of finance for the project. However, it may be mentioned that the viability of the project must not be dependent on the quantum and availability of incentives. Institutions, while appraising the project, assess the viability of the project per se, without considering the impact of incentives on the cash flows and profitability of the project. Special capital incentives are sanctioned and released to the units only after they have complied with the requirements of the relevant scheme. The requirements may be classified into initial effective steps and final effective steps.

(vi) Deep Discount Bonds: Deep Discount Bonds is a form of zero-interest bonds. These bonds are sold at a discounted value and on maturity, face value is paid to the investors. In such bonds, there is no interest payout during lock in period.

Exam Focus...	
May 2023	2 Marks

(vii) Secured Premium Notes: Secured Premium Notes is issued along with a detachable warrant and is redeemable after a notified period of say 4 to 7 years. The conversion

of detachable warrant into equity shares will have to be done within time period notified by the company.

(viii) Zero Interest Fully Convertible Debentures: These are fully convertible debentures which do not carry any interest. The debentures are compulsorily and automatically converted after a specified period of time and holders thereof are entitled to new equity shares of the company at predetermined price. From the point of view of company, this kind of instrument is beneficial in the sense that no interest is to be paid on it. If the share price of the company in the market is very high then the investors tends to get equity shares of the company at the lower rate.

(ix) Zero Coupon Bonds: A Zero Coupon Bond does not carry any interest but it is sold by the issuing company at a discount. The difference between the discounted value and maturing or face value represents the interest to be earned by the investor on such bonds.

(x) Option Bonds: These are cumulative and non-cumulative bonds where interest is payable on maturity or periodically. Redemption premium is also offered to attract investors.

(xi) Inflation Bonds: Inflation Bonds are the bonds in which interest rate is adjusted for inflation. Thus, the investor gets interest which is free from the effects of inflation. For example, if the interest rate is 11 per cent and the inflation is 5 per cent, the investor will earn 16 per cent meaning thereby that the investor is protected against inflation.

(xii) Floating Rate Bonds: This as the name suggests is bond where the interest rate is not fixed and is allowed to float depending upon the market conditions. This is an ideal instrument which can be resorted to by the issuer to hedge themselves against the volatility in the interest rates. This has become more popular as a money market instrument and has been successfully issued by financial institutions like IDBI, ICICI etc.

Euro Issues by Indian Companies

Exam Focus...

May - 2009	3 Marks
Nov. - 2010	2 Marks
May - 2017	4 Marks

Exam Focus...

Nov. - 2010	2 Marks
May - 2014	4 Marks
May - 2022	2 Marks

Exam Focus...

Nov. - 2007	2 Marks

(a) **American Depository Deposits (ADR):** These are securities offered by non-US companies who want to list on any of the US exchange. Each ADR represents a certain number of a company's regular shares. ADRs allow US investors to buy shares of these companies without the costs of investing directly in a foreign stock exchange. ADRs are issued by an approved New York bank or trust company against the deposit of the original shares. These are deposited in custodial account in the US. Such receipts have to be issued in accordance with the provisions stipulated by the SEC. USA which are very stringent.

(b) **Global Depository Receipt (GDRs):** These are negotiable certificate held in the bank of one country representing a specific number of shares of a stock traded on the exchange of another country. These financial instruments are used by companies to raise capital in either dollars or Euros. These are mainly traded in European countries and particularly in London.

(c) **Indian Depository Receipts (IDRs):** The concept of the depository receipt mechanism which is used to raise fund in foreign currency has been applied in the Indian Capital Market through the issue of Indian Depository Receipts (IDRs). IDRs are similar to Market through the issue of Indian Depository Receipts (IDRs) IDRs are similar to ADRs/GDRs in the sense that foreign companies can issue IDRs to raise funds from the Indian Capital Market in the same lines as an Indian company uses ADRs/GDRs to raise foreign capital. The IDRs are listed and traded in India in the same way as other Indian securities are traded.

External Commercial Borrowings (ECB)

Exam Focus...	
May - 2008	3 Marks

ECBs refer to commercial loans(in the form of bank loans, buyers credit, suppliers credit, securitized instruments (e.g. floating rate notes and fixed rate bonds) availed from non resident lenders with minimum average maturity of 3 years. Borrowers can raise ECBs through internationally recognized sources like (i) international banks, (ii) international capital markets (iii) multilateral financial institutions such as the IFC, ADB etc, (iv) export credit agencies (v) suppliers of equipment, (vi) foreign collaborators and (vii) foreign equity holders.

External Commercial Borrowings can be accessed under two routes viz (i) Automatic route (ii) Approval route. Under the Automatic route there is no need to take the RBI/ Government approval whereas such approval is necessary under the Approval route. Company's registered under the Companies Act and NGOs engaged in micro finance activities are eligible for the Automatic Route where as Financial Institutions and Banks dealing exclusively in infrastructure or export finance and the ones which had participated in the textile and steel sector restructuring packages as approved by the government are required to take the Approval Route.

Financial Instruments Dealt with in the International Market

Exam Focus...	
May - 1998	3 Marks
Nov. - 2008	2 Marks
May - 2014	4 Marks

(a) Foreign Euro Bonds: In domestic capital markets of various countries the Bond issues referred to above are known by different names such as Yankee Bonds in the US, Swiss Frances in Switzerland, Samurai Bonds in Tokyo and Buldogs in UK.

(b) Euro Convertible Bonds: It is a Euro-Bond, a debt instrument which gives the bondholders an option to convert them into a pre-determined number of Equity shares of the company. Usually the price of the Equity Share at the time of conversion will have a call option (where the issuer company has the option of calling/buying the bonds for redemption prior to the maturity date) or a Put Option (which gives the holder the option to put/sell his bonds to the issuer company at a pre-determined date and price)

(c) Plain Euro Bonds: Plain Euro Bonds are nothing but debt instruments. These are not very attractive for an investor who desires to have valuable additions to his investment.

(d) Euro Convertible Zero Bonds: These bonds are structured as a convertible bond. No interest is payable on the bonds. But conversion of bonds takes place on maturity at a pre-determined price. Usually there is a five years maturity period and they are treated as a deferred Equity issue.

(e) Euro Bonds with Equity Warrants: These bonds carry a coupon rate determined by market rates. The warrants are detachable. Pure bonds are traded at a discount. Fixed Income Funds Management may like to invest for the purposes of regular income.

(f) Euro Bonds: Euro bonds are debt instruments denominated in a currency issued outside the country of that currency. For example, a Rupee Bond floated in France, a Yen Bond floated in Germany.

(g) Foreign Bonds: These are debt instruments denominated in a currency which is foreign to the borrower and is sold in the country of that currency. Example A British firm placing Dollar denominated bonds in USA.

(h) Floating Rate Notes: These are issued up to seven years maturity. Interest rates are adjusted to reflect the prevailing exchange rates. They provide cheaper money than foreign loans.

(i) Euro Commercial Papers: ECP's are short- term money market instruments with a maturity period of less than one year. They are usually designated in US Dollars.

(j) Foreign Currency option: A Foreign Currency Option is the right to buy or sell, spot, future or forward, a specified foreign currency. It provides a hedge against financial and economic risks.

(k) Foreign Currency Futures: These are obligations to buy or sell a specified currency in the present for settlement at a future date.

Ploughing Back of Profits

Exam Focus...	
May - 2007	2 Marks
Nov. - 2009	1.5 Marks

Long term funds may also be provided by accumulating the profits of the company and by ploughing them back into business.

Such funds belong to the ordinary shareholders and increase the net worth of the company. A public limited company must plough back a reasonable amount of its profits each year keeping in view the legal requirements in this regard and its own expansion plans. Such funds also entail almost no risk. Further, control of present owners is also not diluted by retaining profits.

Different Types of Packing Credit

Exam Focus...	
Dec. - 2021	2 Marks

Packing credit may be of the following types:

(i) ***Clean Packing credit:*** This is an advance made available to an exporter only on production of a firm export order or a letter of credit without exercising any charge or control over raw material or finished goods. It is a clean type of export advance. Each proposal is weighted according to particular requirements of the trade and credit worthiness of the exporter. A suitable margin has to be maintained. Also, Export Credit Guarantee Corporation (ECGC) cover should be obtained by the bank.

(ii) ***Packing credit against hypothecation of goods:*** Export finance is made available on certain terms and conditions where the exporter has pledgeable interest and the goods are hypothecated to the bank as security with stipulated margin. At the time of utilising the advance, the exporter is required to submit alongwith the firm export order or letter of credit, relative stock statements and thereafter continue submitting them every fortnight and whenever there is any movement in stocks.

(iii) ***Packing credit against pledge of goods:*** Export finance is made available on certain terms and conditions where the exportable finished goods are pledged to the banks with approved clearing agents who will ship the same from time to time as required by the exporter. The possession of the goods so pledged lies with the bank and is kept under its lock and key.

(iv) ***E.C.G.C. guarantee:*** Any loan given to an exporter for the manufacture, processing, purchasing, or packing of goods meant for export against a firm order qualifies for the packing credit guarantee issued by Export Credit Guarantee Corporation.

(v) ***Forward exchange contract:*** Another requirement of packing credit facility is that if the export bill is to be drawn in a foreign currency, the exporter should enter into a forward exchange contact with the bank, thereby avoiding risk involved in a possible change in the rate of exchange.

(Note: Students may answer any four of the above packing credits).

Contemporary Sources of Funding

(i) Crowd funding: In simple terms, crowdfunding means raising money for an individual or organisation from a group of people to fund a project, typically via internet **(social media and crowdfunding websites).** It generally involves collecting funds from family, friends, strangers, corporates and many more in exchange of equity **(known as Equity funding),** loans **(known as P2P lending)** or nothing at all

(i.e. donation). This source of funding also helps start-up to substantiate demand for their product before entering into production. In the crowdfunding process, three parties are involved i.e. fund raiser, mediator and fund investor. The platforms (mediator) may also charge certain fees in the form of processing fee, transaction fee, etc. either as a fixed amount or a percentage or in combination of both.

(ii) Equity funding: Equity crowdfunding is a mechanism where investor invests money in an organisation and receive securities of that organisation in return. Every investor would be entitled to a stake in the organisation depending on their investment. The digital nature of crowdfunding targets large number of investors with small contributions. This type of funding is mostly adopted by startups. Some of the platforms offering equity crowdfunding are Start Engine, Equity Net, Seed Invest, etc.

(iii) Peer-to-Peer (P2P) lending: It is that category of crowdfunding where lenders match with the borrowers in order to provide unsecured loans through online platform. The fund raised are paid back by the borrowers with interest, though this kind of lending involves certain risk of defaults (just as the banks bear in the case of conventional method of lending). Anyone interested in investing money under P2P lending can visit the P2P lending platforms and choose amongst borrowers considering risk & returns. Some of the platforms offering P2P lending are i2i Funding, Lendbox, Faircent, Rupee Circle, etc.

(iv) Start-up funding: A start-up company being newly formed needs fund before starting any project. However, as a start-up, it is difficult to manage loans from bank, leaving crowdfunding as one of the sources of finance. Through crowdfunding, a start-up company can raise money from large group of people. The crowdfunding may be in the form of equity funding, P2P lending or both.

(v) Donation-based Crowdfunding: It is a source of finance where large group of people donate money as a charity for some cause with no expectation of any ownership or debt. Some of the platforms that are used for donation based crowdfunding are GoFundMe (used for donations against medical needs, education, etc.), Ketto (used for donation against medical needs), Fuel A Dream (used for donation against charity projects, new ideas), etc.

Yankee Bond

- Yankee Bonds are denominated in dollars.
- These bonds are issued by non-US banks and non-US corporations in USA.
- They are registered in Securities and Exchange Commission (SEC).
- Yankee Bonds are issued in tranches.
- Time taken can be up to 14 weeks.
- Interest rate applied is Dollar LIBOR (London Interbank Offered Rate).

"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

– Alvin Toffler

CHAPTER THREE

Time Value of Money

Learning Objectives

After studying this chapter, you should be able to

- Understand the concept of time value of money.
- Understand the relationship between the present and future value of money and how interest rate is used to adjust the value of cash flows in-order to arrive at present (discounting) or future (compounding) values.
- Understand how to calculate the present or future value of an annuity.
- Know how to use interest factor table's in order to calculate the present or future values.

Chapter Outline

- Introduction
- Annuities
- Future Value of Annuity (Regular or Ordinary Annuity)
- Future Value of Annuity (Due)
- Present Value of Annuity (Regular or Ordinary Annuity)
- Future and Present Value of Uneven Cash Flows
- Loan Amortization
- Finding Interest or Growth Rates
- Relevance of Time Value of Money in Financial Decisions
- Single-payment loan repayment
- Present value calculation Without
- Time value and discount rates
- Cash flow investment decision
- Future value of an annuity
- Present value of an annuity
- Calculating the number of periods
- Perpetuities
- Value of a mixed stream
- Value of mixed streams
- Funding budget shortfalls
- Changing compounding frequency
- Compounding frequency, time value, and effective annual rates
- Continuous compounding
- Rate of return
- Rate of return and investment choice Clare
- Rate of return: Annuity

Your work is to discover your work and then with all your heart to give yourself to it.

– Gauthama Buddha

Introduction

The first basic principle of finance is that a rupee today is worth more than a rupee tomorrow, because the rupee today can be invested to start earning interest immediately. Financial managers refer to this as the time value of money. **Time Value of Money (TVM)** is an individual's preference for possession of a given amount of money *now,* rather than the same amount at some future time.

Time value of money means that worth of a rupee received today is different from the worth of a rupee to be received in future.

Time value of money means that worth of a rupee received today is different from the worth of a rupee to be received in future. The preference of money now as compared to future money is known as time preference for money.

A rupee today is more valuable than rupee after a year due to several reasons:

- **Risk:** There is uncertainty about the receipt of money in future.
- **Preference for present consumption:** Most of the persons and companies in general, prefer current consumption over future consumption.
- **Inflation:** In an inflationary period a rupee today represents a greater real purchasing power than a rupee a year hence.
- **Investment opportunities:** Most of the persons and companies have a preference for present money because of availabilities of opportunities of investment for earning additional cash flow.

Many financial problems involve cash flow accruing at different points of time for evaluating such cash flow an explicit consideration of time value of money is required.

Example 1: If you are offered the choice between having ₹ 10,000 today and having ₹ 10,000 at a future date, you will usually prefer to have ₹ 10,000 now. Similarly, if the choice is between paying ₹ 10,000 now or paying the same ₹ 10,000 at a future date, you will usually prefer to pay ₹ 10,000 later. It is simple common sense. In the first case by accepting ₹ 10,000 early, you can simply put the money in the bank and earn some interest. Similarly in the second case by deferring the payment, you can earn interest by keeping the money in the bank.

Simple Interest

It may be defined as Interest that is calculated as a simple percentage of the original principal amount.

SI = P0 (i) (n)

Formula to calculate the simple interest:

$$SI = P0\ (i)\ (n)$$

Where,

SI = simple interest in rupees

P0 = original principal

i = interest rate per time period (in decimals)

n = number of time periods

FVn = P0+ SI = P0 + P0(i) (n)

If we add principal to the interest, we will get the total Future Value (FV). (Future vale is also known as Terminal Value (TV)). For any simple interest rate, the future value of an account at the end of n period is:-

$$FVn = P0 + SI = P0 + P0(i)\ (n)$$

Example 2: A person lends ₹ 10,000 to a corporation by purchasing a bond from the corporation. Simple interest is computed quarterly at the rate of 3 per cent per quarter, and a cheque for the interest is mailed each quarter to all bondholders. The bonds expire at the end of 5 years and the final cheque includes the original principal plus interest earned during the last quarter. Compute the interest earned each quarter and the total interest which will be earned over the 5-year life of the bonds.

Answer:

In this problem, principal = ₹ 10,000, interest = 3 per cent per quarter and the period of loan is 5 years. Since the time period for interest is a quarter of a year, we must consider 5 years as 20 quarters. And since we are interested in the amount of interest earned over one quarter, the period is 1 quarter. Therefore, quarterly interest equals ₹ 10,000 × 0.03 × 1 = ₹ 300

To compute total interest over the 5-year period, we multiply the per-quarter interest of ₹ 300 by the number of quarters 20, to obtain

Total interest = ₹ 300 × 20 = ₹ 6,000

Compound Interest

Compound Interest occurs when interest earned during the previous period itself earns interest in the next and subsequent periods.

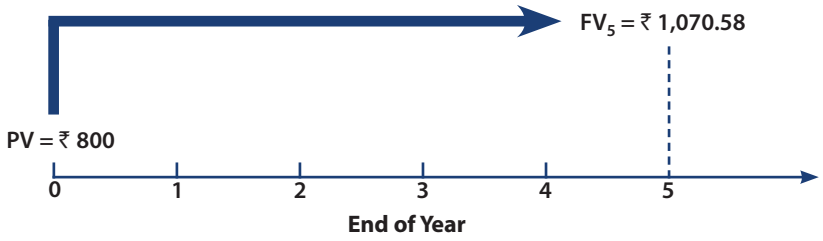
Compounding

Example 3: Ananya places ₹ 800 in a savings account paying 6% interest compounded annually. She wants to know how much money will be in the account at the end of 5 years.

Answer:

Future Value = ₹ 800 x $(1 + 0.06)^5$ = ₹ 800 x (1.33823) = ₹ 1,070.58

Timeline for the above solution



Future Value

$FV_n = P_0 (1 + i)^n$

The amount to which a cash flow or series of cash flows will grow over a given period of time when compounded at a given interest rate.

The future value of ₹ 1000 invested at 6% compounded annually for 2 years is ₹ 1123.60. The future value includes the original principal and the accumulated interest.

Future Value (FV): The amount to which a cash flow or series of cash flows will grow over a given period of time when compounded at a given interest rate.

Typical conversion periods are given below:

Conversion	Period Description
1 day	Compounded daily
1 month	Compounded monthly
3 months	Compounded quarterly
6 months	Compounded semiannually
12 months	Compounded annually

Thus, the accrued amount FVn on a principal P after n payment periods at i (in decimal) rate of interest per payment period is given by:

$$FV_n = P_0 (1 + i)^n$$

$FV_n = P_0 \left(1 + \frac{r}{k}\right)^n$

Where,

$$i = \frac{\text{Annual rate of interest}}{\text{Number of payment periods per year}} = \frac{r}{k}$$

So, $$FV_n = P_0 \left(1 + \frac{r}{k}\right)^n,$$

When compounding is done k times a year at an annual interest rate r. Or

$$FV_n = P_0(FVIF_{i,n})$$

Where $FVIF_{i,n}$ is the future value interest factor at i% for n periods equal $(1 + i)^n$.

Example 4: ₹ 2,000 is invested at annual rate of interest of 10%. What is the amount after 2 years if the compounding is done:

(a) Annually? (b) Semi annually? (c) Monthly? (d) Daily?

Answer:

(a) The annual compounding is given by:

$FV_2 = P(1 + i)^n$, n being 2, i being $\frac{10}{100} = 0.1$ and P being 2,000

$= 2,000\ (1.1)_2 = 2,000 \times 1.21 =$ ₹ 2,420

(b) For Semiannual compounding, $n = 2 \times 2 = 4$, $i = \frac{0.1}{2} = 0.05$

$FV_4 = 2,000(1 + 0.05)^4 = 2,000 \times 1.2155 =$ ₹ 2,431

(c) For monthly compounding, n $12 \times 2 = 24$, $i = \frac{0.1}{12} = 0.00833$

$FV_{24} = 2,000(1.00833)^{24} = 2,000 \times 1.22029 =$ ₹ 2440.58

(d) For daily compounding, $n = 365 \times 2 = 730$, $i = \frac{0.1}{365} = 0.00027$

$FV_{730} = 2,000(1.00027)^{730} = 2,000 \times 1.21783 =$ ₹ 2435.6668

Effective Rate of Interest

The Effective interest rate, Annual Equivalent rate (AER) or simply Effective rate is the interest rate on a loan or financial product restated from the nominal interest rate as an interest rate with annual compound interest payable in arrears.

It is used to compare the yearly interest between loans with different compounding periods like week, month, year, etc.

It is the actual equivalent annual rate of interest at which an investment grows in value when interest is credited more often than once a year. If interest is paid *m* times in a year, it can be found by calculating:

$$E_i = \left(1 + \frac{i}{m}\right)^m - 1$$

Where,

e = the effective annual rate,

i = the nominal rate and

m = the number of compounding periods per year (for example, 12 for monthly compounding)

Example 5: If the interest is 10% payable quarterly, find the effective rate of interest.

Answer:

$$E = \left(1 + \frac{0.1}{4}\right)^4 - 1 = 0.1038 \text{ or } 10.38\%$$

Effective Rate of Interest and Conversion Periods

Example 6: Mr. Roopak Jaiswal wishes to find the effective annual rate associated with an 8% nominal annual rate (r = 0.08) when interest is compounded (1) annually, (2) semi-annually, and (3) quarterly.

Answer:

1. **For annual compounding:**
   EAR = $(1 + 0.08/1)^1 - 1 = (1 + 0.08)1 - 1 = 1 + 0.08 - 1 = 0.08 = 8\%$
2. **For semi-annual compounding:**
   EAR = $(1 + 0.08/2)^2 - 1 = (1 + 0.04)2 - 1 = 1.0816 - 1 = 0.0816 = 8.16\%$
3. **For quarterly compounding:**
   EAR = $(1 + 0.08/4)^4 - 1 = (1 + 0.02)4 - 1 = 1.0824 - 1 = 0.0824 = 8.24\%$

Present Value (PV)

Present Value (PV): The value today of a future cash flow or series of cash flows.

Exam Focus...

May - 2015	2 Marks

The value today of a future cash flow or series of cash flows is called present value (PV).

It can also be defined as the amount to be invested today (Present Value) at a given rate over specified period to equal the "Future Amount".

If we reverse the flow by saying that we expect a fixed amount after 'n' number of years, and we also know the current prevailing interest rate, then by discounting the future amount, at the given interest rate, we will get the present value of investment to be made.

Discounting

Discounting: The process of finding the present value of a cash flow or a series of cash flows; discounting is the reverse of compounding.

The present value of a sum of money to be received at a future date is determined by discounting the future value at the interest rate that the money could earn over the period. This process is known as **Discounting**.

Since finding present value is simply the reverse of finding Future Value (FV), the formula for Future Value (FV) can be readily transformed into a Present Value formula. Therefore the P_0, the Present Value becomes:

$$P_0 = \frac{FV_n}{(1+i)_n} \quad \text{Or} \quad P_0 = FV_n(1+i)^{-n}$$

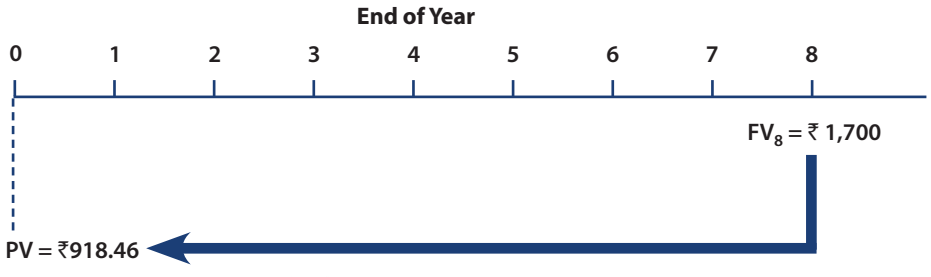
Where, FV_n = Future value n years hence
i = Rate of interest per annum
n = Number of years for which discounting is done

Discounting

Example 7: Champions wishe to find the present value of ₹ 1,700 that she will receive 8 years from now. Champions opportunity cost is 8%.

Answer:

Present Value = ₹ 1,700/$(1 + 0.08)^8$ = ₹ 1,700/1.85093 = ₹ 918.46



Example 8: Mr. X has made real estate investment for ₹ 12,000 which he expects will have a maturity value equivalent to interest at 12% compounded monthly for 5 years. If most savings institutions currently pay 8% compounded quarterly on a 5 year term, what is the least amount for which Mr. X should sell his property?

Given that $(1 + i)^n = 1.81669670$ for i = 1% and n = 60 and that $(1 + i)^{-n} = 0.67297133$ for i = 2% and n = 20

Answer:

It is a two-part problem. First being determination of maturity value of the investment of ₹ 12,000 and then finding of present value of the obtained maturity value. Maturity value of the investment may be found from $FV_n = P(1 + i)^n$

Where $P = 12{,}000,\ i = \frac{12}{12} = 1\%,\ n = 5 \times 12 = 60$

Now, $FV_n = 12{,}000\ (1 + 1\%)^{60} = 12{,}000 \times 1.81669670$

$= 21{,}800.36040000 = ₹\ 21{,}800.36$

Thus, maturity value of the investment in real estate = ₹ 21,800.36

The present value, P of the amount FV_n due at the end of n interest periods at the rate of i% interest per period is given by $P = FV_n\ (1 + i)^{-n}$

We have in the present case, $FV_n = ₹\ 21{,}800.36,\ i = \frac{8}{4} = 2\%,\ n = 5 \times 4 = 20$

Thus, $P = 21{,}800.36\ (1 + 2\%)^{-20}$

$= 21{,}800.36 \times 0.67297133 = ₹\ 14{,}671.02$

Mr. X should not sell the property for less than ₹ 14,671.02

Annuities

Annuity: A series of payments of an equal amount at fixed intervals for a specified number of periods.

An **annuity** is a series of equal payments made at equal time intervals, with compounding or discounting taking place at the time of each payment. Each annuity payment is called a **rent**. There are several types of annuities, out of which, in an ordinary annuity each rent is paid or received at the **end** of each period. There are as many rents as there are periods. Installment purchases, long-term bonds, pension plans, and capital budgeting all involve annuities.

Future Value of Annuity

FVA_n: The future value of an annuity over n periods.

Expressed algebraically, FVA_n is defined as future (compound) value of an annuity, R the periodic receipt (or payment), and n the length of the annuity, the formula for FVA_n is:-

$$FVA_n = R(1 + i)^{n-1} + R(1 + i)^{n-2} + \ldots + R(1 + i)^1 + R(1 + i)^0$$

As we can see, FVA_n is simply equal to the periodic receipt (R) times the "sum of the future value interest factors at 1 percent for time periods 0 to n – 1.

As a shortcut, if R be the periodic payments, the amount FVA_n of the annuity is given by:

$$FVA_n = \frac{R\ (1 + i)^n - 1}{i}$$

Or $FVA_n = R(FVIFA_{i,\ n})$

Where $FVIFA_{i,\ n}$ stands for the future interest factor of an annuity at i% for n periods

If you open a savings account that compounds interest each month, and at the end of each month you deposit ₹ 100 in the savings account, your deposits are the rents of an annuity. After 1 year, you will have 12 deposits of ₹ 100 each, and a total of ₹ 1200, but the account will have more than ₹ 1200 in it because each deposit earns interest.

If the interest rate is 6 per cent a year, compounded monthly, your balance is ₹ 1233.56. The future value of an annuity or amount of annuity is the sum accumulated in the future from all the rents paid and the interest earned by the rents.

Example 9: A person is required to pay four equal annual payments of ₹ 5,000 each in his deposit account that pays 8% interest per year. Find out the future value of annuity at the end of 4 years.

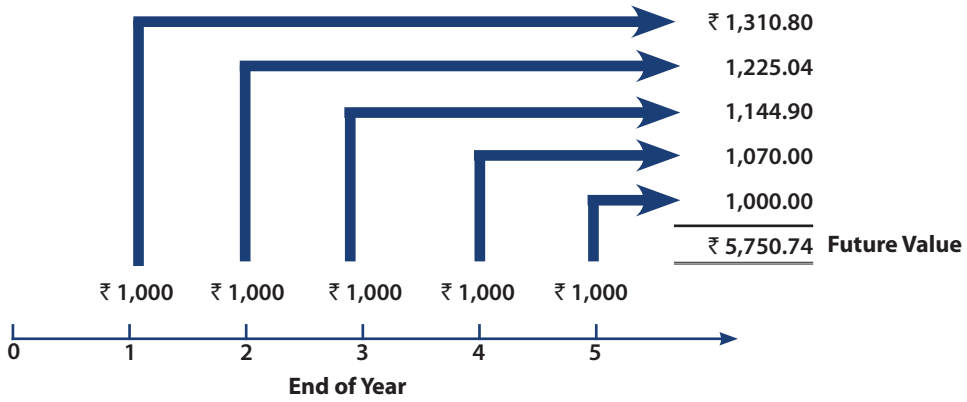
Answer:

$$FVA = R\left(\frac{(1+i)^n - 1}{i}\right) = ₹\ 5,000\ (4.507) = ₹\ 22,535$$

Future Value of Annuity (Regular or Ordinary Annuity)

Example 10: Franak Kapadia wishes to determine how much money she will have at the end of 5 years if she chooses annuity A, the ordinary annuity. She will deposit ₹ 1,000 annually, at the end of each of the next 5 years, into a savings account paying 7% annual interest.

Answer:



Or, Future Value = ₹ 1,000 x $\{[(1 + 0.07)^5 - 1]/0.07\}$ = ₹ 5,750.74

Future Value of Annuity (Due)

Example 11: Future values of annuities Prathama Trivedi wishes to choose the better of two equally costly cash flow streams: annuity X and annuity Y.

- X is an annuity due with a cash inflow of ₹ 9,000 for each of 6 years.
- Y is an ordinary annuity with a cash inflow of ₹ 10,000 for each of 6 years.

Assume that Prathama can earn 15% on his investments.

Required:

i. On a purely subjective basis, which annuity do you think is more attractive? Why?
ii. Find the future value at the end of year 6 for both annuities.
iii. Use your finding in part b to indicate which annuity is more attractive. Why? Compare your finding to your subjective response in part a.

Answer:

i. On the surface, annuity Y looks more attractive than annuity X because it provides ₹ 1,000 more each year than does annuity X. Of course, X being an annuity due means that the ₹ 9,000 would be received at the beginning of each year, unlike the ₹ 10,000 at the end of each year, and this fact makes annuity X more appealing than it otherwise would be.

ii.

Annuity X:

Future Value = ₹ 9,000 x 5 $\{[(1 + 0.15)^6 - 1]/0.15\}$ x (1 + 0.15)
= ₹ 9,000 x 8.754 x 1.15 = ₹ 90,603.90

Annuity Y:

Future Value = ₹ 10,000 x 5 {[(1 + 0.15)^6 – 1]/0.15}

= ₹ 10,000 x 8.754 = ₹ 87,540.00

iii. The subjective assessment in part a was incorrect. The benefit of receiving annuity X's cash inflows at the beginning of each year appears to have outweighed the fact that annuity Y's annual cash inflow, which occurs at the end of each year, is ₹ 1,000 larger (₹ 10,000 vs. ₹ 9,000) than annuity X's.

Present Value of Annuity

Sometimes instead of a single cash flow the cash flows of the same amount is received for a number of years. The present value of an annuity may be expressed as follows:

$$PVA_n = \frac{R}{(1+i)^1} + \frac{R}{(1+i)^2} + \ldots + \frac{R}{(1+i)^{n-1}} + \frac{R}{(1+i)^n}$$

$$= R\left(\frac{1}{(1+i)^1} + \frac{1}{(1+i)^2} + \ldots + \frac{1}{(1+i)^{n-1}} + \frac{1}{(1+i)^n}\right)$$

$$= R\,(PVIF_{i,1} + PVIF_{i,2} + PVIF_{i,3} + \ldots + PVIF_{i,n})$$

$$= R\,(PVIF_{i,n})$$

Where,

PVA_n = Present value of annuity which has duration of n years

R = Constant periodic flow

i = Discount rate and

N = Present value interest factor of an (ordinary) annuity at i percent for n periods

Example 12: Mr. Z plans to receive an annuity of ₹ 5,000 semi-annually for 10 years after he retires in 18 years. Money is worth 9% compounded semi-annually.

(a) How much amount is required to finance the annuity?

(b) What amount of single deposit made now would provide the funds for the annuity?

(c) How much will Mr. Z receive from the annuity?

Answer:

(a) Let us first find the required present value for the 10 years annuity by using

PVA = R[PVIF(i, n)]

= 5,000 [PVIF(4.5%, 20)]

= 5,000 × 13.00793654 = ₹ 65,039.68

Since, $PVIF\,(4.5\%, 20) = \frac{(1+4.5\%)^{20} - 1}{.045(1+4.5\%)^{20}}$

$= \frac{2.41171402 - 1}{0.10852713} = 13.00793654$

(b) We require the amount of single deposit that matures to ₹ 65,039.68 in 18 years at 9% compounded semi-annually. We use the following formula:-

$P_0 = FV_n\,(1+i)^{-n}$

Where $FV_n = 65{,}039.68,\ n = 18 \times 2 = 36,\ i = \frac{9}{2} = 4\frac{1}{2}\%,\ P_0 = ?$

Thus, $P_0 = 65{,}039.68\left(1 + 4\frac{1}{2}\%\right)^{-36}$

= 65,039.68 × 0.20502817 = ₹ 13,334.97

(c) Required Amount = ₹ 5,000 x 20 = ₹ 1,00,000

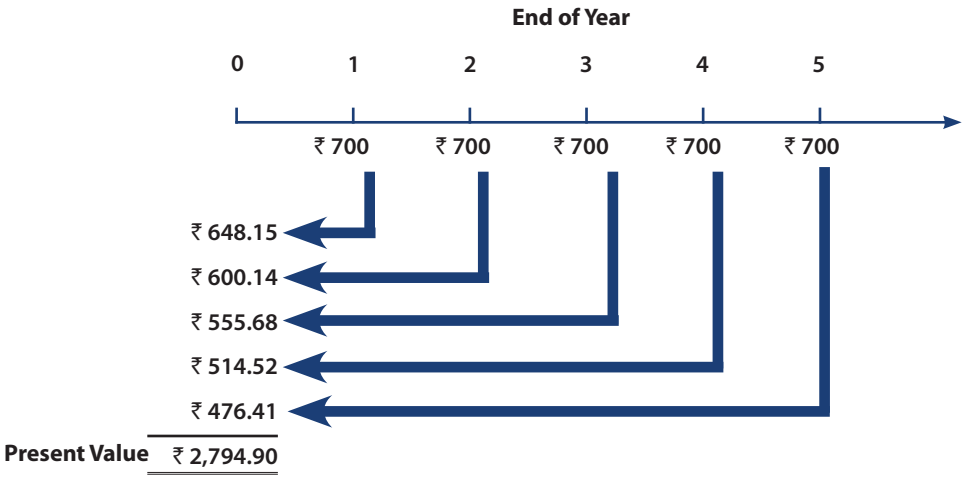
Present Value of Annuity (Regular or Ordinary Annuity)

Example 13: CNP Ltd., a publisher of books, wants to determine the most it should pay to purchase a particular ordinary annuity. The annuity consists of cash flows of ₹ 700 at the end of each year for 5 years. The firm requires the annuity to provide a minimum return of 8%.

Answer:

$$\text{Present Value of the Annuity} = A\left[\frac{(1+i)^n - 1}{i \times (1+i)^n}\right] = ₹\ 700\left[\frac{(1+.08)^5 - 1}{.08 \times (1+.08)^5}\right] = ₹\ 2794.90$$

Or, Present Value of the Annuity $= A \times PVAF_{(n,i)}$



Example 14: FMSM Ltd., a publisher of books, wants to determine the most it should pay to purchase a particular ordinary annuity. The annuity consists of cash flows of ₹ 700 at the start of each year for 5 years. The firm requires the annuity to provide a minimum return of 8%.

Answer:

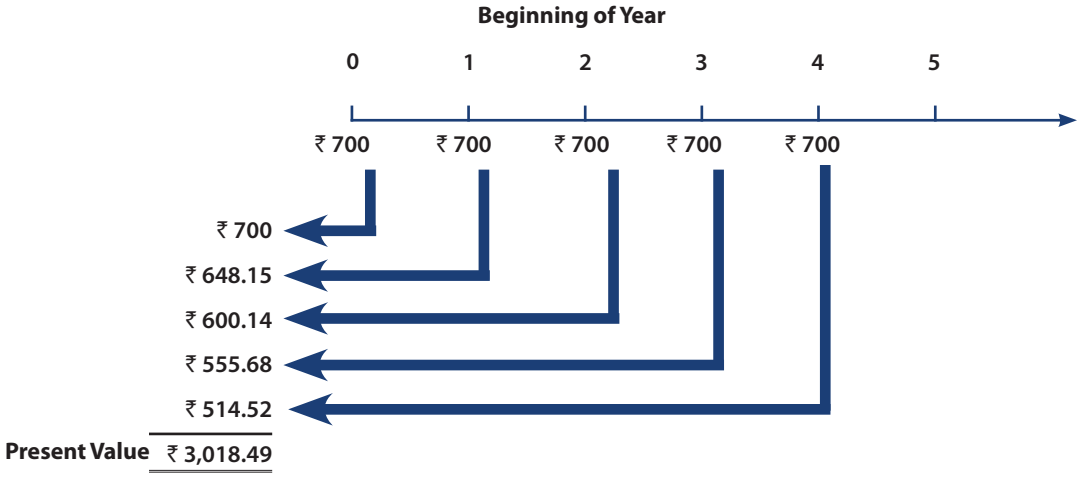
Present Value of the Annuity $= A\,(1 + PVAF(n,i-1))$

Present Value of the Annuity $= A\,[1 + (1+i)^{n-1} - 1/i \times (1+i)^{n-1}]$

Present Value of the Annuity $= ₹\ 700\,[1 + (1+.08)^{5-1} - 1/.08 \times (1+.08)^{5-1}]$

$= ₹\ 700\,[1 + (1+.08)^{4-1}/.08 \times (1+.08)^4]$

$= ₹\ 3018.49$



Perpetuity

Exam Focus...

May - 2015	2 Marks

Perpetuity is an annuity in which the periodic payments or receipts begin on a fixed date and continue indefinitely or perpetually.

Perpetuity is an annuity in which the periodic payments or receipts begin on a fixed date and continue indefinitely or perpetually.

Fixed coupon payments on permanently invested (irredeemable) sums of money are prime examples of perpetuities.

The formula for evaluating perpetuity is relatively straight forward. Two points which are important to understand in this regard are:

(a) The value of the perpetuity is finite because receipts that are anticipated far in the future have extremely low present value (today's value of the future cash flows).

(b) Additionally, because the principal is never repaid, there is no present value for the principal.

Therefore the price of perpetuity is simply the coupon amount over the appropriate discount rate or yield.

Calculation of Multi Period Perpetuity

The formula for determining the present value of multi-period perpetuity is as follows:

$$PVA_{\infty} = \frac{R}{(1+i)^1} + \frac{R}{(1+i)^2} + \frac{R}{(1+i)^3} + \ldots + \frac{R}{(1+i)^{\infty}} = \sum_{n=1}^{\infty} \frac{R}{(1+i)^n} = \frac{R}{i}$$

Calculation of Growing Perpetuity

A stream of cash flows that grows at a constant rate forever is known as growing perpetuity.

The formula for determining the present value of growing perpetuity is as follows:

$$PVA = \frac{R}{(1+i)^1} + \frac{R(1+g)}{(1+i)^2} + \frac{R(1+g)^2}{(1+i)^3} + \ldots + \frac{R(1+g)^{\infty}}{(1+i)^{\infty}} = \sum_{n=1}^{\infty} \frac{R(1+g)^{n-1}}{(i+i)^n} = \frac{R}{i-g}$$

Example 15: I wish to fund my first school with a sum of ₹ 200,000 per year to support the education of needy, poor and under privileged boys and girls, and the funding would earn 10% per year. How much fund I must give my first school to fund education of needy, poor and under privileged boys and girls?

Answer:

We must determine the present value of a ₹ 200,000 perpetuity discounted at 10%.

Present Value of (perpetuity) = ₹ 200,000/0.10 = ₹ 2,000,000

Sinking Fund

Sinking fund is a fund, which is created out of fixed payments each period to accumulate to a future sum after a specified period.

Sinking fund is a fund, which is created out of fixed payments each period to accumulate to a future sum after a specified period. For example, companies generally create sinking funds to retire bonds (debentures) on maturity.

It is the fund created for a specified purpose by way of sequence of periodic payments over a time period at a specified interest rate. Size of the sinking fund deposit is computed from FVA = R[FVIFA(i, n)], where FVA is the amount to be saved, R, the periodic payment, n, the payment period.

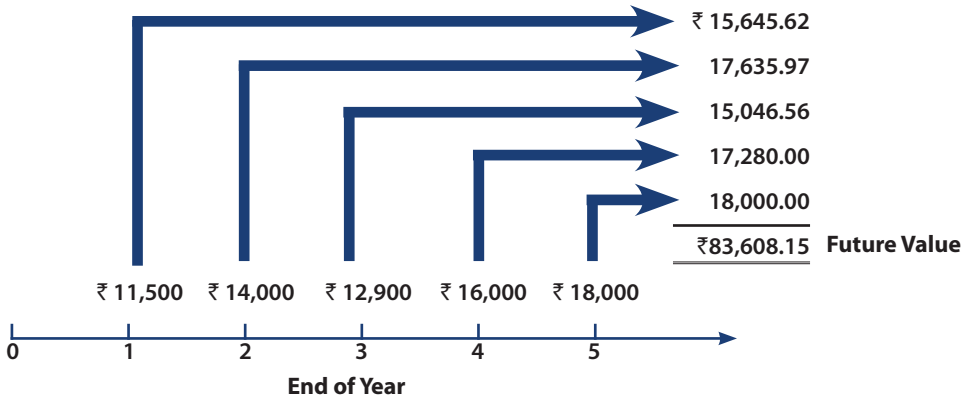
Future and Present Value of Uneven Cash Flows

Example 16: OTC Industries, a cabinet manufacturer, expects to receive the following mixed stream of cash flows over the next 5 years from one of its small customers.

End of year	Cash flow
1	₹ 11,500
2	₹ 14,000
3	₹ 12,900
4	₹ 16,000
5	₹ 18,000

If OTC expects to earn 8% on its investments, how much will it accumulate by the end of year 5 if it immediately invests these cash flows when they are received?

Answer:

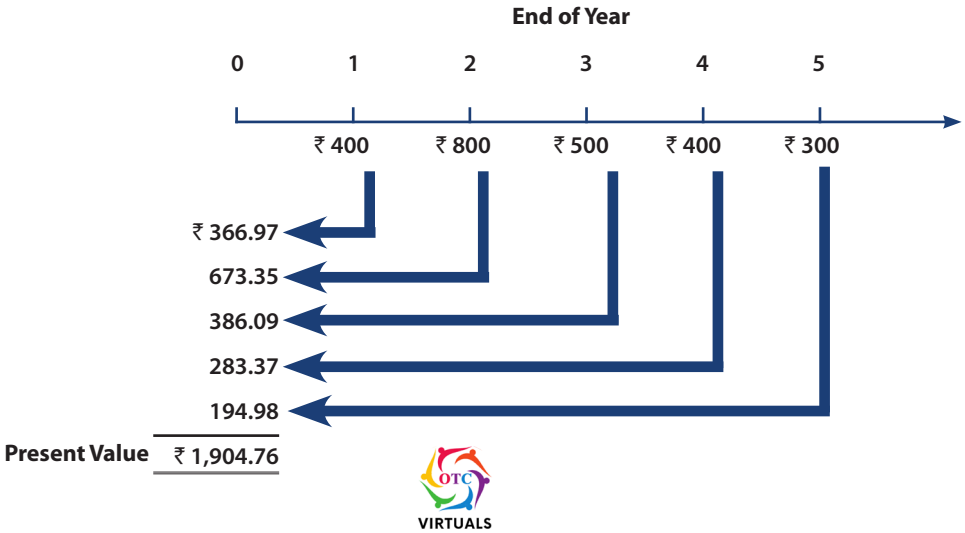


Example 17: CNP Ltd., a publisher of books, has been offered an opportunity to receive the following mixed stream of cash flows over the next 5 years.

End of year	Cash flow
1	₹ 400
2	₹ 800
3	₹ 500
4	₹ 400
5	₹ 300

If the firm must earn at least 9% on its investments, what is the most it should pay for this opportunity?

Answer:



Loan Amortization

The term loan amortization refers to the **determination of equal periodic loan payments.** These payments provide a lender with a specified interest return and repay the loan principal over a specified period. The **loan amortization process** involves finding the **future payments, over the term of the loan, whose present value at the loan interest rate equals the amount of initial principal borrowed.** Lenders use a loan amortization schedule to determine these payment amounts and the allocation of each payment to interest and principal.

Loan amortization schedule: A schedule of equal payments to repay a loan. It shows the allocation of each loan payment to interest and principal.

Equation

$$CF = (PV \times r) \div \left[1 - \frac{1}{(1+r)^n}\right]$$

Example 18: Determine the equal annual end-of year payments necessary to amortize fully a ₹ 6,000, 10% loan over 4 years.

Answer:

By using the formula:

$$CF = (PV \times r) \div \left[1 - \frac{1}{(1+r)^n}\right]$$

Loan Amortization Schedule (₹ 6000 Principal, 10% interest, 4 - Year Payment Period

			Payment		
End of year	**Beginning of year principal**	**Loan payment**	**Interest [0.10 × (1)]**	**Principal [(2) – (3)]**	**End of year Principal [(1) – (4)]**
	(1)	(2)	(3)	(4)	(5)
1	6,000.00	1892.82	600.00	1292.82	4707.18
2	4707.18	1892.82	470.72	1422.10	3285.08
3	3285.08	1892.82	328.51	1564.31	1720.77
4	1720.77	1892.82	172.08	1720.74	_____

"I never learned from a man who agreed with me."

– Robert A. Heinlein

"Education is the most powerful weapon which you can use to change the world."

– Nelson Mandela

Finding Interest or Growth Rates

It is often necessary to **calculate the compound annual interest or growth rate** (that is, the annual rate of change in values) of a series of cash flows. Examples include finding the **interest rate on a loan, the rate of growth in sales, and the rate of growth in earnings.**

Equation

$$r = \left(\frac{FV_n}{PV}\right)^{1/n} - 1$$

Example 19: Vijay purchased an investment 4 years ago for ₹1,250. Now it is worth ₹1,520. What compound annual rate of return has Vijay earned on this investment?

Answer:

Rate of Return (r) = (₹1,520/₹1,250)1/4 – 1 = 0.0501 = 5.01%

Relevance of Time Value of Money in Financial Decisions

Exam Focus...

May - 2005	2 Marks
May - 2008	2 Marks
Nov. - 2014	4 Marks

Time value of money means "The worth of a rupee received today is different from the worth of a rupee to be received in future". This preference for money now, as compared to future money, is known as time preference of money.

Reasons for time preference of money:

- **Risk:** There is uncertainty about the receipt of money in future. Hence, present money is preferred.
- **Preference for present consumption:** Most persons / companies have preference for present consumption than future consumption e.g. due to urgency of need (say, consumer durable) or otherwise.
- **Investment opportunities:** Present Money is preferred due to availability of investment opportunities for earning additional cash flows. For example, ₹ 1,000 available now can earn interest at the bank rate.

Methods of analysis: The concept of time value of money helps in arriving at the comparable value of the different rupee amount arising at different points of time into equivalent values of a particular point of time (Present or future). This can be done by using anyone of the following two ways:

(i) By compounding the present money to a future date i.e. **by finding out future value** of the present money.

(ii) By discounting the future money to the present date i.e. **by finding out present value** (PV) of future money.

"You can teach a student a lesson for a day; but if you can teach him to learn by creating curiosity, he will continue the learning process as long as he lives."

– Clay P. Bedford

Problems and Solutions

Problem 1: A person is required to pay four equal annual payments of ₹ 4,000 each in his Deposit account that pays 10% interest per annum. Find out the future value of annuity at the end of 4th years. **[May-2007]**

Solution: Here,

Amount (A) = ₹ 4,000
Rate of Interest (r) = 10%
Time (t) = 4 Years
Installment per year (a) = 1 times
Future Value of annuity (FVA) = ?
By formula,

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

Where, $i = \frac{r}{100} = \frac{10}{100} = 0.1$

$n = t \times a = 4 \times 1 = 4$

Now,

$$FVA = 4000\left[\frac{(1+0.1)^4 - 1}{0.1}\right] = ₹\ 4,000 \times 4.641 = ₹\ 18,564$$

∴ The future value of annuity at the end of the 4th year is ₹ 18,564.

Problem 2: A company offers a Fixed deposit scheme whereby ₹ 10,000 matures to ₹ 12,625 after 2 years, on a half-yearly compounding basis. If the company wishes to amend the scheme by compounding interest every quarter, what will be the revised maturity value? **[Nov-2008]**

Solution: Here,

Principal (P) = ₹ 10,000
Future Value (FV) = ₹ 12,625
Time (t) = 2 years
Rate (r) = ? Compounded half Yearly
No. of periods for which compounding done (n) = 2 × 2 = 4 times
By Formula,

Future value (FV) = $P(1 + r)^n$

$12,625 = 10,000(1 + r)^4$

By solving through interpolation,

r = 12%

Now, if the company goes for quarterly compounding the maturity value will,

Quarterly rate = 12% ÷ 4 = 3%

Revised Maturity value = ₹ $10,000(1 + 3\%)^{2\times4}$ = ₹ $10,000(1.03)^8$ = ₹ 12,668

Thus, the revised maturity value of ₹ 10,000 compounded quarterly at the rate of 12% p.a. is ₹ 12,668.

Problem 3: Ascertain the compound value and compound interest of an amount of ₹ 75,000 at 8 percent compounded semiannually for 5 years. **[May-2010]**

Solution

Note: It is assumed that 8% is the per annum rate.

Compound Value = Present Value × $(1 + r)^n$ = 75,000 × $(1.04)^{10}$
= 75,000 × 1.480 = 1,11,000

Compound Interest = 1,11,000 – 75,000 = 36,000

(Compound Semiannually) = 8% ÷ 2 or $8\% \times \frac{6}{12} = 4\%$

Problem 4: X has invested ₹ 240000 at annual rate of interest of 10 percent. What is the amount after 3 years if the compounding is done?

(i) Annually

(ii) Semi-annually. **[Nov. 2012]**

Solution: Computation of Future Value

Principal (P) = ₹ 240000

Rate of Interest (I) = 10% p.a.

Time period (n) = 3 years

Amount if compounding is done:

(i) Annually

Future Value = $P(1+I)_n = 240000\ (1 + (1+10/100)_3 = 240000\ (1+0.1)_3 = 240000 \times 1.331 = ₹\ 319440$

(ii) Semi-Annually

Future Value = $240000\left(1+\frac{10}{100\times 2}\right)^{3\times 2}$

$= 240000\ (1+0.05)_6 = 240{,}000 \text{ x } (1.05)^6 = 240000 \text{ x } 1.3401 = ₹3{,}21{,}624$

Single-payment (loan repayment)

Problem 5: A person borrows ₹ 200 to be repaid in 8 years with 14% annually compounded interest. The loan may be repaid at the end of any earlier year with no prepayment penalty.

a. What amount will be due if the loan is repaid at the end of year 1?

b. What is the repayment at the end of year 4? c. What amount is due at the end of the eighth year?

Present value calculation

Problem 6: Calculate the present value of ₹ 1 in each of the cases shown in the following table.

Case	*Opportunity cost, r*	*Number of periods, n*
A	2%	4
B	10%	2
C	5%	3
D	13%	2

Problem 7: For each of the cases shown in the following table, calculate the present value of the cash flow, discounting at the rate given and assuming that the cash flow is received at the end of the period noted.

Case	*Single cash flow (₹)*	*Discount rate*	*End of period (years)*
A	7,000	12 %	4
B	28,000	8 %	20
C	10,000	14 %	12
D	150,000	11%	6
E	45,000	20 %	8

Problem 8: Answer each of the following questions.

a. What single investment made today, earning 12% annual interest, will be worth ₹ 6,000 at the end of 6 years?

b. What is the present value of ₹ 6,000 to be received at the end of 6 years if the discount rate is 12%?

c. What is the most you would pay today for a promise to repay you ₹ 6,000 at the end of 6 years if your opportunity cost is 12%?

d. Compare, contrast, and discuss your findings in parts a through c.

Time value and discount rates

Problem 9: You just won a lottery that promises to pay you ₹ 10,00,000 exactly 10 years from today. Because the ₹ 10,00,000 payment is guaranteed by the state in which you live, opportunities exist to sell the claim today for an immediate single cash payment.

a. What is the least you will sell your claim for if you can earn the following rates of return on similar-risk investments during the 10-year period?
   (1) 6% (2) 9% (3) 12%

b. Rework part a under the assumption that the ₹ 1,000,000 payment will be received in 15 rather than 10 years.

c. On the basis of your findings in parts a and b, discuss the effect of both the size of the rate of return and the time until receipt of payment on the present value of a future sum.

Cash flow investment decision

Problem 10: Mr. Radiator has an opportunity to purchase any of the investments shown in the following table. The purchase price, the amount of the single cash inflow, and its year of receipt are given for each investment. Which purchase recommendations would you make, assuming that he can earn 10% on his investments?

Investment	*Price (₹)*	*Single cash inflow (₹)*	*Year of receipt*
A	18,000	30,000	4
B	600	3,000	20
C	3,500	10,000	10
D	1,000	15,000	40

Future value of an annuity

Problem 11: For each case in the accompanying table, answer the questions that follow.

Case	*Amount of annuity (₹)*	*Interest rate (%)*	*Deposit period (years)*
A	2,500	8	10
B	500	12	6
C	30,000	20	5
D	11,500	9	8
E	6,000	14	30

a. Calculate the future value of the annuity, assuming that it is
   (1) An ordinary annuity.
   (2) An annuity due.

b. Compare your findings in parts a(1) and a(2). All else being identical, which type of annuity - ordinary or annuity due—is preferable? Explain why.

Present value of an annuity

Problem 12: Consider the following cases.

Case	*Amount of annuity (₹)*	*Interest rate (%)*	*Deposit period (years)*
A	12,000	7	3
B	55,000	12	15
C	700	20	9
D	1,40,000	5	7
E	22,500	10	5

a. Calculate the present value of the annuity, assuming that it is
   (1) An ordinary annuity.
   (2) An annuity due.
b. Compare your findings in parts a(1) and a(2). All else being identical, which type of annuity—ordinary or annuity due—is preferable? Explain why.

Calculating the number of periods

Problem 13: CA Students wants to borrow ₹ 6,00,000 to buy an apartment, and he/she can only afford ₹ 4,000 a month to repay the loan. Suppose the bank charges a fixed interest rate of 4% with monthly compounding. How long will it take to pay off the loan?

Perpetuities

Problem 14: Consider the data in the following table.

Perpetuity	*Annual amount (₹)*	*Discount rate (%)*
A	20,000	8
B	1,00,000	10
C	3,000	6
D	60,000	5

Determine the present value of each perpetuity.

Value of a mixed stream

Problem 15: For each of the mixed streams of cash flows shown in the following table, determine the future value at the end of the final year if deposits are made into an account paying annual interest of 12%, assuming that no withdrawals are made during the period and that the deposits are made

a. At the end of each year.
b. At the beginning of each year.

	Cash Flow Stream (₹)		
Year	*A*	*B*	*C*
1	900	30,000	1,200
2	1,000	25,000	1,200
3	1,200	20,000	1,000
4	-	10,000	1,900
5	-	5,000	-

Value of mixed streams

Problem 16: Find the present value of the streams of cash flows shown in the following table. Assume that the firm's opportunity cost is 12%.

A		*B*		*C*	
Year	***Cash Flow (₹)***	***Year***	***Cash Flow (₹)***	***Year***	***Cash Flow (₹)***
1	2,000	1	10,000	1-5	10,000/ yr
2	3,000	2-5	5,000 / yr	6-10	8,000 / yr
3	4,000	6	7,000		
4	6,000				
5	8,000				

Funding budget shortfalls

Problem 17: As part of your personal budgeting process, you have determined that in each of the next 5 years you will have budget shortfalls. In other words, you will need the amounts shown in the following table at the end of the given year to balance your budget, that is, to make inflows equal outflows. You expect to be able to earn 8% on your investments during the next 5 years and wish to fund the budget shortfalls over the next 5 years with a single amount.

Year	***Budget shortfall (₹)***
1	5,000
2	4,000
3	6,000
4	10,000
5	3,000

a. How large must the single deposit today into an account paying **8%** annual interest be to provide for full coverage of the anticipated budget shortfalls?
b. What effect would an increase in your earnings rate have on the amount calculated in part a? Explain.

Changing compounding frequency

Problem 18: Using annual, semiannual, and quarterly compounding periods for each of the following,
(1) calculate the future value if ₹ 5,000 is deposited initially, and
(2) determine the effective annual rate (EAR).

a. At 12% annual interest for 5 years.
b. At 16% annual interest for 6 years.
c. At 20% annual interest for 10 years.

Compounding frequency, time value, and effective annual rates

Problem 19: For each of the cases in the following table:

a. Calculate the future value at the end of the specified deposit period.
b. Determine the effective annual rate, EAR.
c. Compare the nominal annual rate, r, to the effective annual rate, EAR. What relationship exists between compounding frequency and the nominal and effective annual rates?

Case	Amount of initial deposit (₹)	Nominal annual rate, r (%)	Compounding frequency, m (times/ year)	Deposit period (years)
A	2,500	6	2	5
B	50,000	12	6	3
C	1,000	5	1	10
D	20,000	16	4	6

Continuous compounding

Problem 20: For each of the cases in the following table, find the future value at the end of the deposit period, assuming that interest is compounded continuously at the given nominal annual rate.

Case	Amount of initial deposit (₹)	Nominal annual rate, r (%)	Deposit period (years)
A	1,000	9	2
B	600	10	10
C	4,000	8	7
D	2,500	12	4

Rate of return

Problem 21: Om Sir has ₹ 1,500 to invest. His investment counselor suggests an investment that pays no stated interest but will return ₹ 2,000 at the end of 3 years.

a. What annual rate of return will Om Sir earn with this investment?

b. Om Sir is considering another investment, of equal risk, that earns an annual return of 8%. **Which investment should he make, and why?**

Rate of return and investment choice

Problem 22: Ms. Innovator has ₹ 5,000 to invest. Because she is only 25 years old, she is not concerned about the length of the investment's life. What she is sensitive to is the rate of return she will earn on the investment. With the help of her financial advisor, She has isolated four equally risky investments, each providing a single amount at the end of its life, as shown in the following table. All the investments require an initial ₹ 5,000 payment.

Investment	Single amount (₹)	Investment life (years)
A	8,400	6
B	15,900	15
C	7,600	4
D	13,000	10

a. Calculate, to the nearest 1%, the rate of return on each of the four investments available to Ms. Innovator.

b. Which investment would you recommend given her goal of maximizing the rate of return?

Rate of return: Annuity

Problem 23: What is the rate of return on an investment of ₹ **10,606** if the company will receive ₹ 2,000 each year for the next 10 years?

CHAPTER FOUR

Valuation of Securities

Thinking should become your capital asset, no matter whatever ups and downs you come across in your life.

– APJ Kalam

Chapter Outline

- Introduction
- Key Inputs Required for Valuation
- Valuation of Straight Coupon Bond (Definite Period)
- Valuation of Redeemable Bond
- Valuation of Irredeemable Bond or Perpetual Bond (Constant Interest)
- Value of Self Amortization Bond
- Valuation of Equity (Definite Period and Constant Dividends or Equal Cash Flows)
- Valuation of Equity (Definite Period and Variable Dividends or Unequal Cash Flows)
- Valuation of Equity (Indefinite Period and Constant Dividend or Equal Cash Flows)
- Valuation of Equity (Indefinite Period and Growing Dividend)
- Valuation of Redeemable Preference Share (Definite Period and Constant Dividend or Equal Cash Flows)
- Valuation of Irredeemable Preference Shares or Perpetual Preference Shares (Indefinite Period and Constant Dividend)

Introduction

Valuation is the process that links risk and return to determine the worth of an asset.

In this chapter, we will now be **able to apply the concepts of time value of money** to determining the value of different securities. Here, we are concerned with the valuation of the firm's **long-term securities – bonds, debentures, preferred stock, and equity shares.** Valuation is the process that links risk and return to determine the worth of an asset. It is a relatively simple process that can be applied to expected streams of benefits from bonds, stocks, income properties, etc. To determine an asset's worth at a given point in time, a financial manager uses the time value-of-money techniques.

Author's **Note**

1. Higher will be the Future Value (FV), the higher will be the Present Value (PV) and Vice-versa.
2. Different assets are valued differently due to their different features.

Key Inputs Required for Valuation

Cash Flows (Returns): The value of any asset depends on the cash flow(s) it is *expected* to provide over the ownership period. To have value, an asset does not have to provide an annual cash flow; it can provide an intermittent cash flow or even a single cash flow over the period.

Timing: In addition to making cash flow estimates, we must know the timing of the cash flows.

Risk and Required Return: The level of risk associated with a given cash flow can significantly affect its value.

- The **greater the risk** of (or the less certain) a cash flow, the **lower its value**.
- Greater **risk can be incorporated** into a valuation analysis by **using a higher required return or discount rate.**
- **The higher the risk, the greater the required return, and the lower the risk, the less the required return.**

Book Value: The book value of an asset is the accounting value of the asset – the asset's cost minus its accumulated depreciation.

- The book value of a firm, on the other hand, is **equal to the difference between the firm's total assets and its liabilities and preferred stock** as listed on its balance sheet.
- Because book value is based on historical values, it may bear little relationship to an asset's or firm's market value.

Market Value: The market value of an asset is simply the market price at which the asset (or a similar asset) trades in an open marketplace.

Liquidation value: Liquidation value is the amount of money that could be **realized if an asset or a group of assets (e.g., a firm) is sold** separately from its operating organization.

Valuation Model

- The **present value of all future cash flows** it is expected to provide over the relevant **time** period. The time period can be any **length, even infinity.**
- The value of an asset is therefore determined by **discounting the expected cash flows back to their present value**, using the required return commensurate with the asset's risk as the appropriate discount rate.

Problems and Solutions

Valuation of Straight Coupon Bond (Definite Period)

Problem 1: Hyundai Motors, issued a 10% coupon interest rate, 10 year bond with a ₹1,000 par value that pays interest annually. Investors who buy this bond receive the contractual right to two cash flows:

1. ₹100 annual interest (10% coupon interest rate at ₹1,000 par value) distributed at the end of each year and
2. ₹1,000 par value at the end of the tenth year.

Required:

1. Determine the current value of Hyundai Motors Bond.
2. Determine the current value of Hyundai Motors Bond, if the required return were to rise to 12% or fall to 8% and express your views on the current value.
3. Determine the current value of Hyundai Motors Bond if the bond pays interest semi-annually and that the required stated annual return is 12%.

Valuation of Redeemable Bond

Problem 2: A ₹ 1,000 par value bond bearing a coupon rate of 14% matures after 5 years. The required rate of return on this bond is 13%. Redemption Value at year end 5 is ₹ 1000. Calculate the value of bond.

Solution:

Value of Bond = ₹ 140 x PVAF (13%, 5yrs) = ₹ 1,000 x PVF (13%, 5yrs) = ₹ 140 x 3.517 + ₹ 1,000 x 0.543 = ₹ 1,035.4

Valuation of Irredeemable Bond or Perpetual Bond (Constant Interest)

Problem 3: A bond pays ₹ 90 interest annually up to perpetuity. What it its value if the Discount Rate is 10%?

Solution:

Value of Perpetual Bond = $\frac{\text{Interest}}{K_d} = \frac{90}{.10} =$ **₹ 900**

Value of Self Amortization Bond

Problem 4: GAIL India is proposing to sell 8 years bond of ₹ 1000 at 10% coupon rate per annum. Bond amount will be amortized equally over its life. If an investor has a minimum required rate of return of 8%, what is the bond's present value?

Solution:

Present Value of Bond =

$$= \frac{100+125}{(1+0.08)^1} + \frac{100+125}{(1+0.08)^2} + \frac{100+125}{(1+0.08)^3} + \frac{100+125}{(1+0.08)^4} + \frac{100+125}{(1+0.08)^5} + \frac{100+125}{(1+0.08)^6} + \frac{100+125}{(1+0.08)^7} + \frac{100+125}{(1+0.08)^8} = ₹\ 1070.42$$

Problem 5: Reserve Bank of India is proposing to sell a 5-year bond of ₹ 5,000 at 8% rate of interest per annum. The bond amount will be amortised equally over its life. What is the bond's present value for an investor if he expects a minimum rate of return of 6%?

Solution:

The value of the bond is calculated as follows [Bo]

$$= \frac{1400}{(1+0.06)^1} + \frac{1400}{(1+0.06)^2} + \frac{1400}{(1+0.06)^3} + \frac{1400}{(1+0.06)^4} + \frac{1400}{(1+0.06)^5} = 1,400 \times 0.934 + 1,320 \times 0.890 + 1,240 \times 0.840$$

$$+ 1,160 \times 0.792 + 1,080 \times 0.747 = 1,320.20 + 1,174.80 + 1,041.60 + 918.72 + 806.76 = ₹\ 5,262.08$$

Working Notes:

1. The amount of interest will go on declining as the outstanding amount of bond will be reducing due to amortization. **The amount of interest for five years:**

   First year: ₹ 5,000 x 0.08 = ₹ 400; **Second year:** (₹ 5,000 = ₹ 1,000) x 0.08 = ₹ 320; **Third year:** (₹ 4,000 - ₹ 1,000) x 0.08 = ₹ 240; **Fourth year:** (₹ 3,000 - ₹ 1,000) x 0.08 = ₹ 160; and **Fifth year:** (₹ 2,000 - ₹ 1,000) x 0.08 = ₹80.
2. The outstanding amount of bond will be zero at the end of fifth year.
3. The outflows every year will consist of interest payment and repayment of principal in the following manner:

   First year: ₹ 1000 + ₹ 400 = ₹ 1,400; **Second year:** ₹ 1000 + ₹ 320 = ₹ 1,320; **Third year:** ₹ 1000 + ₹ 240 = ₹ 1,240; **Fourth year:** ₹ 1000 + ₹ 160 = ₹ 1,160; and **Fifth year:** ₹ 1000 + ₹ 108 = ₹ 1,080.

Problem 6: Infosys has outstanding an 8%, four-year, ₹1,000-par-value bond on which interest is paid annually.

1. If the market required rate of return is 15%, what is the market value of the bond?
2. What would be its market value if the market required return dropped to 12%?
3. If the coupon rate were 15% instead of 8%, what would be the market value [under Part (a)]? If the required rate of return dropped to 8 percent, what would happen to the market price of the bond?

Problem 7: Toyota has outstanding a ₹1,000-face-value bond with a 14% coupon rate and 3 years remaining until final maturity. Interest payments are made semi-annually.

What value should you place on this bond if your nominal annual required rate of return is (i) 12%? (ii) 14%? (iii) 16%?

ii. Assume that we are faced with a bond like the one described above, except that it is a zero-coupon, pure discount bond. What value should you place on this bond if your nominal annual required rate of return is (i) 12%? (ii) 14%? (iii) 16%? **(Assume semi-annual discounting.)**

Valuation of Equity (Definite Period and Constant Dividends or Equal Cash Flows)

Problem 8: CNP Ltd's balance sheet shows total assets of ₹ 60,00,000, total liabilities and preferred stock of ₹ 45,00,000, and 1,00,000 shares of common stock outstanding. CNP found on investigation that it could obtain only ₹ 52,50,000 if it sold its assets today. Calculate the book value and liquidation value of common stocks.

Problem 9: Prathama wants to buy shares of HBL Power Systems. She intends to hold those shares for 6 years during which he expects to receive an annual dividend of ₹ 5 per share. According to her estimation, she can sell these share after 6 years for ₹ 85 per share. Her required rate of return is 12% Per Annum. **Calculate the Current Market Price of HBL Power Systems.**

Solution:

$$\text{Current Market Price} = \frac{5}{(1+.12)^1}+\frac{5}{(1+.12)^2}+\frac{5}{(1+.12)^3}+\frac{5}{(1+.12)^4}+\frac{5}{(1+.12)^5}+\frac{5}{(1+.12)^6}=\frac{85}{(1+.12)^6}=63.618$$

Or,

= 5 x PVAF (12%, 6 years) + 85 x PVF (12%, 6 years) = 5 x 4.1114 + 85 x .5066 = 20.557 + 43.061 = 63.618

Valuation of Equity (Definite Period and Variable Dividends or Unequal Cash Flows)

Problem 10: Ananya wants to buy shares of RPJ Infra Ltd. He intends to hold those share for 6 years, during which he expects to receive dividends of ₹ 5, ₹ 3, ₹ 4, ₹ 2, ₹ 9, ₹ 8 per share at the end of each year. According to his estimation, he can sell these share after 6 years for ₹ 85 per share. His required rate of return is 12% Per Annum. **Calculate the Current Market Price of RPJ Infra Ltd.**

Solution:

$$\text{Current Market Price} = \frac{5}{(1+.12)^1}+\frac{3}{(1+.12)^2}+\frac{4}{(1+.12)^3}+\frac{2}{(1+.12)^4}+\frac{9}{(1+.12)^5}+\frac{8+85}{(1+.12)^6}$$

$$= 5 \times .8929 + 3 \times .7972 + 4 \times .7118 + 2 \times .6355 + 9 \times .5674 + 8 \times .5066 + 85 \times .5066 = 63.1947$$

Valuation of Equity (Indefinite Period and Constant Dividend or Equal Cash Flows)

Problem 11: Radhika wants to buy share of Tata Power. She intends to hold those shares forever. She expects to receive dividend of ₹ 5 per share every year. Her required rate of return is 12% per annum. **Calculate the Current Market Price of Tata Power.**

Solution:

Current Market Price = $\frac{5}{.12}$ = ₹ 41.67

Valuation of Equity (Indefinite Period and Growing Dividend)

Problem 12: Riya wants to buy shares of Tata Motors. She intends to hod those share forever. She expects to receive a dividend of ₹ 5 per share in the next year, which will grow @ 4% p.a. forever. Her required rate of returns 12% Per Annum. Calculate the Current Market Price of Tata Motors.

Solution:

Current Market Price (Po) of Tata Motors: = $\frac{5}{.12 - 0.4}$ = ₹ 62.50

Problem 13: Tata Motors' common stock just paid its annual dividend of ₹1.80 per share. The required return on the common stock is 12%. Estimate the value of the common stock under each of the following assumptions about the dividend:

i. Dividends are expected to grow at an annual rate of 0% to infinity.
ii. Dividends are expected to grow at a constant annual rate of 5% to infinity.
iii. Dividends are expected to grow at an annual rate of 5% for each of the next 3 years, followed by a constant annual growth rate of 4% in years 4 to infinity.

Problem 14: Infosys currently pays a dividend of ₹1.60 per share. The company expects to increase the dividend at a 20% annual rate for the first 4 years and at a 13% rate for the next four years, and then grow the dividend at a 7% rate thereafter. This phased-growth pattern is in keeping with the expected life cycle of earnings. You require a 16% return to invest in this stock. What value should you place on a share of this stock?

Valuation of Redeemable Preference Share (Definite Period and Constant Dividend or Equal Cash Flows)

Problem 15: OTC is planning to purchase a 12 year, 10% ₹ 100 par value preference share of CNP Ltd.. The redemption value of the preference share on maturity is ₹ 120. OTC's required rate or return is 10.5%. Calculate the Current Market Price.

Solution:

Current Market Price of Preference Share = $\frac{10}{(1 + .105)^1} + ... + \frac{10}{(1 + .105)^{12}} + \frac{10}{(1 + .105)^{12}}$

= 10 x 6.506 + 120 x 0.302 = 65.06 + 36.24 = ₹ 102.71

Valuation of Irredeemable Preference Shares or Perpetual Preference Shares (Indefinite Period and Constant Dividend)

Problem 16: A preference share pays ₹ 10 as dividend annually up to perpetuity. **What is the value of preference Share If Cost of Preference Share is 10%.**

Solution:

Current Value of Preference Share Capital = $\frac{10}{.10}$ = ₹ **100**

Miscellaneous Questions for Practice

Problem 17: (Valuation of Equity Share): Growth Ltd. is foreseeing a growth rate of 12% per annum in the next two years. The growth rate is likely to be 10% for the third and fourth year. After that, the growth rate is expected to stabilise at 8% per annum. If the last dividend was ₹1.50 per Share and the Investor's required rate of return is 16%, determine the current value of Equity Share of the Company.

The P.V. factors at 16% are —

Year	1	2	3	4
P V factor	0.862	0.743	0.641	0.552

Solution:

Value of Equity Share = Present Value of all dividend flows.

Year	*Dividend*	*Discount Rate*	*PV of Dividend*
1	₹ 1.50 + 12% = ₹ 1.68	0.862	₹ 1.4482
2	₹ 1.68 + 12% = ₹ 1.88	0.743	₹ 1.3968
3	₹ 1.88 + 10% = ₹ 2.07	0.641	₹ 1.3269
4	₹ 2.07 + 10% = ₹ 2.27	0.552	₹ 1.2530

5 onwards See Note below = ₹ 30.65 × 0.552 ₹ 16.9160 = 30.65 × .552

Total Current Value of Equity Share of the Company ₹ 22.3409 = 16.9160

Computation of Perpetual Dividend received after 4th year i.e. at 8% per annum

$$\textbf{Total Dividend} = \frac{D \times (1 + g)}{(k - g)} = \frac{2.27 \times (1 + 0.08)}{(0.16 - 0.08)} = ₹\ 30.645$$

Where, D = Dividend; g = Growth Rate and K = Cost of Equity Capital

"A teacher affects eternity; he can never tell where his influence stops."

– Henry B. Adams

CHAPTER FIVE

Cost of Capital

Learning Objectives

After studying this chapter, you should be able to

- Understand the concept of "Cost of Capital" that impacts the capital investments decisions for a business.
- Understand what are the different sources of capital (Debt, Equity Shares, Preference Shares; etc.).
- Understand what is the cost of employing each of these sources of capital.
- Know what is weighted average cost of capital (WACC) (overall cost of capital) for a business and also what is marginal cost of capital.
- Summarize how cost of capital is important in financial management.

Chapter Outline

- Introduction
- Basic Definitions
- Cost of Debt, k_d (1-T)
- Cost of Debentures
- Cost of Preference Share, k_p
- Cost of Equity
- Cost of Retained Earnings, k_s
- Cost of New Equity, k_e
- Value of Bond
- Composite, or Weighted Average Cost of Capital (WACC)
- Factors that affect the Composite Cost of Capital
- Determination of Post-Tax Average Cost of additional Debt
- Treatment of Short-Term Debt
- Zero Coupon Bonds (ZCB)
- Cost of Debt
- Cost of Redeemable Debentures
- Cost of Irredeemable Debentures
- Cost of Redeemable Preference Shares
- Cost of Irredeemable Preference Shares
- Cost of Equity Shares – Dividend Price Approach
- Cost of Equity Shares – Dividend Price plus Growth Approach
- Cost of Preference Shares
- Cost of Equity Shares – Realized Yield Approach (Holding Period Return - HPR)
- Cost of Equity Capital (CAPM)
- Weighted Average Cost of Capital
- Marginal Cost of Capital [MCC]
- Levered Firm & Unlevered Firm
- Miscellaneous Problems for Practice
- Present Values of Growth Opportunities
- Current Price of Shares
- Price Per Share
- Equilibrium Price Per Share
- Expected Return on Market Portfolio
- Miscellaneous
- Beta and Cost of Equity Capital
- Marginal Cost of Capital
- Optimum Debt Equity Mix Using Cost of Capital
- Holding Period Return – Realized Yield Approach
- Zero Coupon Bonds
- Calculation of Prevailing Interest Rate
- WACC Computation when different Capital Structure are Given.
- Cost of Preference Share Using YTM Method

Be faithful in small things because it is in them that your strength lies.

– Mother Teresa

Introduction

The company may raise funds through debts, equity share or preference share. It may use the retrained earning of equity in business. Each component has cost to the company and it is called as **cost of capital** (component wise)

The project's cost of capital is the minimum required rate of return on funds committed to the project

The opportunity cost of capital (or simply, the cost of capital) for a project is the **discount rate** for discounting its cash flows. The **project's cost of capital** is the minimum required rate of return on funds committed to the project, which depends on the riskiness of its cash flows. Since the investment projects undertaken by a firm may differ in risk, each one of them will have its own unique cost of capital.

Basic Definitions

The items on the right side of a firm's balance sheet – various types of debt, preferred stock, and common equity – are called **capital components.** Any increase in total assets must be financed by an increase in one or more of these capital components.

$\mathbf{K_d}$ = Interest rate on the firm's new debt = before-tax component cost of debt.

$\mathbf{K_d(1\text{-}T)}$ = After-tax component cost of debt, where T is the firm's marginal tax rate, $k_d(1\text{-}T)$ is the debt cost used to calculate the weighted average cost of capital.

$\mathbf{k_p}$ = Component cost of preferred stock.

$\mathbf{k_e}$ = Component cost of common equity.

Equity capital is raised in two ways:

(1) by retaining earnings (internal equity) or

(2) by issuing new common stock (external equity).

Exam Focus...

Nov. - 2009	2 Marks

Weighted Average Cost of Capital, WACC: A weighted average of the component costs of debt, preferred stock, and common equity.

WACC = **The weighted average cost of capital.** If a company raises new capital to finance asset expansion, and if it is to keep its capital structure in balance (that is, if it is to keep the same percentage of debt, preferred stock, and common equity funds), then it must raise part of its new funds as debt, part as preferred stock, and part as common equity (with equity coming either from retained earnings or by issuing new common stock).

Cost of Capital

Cost of capital refers to the discount rate that is used in determining the present value of the estimated future cash proceeds of the business/ new project and eventually deciding whether the business/new project is worth undertaking or not.

Cost of capital refers to the discount rate that is used in determining the present value of the estimated future cash proceeds of the business/new project and eventually deciding whether the business/new project is worth undertaking or not. It is also the ***minimum rate of return*** that a firm must earn on its investment which will maintain the market value of share at its current level. It can also be stated as the ***opportunity cost*** of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.

Components of Cost of Capital

- **Explicit Cost**
  - **Explicit Cost:** The discount rate that equals the present value of the incremental cash inflows with the present value of its incremental cash outflows.
- **Implicit Cost**
  - **Implicit Cost:** It is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm was accepted.

Measurement of Specific Cost of Capital

The first step in the measurement of the cost of the capital of the firm is the calculation of the cost of individual sources of raising funds.

Cost of Debt, k_d (1-T)

The after-tax cost of debt, **k_d(1-t),** is used to calculate the weighted average cost of capital, and it is the interest rate on debt, k_d, less the tax savings that result because interest is tax deductible. This is the same as k_d multiplied by (1-T), where T is the firm's marginal tax rate.

After-tax component cost of debt = Interest rate – tax savings

$$= k_d - k_d T$$
$$= k_d (1-T)$$

The concern may raise loan from bank or other sources. It has to pay interest on amount of loan. The interest is taken as an expense. It is charged against profit of the concern. Hence the amount of interest is subject to tax savings thereon.

$$\textbf{Cost of Debts} = \frac{\text{Amount of interest} \times (1\text{-tax})}{\text{Amount of loan}} \times 100$$

Or, Alternatively

Cost of Debts = Interest rate × (1-tax)

Example 1:

Suppose the amount of loan is ₹ 5,00,000

Interest rate upto ₹ 3,00,000 = 10% p.a.

Interest rate above ₹ 3,00,000 = 12% p.a.

Tax rate = 40%

Find the cost of debts

Answer:

Interest	₹
On ₹ 3,00,000 @ 10%	= 30,000
On ₹ 2,00,000 @ 12%	= 24,000
	54,000
Less: Tax savings on interest cost (40%)	(21,600)
Interest (Net of tax)	32,400

Cost of debt $= \frac{\text{Amount of interest (1-tax)}}{\text{Amount of loan}} \times 100 = \frac{32,400}{5,00,000} \times 100 = 6.48\%$

Alternatively,

Cost of Debts = Interest rate x (1-tax)

For first 3 lakh = 10 × (1-0.40) = 6%

For next 2 lakh = 12 × (1-0.40) = 7.2%

Overall cost of debts $= \left(\frac{3 \text{ lakhs}}{5 \text{ lakhs}}\right) \times 6 + \left(\frac{2 \text{ lakh}}{5 \text{ lakh}}\right) \times 7.20 = 3.60 + 2.88 = 6.48\%$

Example 2:

If the company raises debts then annual interest payment will be ₹ 2,00,000 and amount of debts ₹ 10,00,000.

	Case I	**Case II**
EBIT	5,00,000	5,00,000
Debts	10,00,000	Nil
Interest	2,00,000	Nil
Tax	30%	30%

Profit and Loss Account

Particulars	*Case I (₹)*	*Case II (₹)*	*Particulars*	*Case I (₹)*	*Case II (₹)*
To Interest	2,00,000	Nil	By EBIT	5,00,000	5,00,000
To Tax (30%)	90,000	1,50,000			
To Net Profit	2,10,000	3,50,000			
	5,00,000	5,00,000		5,00,000	5,00,000

$$\text{Cost of Debts} = \frac{\text{Amount of Interest (1-tax)}}{\text{loan}} \times 100 = \frac{2,00,000\ (1-0.30)}{1,00,000} \times 100$$

$$= \frac{1,40,000}{10,00,000} \times 100 = 14\%$$

The interest rate is 20% hence post tax cost of debts = Interest rate (1-tax) = 20% (1-0.30) = 14%

A debt may be in the form of Bond or Debenture.

Cost of Debentures

The cost of debentures and long term loan is the contractual interest rate adjusted further for the tax liability of the company.

Cost of Irredeemable Debentures

Cost of debentures

$Kd = \frac{I}{NP}(1-t)$

Cost of Debentures not redeemable during the life time of the company.

$$K_d = \frac{I}{NP}(1-t)$$

Author's **Note**

The fund may be raised through debenture. The debenture interest is paid on face value, par value of debenture. The market price of debenture may or not be equal to par value when the market price of debenture is given in the question and it is different from face value.

$$\text{Cost of debenture} = \frac{\text{Amount of interest on a debenture (1-tax)}}{\text{Market price of debenture}} \times 100$$

Example 3:

	A Ltd.	**B Ltd.**	**C Ltd.**
Face value per debenture (₹)	100	100	100
Interest rate	14%	15%	20%
Market price per debenture (₹)	140	75	125
Tax rate	30%	40%	20%
Find cost of debts.			

Solution:

	A Ltd.	**B Ltd.**	**C Ltd.**
Face value/debenture (₹)	100	100	100
Interest	100 × 14%	100 × 15%	100 × 20%
	= 14	= 15	= 20

Market price per debenture (₹)	140	75	125

$$\text{Cost of debts } (K_d) = \frac{\text{Amount of interest on a debenture (1-tax)}}{\text{Market price of debenture}} \times 100$$

$$= \frac{14\ (1-0.30)}{140} \times 100 = 7\% \qquad = \frac{15\ (1-0.40)}{75} \times 100 = 12\% \qquad = \frac{20\ (1-0.20)}{125} \times 100 = 12.8\%$$

Author's **Note**

(i) If the market price of debenture is equal to face value then the % cost of debts = Interest rate (1 - tax)

(ii) In case of irredeemable debentures, the life of debenture is infinite. Hence we do not consider the principal repayment or duration i.e. life.

Cost of Redeemable Debentures

If the debentures are redeemable after the expiry of a fixed period, the cost of debentures would be:

$$K_d = \frac{I(1-t) + (RV - NP)/N}{\frac{RV + NP}{2}}$$

$$\text{Or} \quad \frac{\text{Amount of Interest } (1 - \text{tax rate}) + \frac{(\text{Redeemable value} - \text{Market price})}{\text{Life}}}{\frac{\text{Redeemable value} + \text{Market vaue}}{2}} \times 100$$

Example 4:

Suppose the current market price of debenture = ₹ 125 (Face Value = ₹ 100).
Interest Rate = 10% p.a.
Life = 5 Years
Tax = 40%
Redeemable value at 5 years end = ₹ 150
Find Post Tax cost of debts.

Answer:

$$K_d = \frac{\text{Amount of Interest } (1 - \text{tax rate}) + \left(\frac{\text{Redeemable value} - \text{Market price}}{\text{Life}}\right)}{\frac{\text{Redeemable value} + \text{Market vaue}}{2}} \times 100$$

$$= \frac{10 \times (1-0.40) + \left(\frac{150-125}{5}\right)}{\left(\frac{150+125}{2}\right)} \times 100 = \frac{6+5}{137.5} \times 100 = \frac{11}{137.5} \times 100 = 8\%$$

Example 5: Express cargo Ltd. has issued 5 years zero coupon bonds of ₹ 1,000 each at a price of ₹ 540. Calculate the cost of debt.

Answer:

Year	*Particulars*	*Cash flow* ₹	*Discount factor @ 12%*	*Present Value* ₹	*Discount factor @ 14%*	*Present Value* ₹
0	Net proceeds	540	1.000	540	1.000	540
5	Repayment on maturity	(1000)	0.567	(567)	0.519	(519)
	Net present value			(–) 27		21

$$K_d = 12 + \frac{27}{27 + 21} \times 2 = 12 + \frac{54}{48} = 12 + 1.125 = 13.125 \text{ or } 13.125\%$$

Cost of Convertible Debentures

Example 6: Rocks Ltd. has issued 14% convertible debentures of ₹ 100 each at par. Each debenture will be convertible into 8 equity shares of ₹ 10 each at a premium of ₹ 5 per share. The conversion will take place at the end of 4 years the corporate tax rate is assumed to be 40%. Assume that tax savings occur in the same year that the interest payments arise. The flotation cost is 5% of the issue amount. Calculate the cost of convertible debentures.

Answer:

Year	*Particulars*	*Cash flow* ₹	*Discount factor @ 14%*	*Present Value* ₹	*Discount factor @ 15%*	*Present Value* ₹
0	Net proceeds	95.00	1.000	95.00	1.000	95.00
1-4	Interest less tax	(8.40)	2.914	(24.48)	2.855	(23.98)
4	Conversion value (8 × ₹ 15)	(120.00)	0.592	(71.04)	0.572	(68.64)
	Net present value =			(–) 0.52		2.38

$$K_d = 14 + \frac{0.52}{0.52 + 2.38} \times 1 = 14 + \frac{0.52}{2.9} = 14 + 0.18 = 14.18\%$$

Cost of Preference Share, k_p

The component **cost of preference share** used to calculate the weighted average cost of capital, k_p, is the preference dividend, D_p, divided by the current price of the **preference share**, P_p.

Component cost of **preference share** = $k_p = \frac{D_p}{P_p}$

The cost of preference share capital is the dividend expected by its holders.

Cost of Redeemable Preference Shares

If the Preference share are redeemable after the expiry of fixed period the cost of preference shares would be:

$$K_p = \frac{PD + \left(\frac{RV - NP}{N}\right)}{\frac{RV + NP}{2}}$$

Example 7: Rockstar India Issued 30,000 15% Preference Shares of ₹ 100 each, redeemable at 10% premium after 20 years Issue Management Expenses were ₹ 30,000.

Find out the cost of Preference Capital if they were issued (i) par (ii) premium of 10% (iii) discount of 10%?

Solution:

i. Issued at Par: $K_p = \dfrac{30{,}000 \times 100 \times 15\% + \dfrac{(30{,}000\times110) - (30{,}000 \times 100 - 30{,}000)}{20}}{\dfrac{(30{,}000\times110) + (30{,}000 \times 100 - 30{,}000)}{20}} = \mathbf{14.88\%}$

ii. Issued at a Premium: $K_p = \dfrac{30{,}000 \times 100 \times 15\% + \dfrac{(30{,}000\times110) - (30{,}000 \times 110 - 30{,}000)}{20}}{\dfrac{(30{,}000\times110) + (30{,}000 \times 110 - 30{,}000)}{20}} = \mathbf{13.74\%}$

iii. Issued at a Premium: $K_p = \dfrac{30{,}000 \times 100 \times 15\% + \dfrac{(30{,}000\times110) - (30{,}000 \times 90 - 30{,}000)}{20}}{\dfrac{(30{,}000\times110) + (30{,}000 \times 90 - 30{,}000)}{20}} = \mathbf{16.13\%}$

Cost of Irredeemable Preference Shares

$$\text{Cost of Irredeemable Preference Shares} = \frac{P_d}{P_o}$$

Author's **Note**

Cost of irredeemable preference share K_p.

Annual fixed amount of preference dividend will be paid for irredeemable preference shares. The dividend is calculated on face value of preference share as follows

Preference dividend = Face value × Dividend rate.

This calculation is similar as calculation under debenture. The preference dividend is paid out of post tax profit. It is a portion of profit, hence, there will be no tax savings as in case of debenture interest.

$$\text{Cost of preference share} = \frac{\text{Amount of dividend}}{\text{Market price per share}} \times 100$$

Example 8:

Particulars	*A Ltd.*	*B Ltd.*
Face value/preference share (₹)	100	100
Dividend rate	15%	12%
Market price per share (₹)	125	75
Calculate % cost of preference share.		

Answer:

Particulars	*A Ltd.*	*B Ltd.*
Face value/preference share (₹)	100	100
Dividend rate	15%	12%
Amount of preference dividend (₹)	100 × 15% = 15	100 × 12% = 12
Market price per share (₹)	125	75
(%) Cost	$\frac{15}{125} \times 100 = 12\%$	$\frac{12}{75} \times 100 = 16\%$

Example 9: A company issued 40,000 12% Redeemable Preference Shares of ₹ 100 each at a premium of ₹ 5 each, redeemable after 10 year at a premium of ₹10 each.

The floatation cost of each share is ₹ 2. **[May 2013]**

Answer:

Calculation of Cost of Preference Shares (Kp)

Preference Dividend (P_D) = 0.12 x 40,000 x 100
= 4,80,000

Floatation Cost = 40,000 x 2 = ₹ 80,000

Net Proceeds (NP) = 42,00,000 – 80,000 = **41,20,000**

Redemption Value (RV) = 40,000 x 110 = **44,00,000**

Cost of Redeemable Preference Shares = P_D (RV - NP) / N/RV NP/2

Kp = 4,80,000 (44,00,000 - 41,20,000)/10 / 44,00,000 41,20,000 / 2
= 4,80,000 + (2,80,000)/10 / 85,20,000/2 = 4,80,000 + 28,000 / 42,60,000
= 5,08,000 / 42,60,000 = 0.1192

Kp = 11.92%

(**Note:** Kp may be computed alternatively by taking the RV and NP for one unit of preference shares. Final figure would remain unchanged).

Cost of Equity

Cost of New Equity, k_e: The cost of external equity; based on the cost of retained earnings, but increased for flotation costs.

Cost of equity capital is that rate of return which equates the present value of expected dividends with the market share price.

Cost of equity (K_e): The dividend on equity share is variable. It is not fixed dividend per year like preference share. However, if the equity dividend is constant year after year then the cost of equity is calculated similarly as cost of preference share.

$$\text{Percentage (\%) cost of equity} = \frac{\text{Equity dividend per annum}}{\text{Market price per share}} \times 100$$

Dividend Price Approach

Exam Focus...

Nov. - 2006	1 Mark

Here, cost of equity capital is computed by dividing the current dividend by average market price per share.

$$K_e = \frac{D_1}{P_0}$$

Example 10:

	X Ltd.	Y Ltd.
Face value per share (₹)	100	100
Dividend per share (₹)	15	40
Market price per share (₹)	150	250
Percentage (%) cost of equity $\left[= \frac{\text{Annual dividend}}{\text{Market price per share}} \times 100\right]$	$\frac{15}{150} \times 100$ = 10%	$\frac{40}{250} \times 100$ = 16%

Dividend Growth Model (Dividend Price Plus Growth Approach)

When a share is purchased, the investor will receive dividend year after year. The present value of all future dividends for infinite period will be equal to current fair price (P_0) of the share. For this purpose the cost of equity (K_e) is used as discount rate.

Sum of present value of dividends

Sum of present value of dividends

$$\frac{D_1}{(Ke - g)}$$

$$= \left[\frac{D_1}{1+K_e}\right] + \left[\frac{D_2}{(1+K_e)^2}\right] + \left[\frac{D_3}{(1+K_e)^3}\right] + \ldots + \infty$$

$$= \left[\frac{D_1}{1+K_e}\right] + \left[\frac{D_1(1+g)}{(1+K_e)(1+K_e)}\right] + \left[\frac{D_1(1+g)^2}{(1+K_e)(1+K_e)^2}\right] + \ldots + \infty$$

$$= \left[\frac{D_1}{1+K_e}\right] + \frac{\left(\frac{D_1}{1+K_e}\right)}{(1+g)(1+K_e)} + \left(\frac{D_1}{1+K_e}\right) \times \frac{(1+g)^2}{(1+K_e)^2} + \ldots + \infty$$

$$a = \frac{D_1}{1+K_e}, \; r = \frac{1+g}{1+K_e}$$

Sum or series $= \frac{a}{1-r}$

$$= \frac{\left(\frac{D_1}{1+K_e}\right)}{1-\left(\frac{1+g}{1+K_e}\right)} = \frac{D_1}{1+K_e-1-g} \qquad = \left(\frac{D_1}{K_e - g}\right)$$

Example 11:

	A	*B*	*C*	*D*
Last Dividend per share (D_0)	5	3	2	4
Next Dividend per share (D_1)	5 × (1+0.04) = 5.20	3 × (1+0.08) = 3.24	2 × (1+0.06) = 2.12	4 × (1+0.05) = 4.20
K_e	12%	14%	10%	13%
$P_0 = \left(\frac{D_1}{K_e - g}\right)$	$\frac{5.20}{0.12-0.04}$ = ₹ 65	$\frac{3.24}{0.14-0.08}$ = ₹ 54	$\frac{2.12}{0.10-0.06}$ = ₹ 53	$\frac{4.20}{0.13-0.05}$ = ₹ 52.5

Things to Remember

1. The dividend growth model assumes the constant growth in future dividends. The present value of all future dividends will be equal to current price (P_0) of the share.

$$\text{Current Price } (P_0) = \frac{\text{Next Dividend per share } (D_1)}{\text{Cost of equity } (K_e) - \text{Growth rate } (g)}$$

2. If there is different growth rates during initial period and it becomes constant in later year, the above formula will apply in the year in which growth rate becomes constant.

Example 12: The details of dividend paid by Cool Ltd. on existing equity shares of ₹ 10 each for the past 6 years is given below:

Year	Dividend per share
1995	1.05
1996	1.10

1997	1.16
1998	1.21
1999	1.27
2000	1.34

The current market price of equity shares is ₹ 40. It is expected to maintain the fixed dividend payout ratio in the future. The company has issued new equity shares of ₹ 10 each and the cost of its flotation is ₹ 0.50 per share. The expected dividend to be declared for the current year is ₹ 1.40. Using the above information calculate the cost of equity capital.

Answer:

Calculation the dividend growth rate: During the last 5 years (Year 1995 is ignored since the dividend of 1995 is compared with the dividend of 2000), the dividend has increased from ₹ 1.05 to ₹ 1.34.

$$\text{Compound factor} = \frac{₹\ 1.34}{₹\ 1.05} = 1.2762$$

By looking into compound value of ₹ 1 the sum of ₹ 1 would accumulate to ₹ 1.2762 in five years at 5%. Therefore. the dividend growth rate is 5%.

$$K_e = \frac{D_1}{N_P} + g = \frac{₹\ 1.40}{₹\ 9.50} + 0.05 = 0.1474 + 0.05 = 0.1974 \text{ or } 19.74\%.$$

Example 13: The current price of an equity share of ₹ 10 is ₹ 20. The next expected dividend per share is 20%. The dividends are expected to grow at a rate of 5%. Calculate the cost of equity based on dividend growth model.

Answer:

Next expected dividend per share (D_1) = 20% of ₹ 10 = ₹ 2

Market price (P_o) = ₹ 20

Growth rate in dividend (g) = 5%

$$K_e = \frac{D_1}{P_o} + g \quad \text{or} \quad K_e = \frac{2}{20} + 0.05 = 0.15 \text{ of } 15\%$$

Current Price of Share (P_0)

The investor in equity share purchases the share from market at its current price. He receives dividends in future for infinite period. The dividend is inflows to investor and cost to the company. The present value of all future year dividend which satisfied, the required return of investor is equal to fair price (current price P_0) of the share.

For calculation of present value of dividend the required return by investor (i.e. cost to the company) (K_e) is listed as discount rate.

Current price of share (P_0) = Next dividend per share / (cost of equity – growth rate)

It is easy to determine the dividend yield, but it is difficult to establish the proper growth rate. If past growth rates in earnings and dividends have been relatively stable, and if investors appear to be projecting a continuation of past trends, then g may be based on the firm's historic growth rate. *However; if the company's past growth has been abnormally high or low, either because of its own unique situation or because of general economic fluctuations, then investors will not project the past growth rate into the future.* In this case, g must be estimated in some other manner.

$$\text{Current price of } P_0 = \frac{\text{Next dividend per share}}{(\text{cost of equity} - \text{growth rate})}$$

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

$$P_0 (K_e - g) = D_1$$

$$(K_e - g) = \frac{D_1}{P_0}$$

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

Where, K_e = Cost of equity

D_1 = Next dividend per share

g = Constant growth rate.

$D_1 = D_0 (1+g)$

= Last dividend per share (1+growth rate) when dividend growth at constant rate per year.

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

and $$K_e = \frac{D_1}{P_0} + g$$

When growth rate is zero per cent i.e. Nil.

$$P_0 = \frac{D_1}{K_e - g} = \frac{D_0 (1+g)}{K_e - g} = \frac{D_0 (1+Nil)}{K_e - Nil}$$

$$P_0 = \frac{D_0}{K_e}$$

Then, $$K_e = \frac{D_0}{P_0}$$

Things to Remember

Sum of series under geometrical progression = $a + ar + ar^2 + ar^3 + ... + \infty$

Where,

a = first term

r = common ratio (less than 1)

Sum of the series = $\frac{a}{1-r}$

Earning/Price Approach

Exam Focus...	
Nov. - 2006	1 Mark

The advocate of this approach co-relate the earnings of the company with the market price of its share.

$$K_e = \left(\frac{E}{P}\right)$$

Realized Yield Approach

According to this approach, the average rate of return realized in the past few years is historically regarded as 'expected return' in the future. The yield of equity for the year is:

$$Y_t = \frac{D_t + P_{t-1}}{P_{t-1}}$$

Example 14: Dividends and year-end prices of A Ltd. shares for 5 years are given below. You are required to compute cost of equity by Realized Yield Approach.

Year	*Dividend per share (₹)*	*Price per share (₹)*
2000-01	2.50	40.00
2001-02	3.20	42.00
2002-03	3.63	44.25
2003-04	5.33	46.00
2004-05	6.00	46.90

Answer:

$$\text{Wealth Ratio (Year n)} = \frac{\text{Dividend + Closing Price}}{\text{Opening price}} = \frac{D_n + P_n}{P_{(n-1)}} \times 100$$

$$\text{Wealth Ratio (2001 – 02)} = \frac{₹\ 3.20 + ₹\ 42.00}{₹\ 40.00} = 1.13$$

$$\text{Wealth Ratio (2002 – 03)} = \frac{₹\ 3.63 + ₹\ 44.25}{₹\ 42.00} = 1.14$$

$$\text{Wealth Ratio (2003 – 04)} = \frac{₹\ 5.33 + ₹\ 46.00}{₹\ 44.25} = 1.16$$

$$\text{Wealth Ratio (2004 – 05)} = \frac{₹\ 6.00 + ₹\ 46.90}{₹\ 46.00} = 1.15$$

$$\text{Average wealth ratio} = \frac{1.13 + 1.14 + 1.16 + 1.15}{4} = 1.145$$

Cost of equity = Average Wealth Ratio – 1 = 1.145 – 1 = 0.145 or 14.5%

The CAPM Approach

Capital Asset Pricing Model (CAPM): A model based on the proposition that any stock' required rate of return is equal to the risk-free rate of return plus a risk premium that reflects only the risk remaining after diversification.

One approach to estimating the cost of common equity is to use the Capital Asset Pricing Model (CAPM) as follows:

Step 1: Estimate the risk-free rate, R_f, generally taken to either the govt. securities rate or the short-term (30-day) Treasury bill rate.

Step 2: Estimate the stock's beta coefficient, b, and use it as an index of the stock's risk.

Step 3: Estimate the expected rate of return on the market, or an "average" stock, R_m.

Step 4: Substitute the preceding values into the CAPM equation to estimate the required rate of return on the stock in question: $k_e = R_f + b\ (R_m - R_f)$

Equation: Shows that the CAPM estimate of k_e begins with the risk-free rate, R_f, to the risk premium on an average stock, $R_m - R_f$, scaled up or down to reflect the particular stock's risk as measured by its beta coefficient.

It should be noted that although the CAPM approach appears to yield an accurate, precise estimate of k_e, there are actually several problems with it. First, if a firm's shareholders are not well diversified, they may be concerned with *stand-alone* risk rather than just market risk. In that case, the firm's true investment risk would not be measured by its beta, and the CAPM procedure would understate the correct value of k_e. Further, even if the CAPM method is valid, it is hard to obtain correct estimates of the inputs required to make it operational because (1) there is controversy about whether to use long-term or short-term treasury yields for R_f, (2) it is hard to estimate the beta that investors expect the company to have in the future, and (3) it is difficult to estimate the market risk premium.

CAPM model describes the risk-return trade-off for securities. It describes the linear relationship between risk and return for securities.

Author's **Note**

The CAPM approach assumes that the return should be in accordance to the risk in the investment. The risk is shown as Beta. The risk in share is called as equity Beta and overall risk in market (i.e. average securities in market) is known as Beta Market. Beta Market is always assumed to be 'one'.

The Required rate of return = Risk free return + Risk premium for that share

= Risk free return + [Beta share ($\text{Return}_{\text{market}} - \text{Return}_{\text{risk free}}$)]

Example 15:

Suppose the return market is 18%.

Risk free rate = 8%

Normal market premium = $R_M - R_F = (18 - 8)\% = 10\%$

Find the required return for following.

Name of TD	A Ltd.	B Ltd.	C Ltd.	D Ltd.	E Ltd.
Beta Share	2.5	0.8	0	1	1.2

Answer:

We know that

Required return = $RF + B_{equity} (RM - RF)$

A Ltd. = $8 + 2.5 \times 10 = 33\%$

B Ltd. = $8 + 0.8 \times 10 = 16\%$

C Ltd. = $8 + 0 \times 10 = 8\%$

D Ltd. = $8 + 1 \times 10 = 18\%$

E Ltd. = $8 + 1.2 \times 10 = 20\%$

The required rate of return by investor on equity is considered as cost of equity (K_e) for further calculation.

Example 16:

Beta Equity = 1.8

Return Market (RM) = 14%

Return risk free (RF) = 8%

Find cost of equity (K_e). If growth rate of dividend is 6% and next division per share is ₹ 3.20. Find current price of share. Required return by investor in Equity.

Answer:

$K_e = 8 + 1.8 \times (14.8) = 8 + (1.8 \times 6) = 8 + 10.8 = 18.8\%$

The required return for equity share holder is treated as cost of equity to the company.

$$\text{Current Price } (P_0) = \frac{D_1}{K_e - g} = \frac{3.20}{0.188 - 0.06} = \frac{3.20}{0.128} = ₹\ 25.$$

Example 17:

Suppose return market = 12%

Return Risk Free = 7%

Beta Equity = 1.5

Find K_e, If growth rate of dividend is 4% and next dividend per share is ₹ 2.10. Find current price of share. If the share is available in market at ₹ 18. Will you purchase it?

Answer:

Required Return $= 7 + \{1.5 \times (12 - 7)\} = 7 + (1.5 \times 5) = 7 + 7.5 = 14.5\%$

Required return is to be treated as K_e

$$P_0 = \frac{2.10}{0.145 - 0.04} = \frac{2.10}{0.105} = ₹\ 20$$

Actual price in the market = ₹ 18

Decision: The share is available at low price. It should be purchased.

Example 18:: Modern Ltd.'s share beta factor is 1.40. The risk free rate of interest on government securities is 9%. The expected rate of return on company equity shares is 16%. Calculate cost of equity capital based on capital asset pricing model.

Answer:

$$k_e = R_f + \beta (R_m - R_f)$$
$$K_e = 9\% + 1.40\ (16\% - 9\%) = 9\% + 1.40\ (7\%)$$
$$= 9\% + 9.8\% = 18.8\%$$

The appropriate discount rate to apply to the forecasted cash flows in an investment appraisal is the opportunity cost of capital for that investment. The opportunity cost of capital is the expected rate of return offered in the capital markets for investments of a similar risk profile. Thus it depends on the risk attached to the investments cash flows.

Cost of Retained Earnings, k_s

The cost of debt and preference shares are based on the returns investors expect on these securities. Similarly, the cost of equity share is based on the rate of return investors expect on a company's equity shares. Note, that new equity share capital is raised in two way: (1) by retaining some of the current year's earnings and (2) by issuing new equity share. As we shall see, equity raised by issuing shares has a somewhat higher cost than equity raised as retained earnings due to the floatation costs involved with new share issues. We use the symbol k_s to designate the cost of retained earnings and k_e to designate the cost of equity share raised by issuing new shares or external equity.

Required rate of return
= Expected rate of return

$$k_s = k_{RF} + RP = \frac{D_1}{P_0 + g}$$

A corporation's management might misguidedly think that retained earnings are "free" because they represent money that is "left over" after paying dividends. While it is true that no direct costs are associated with capital raised as retained earnings, this capital still has a cost. The reason we must assign a cost of capital to retained earnings involves the *opportunity cost principle*. The firm's after-tax earnings belong to its shareholders. Bondholders are compensated by interest payments and preference shareholders by preference dividends. All earnings remaining after interest and preference dividends belong to the equity shareholder, and these earnings serve to compensate shareholders for the use of their capital. Management may either pay out earnings in the form of dividends or else retain earnings or reinvest them in the business. If management decides to retain earnings, there is an *opportunity cost* involved – stockholders could have received the earnings as dividends and invested this money in other stocks, in bonds, in real estate, or in anything else. *Thus, the firm should earn on its retained earnings at least as much as the shareholders themselves could earn on alternative investments of comparable risk.*

If a stock is in equilibrium then its required rate of return k_s, must be equal to its expected rate of return k_e. Further its *required* return is equal to a risk-free rate, k_{RF}, plus a risk premium RP, whereas the *expected* return on a constant growth share is the share's dividends yield, D_1/P_0, plus its expected growth rate, g:

Required rate of return = Expected rate of return

$$\mathbf{k_s = k_{RF} + RP = \frac{D_1}{P_0} + g}$$

The **cost of retained earnings** is normally equal to the cost of existing equity capital (K_e)

Therefore, we can estimate k_s either as $k_s = k_{RF} + RP$

Note: The cost of retained earnings is normally equal to the cost of existing equity capital (K_e)

Example 19: Y Ltd. retains ₹ 7,50,000 out of its current earning. The expected rate of return to the shareholders. If they had invested the funds elsewhere is 10%. The brokerage is 3% and the shareholders came in 30% tax bracket. Calculate the cost of retained earning. **[Nov-2009]**

Answer: Computations of Cost of Retained Earnings (K_r)

$$K_r = k\,(1 - T_p)(1 - B)$$

$$K_r = 0.10\,(1 - 0.30)(1 - 0.03) = 0.10\,(00.70) \times (0.97) = 0.0679 \text{ or } 6.79\%$$

Cost of Retained Earnings = 6.79%

Cost of Depreciation

Depreciation provisions may be considered in a similar manner to retained earnings – they have an opportunity cost and represent an increased stake in the firm by its shareholders.

However, a distribution of depreciation provisions would produce a capital reduction, probably requiring outstanding debts to be repaid due to the depletion of the capital base, the security against which the debt was obtained.

This indicates a proportional combination between the cost of debt repaid and the cost of retained earnings to calculate the cost of capital in the form of depreciation provisions.

Example 20:

	A Ltd.	B Ltd.	C Ltd.	D Ltd.
Last dividend per share (D_0)	₹ 2	3	4	5
Growth rate (g)	5%	4%	7%	8%
Current price per share (P_0)	₹ 30	₹ 52	₹ 107	₹ 60

(i) Find cost of existing equity and cost of retained earnings.

(ii) Also find cost of new equity. If new shares are allotted at (a) ₹ 25 (b) ₹ 40 (c) ₹ 100 (d) ₹ 54

Answer: (i)

	A Ltd.	B Ltd.	C Ltd.	D Ltd.
Last Dividend per Share (D_0)	₹ 2	₹ 3	₹ 4	₹ 5
Growth rate (g)	5%	4%	7%	8%
Current price per share (P_0)	₹ 30	₹ 52	₹ 107	₹ 60
Cost of existing equity $\left[\frac{D_0(1+g)}{P_0+g}\right]$	$\frac{2\,(1+.05)}{30} + .05$ = 12%	$\frac{3\,(1+.04)}{52} + .04$ = 10%	$\frac{4\,(1+.07)}{107} + 1.07$ = 11%	$\frac{5\,(1+.08)}{60} + .08$ = 17%

(ii) The cost of retained earnings will be the same as the cost of existing equity

$$\text{The cost of new equity share} = \frac{\text{Next Dividend}}{\text{Next Proceeds}} + \text{growth rate}$$

$$\text{A Ltd.} = \frac{2 \times 1.05}{25} + 0.05 = 13.4\% \qquad \text{B Ltd.} = \frac{3 \times 1.04}{40} + 0.04 = 11.8\%$$

$$\text{C Ltd.} = \frac{4 \times 1.07}{100} + 0.07 = 11.28\% \qquad \text{D Ltd.} = \frac{5 \times 1.08}{54} + 0.08 = 18\%$$

Cost of New Equity, k_e

Companies generally hire an investment banker to assist them when they issue equity shares, preference shares, or bonds. In return for a fee, the investment banker helps the company structure the terms and set a price for the issue, and then sells the issue to investors. The banker's fees are often referred to as *flotation costs,* and the total cost of capital should reflect both the required return paid to investors and the flotation fees paid to the investment banker.

Cost of New Equity, k_e: The cost of external equity; based on the cost of retained earnings, but increased for flotation costs.

Flotation costs are often substantial, and they vary depending on the size and risk of the issuing firm and on the type of capital raised. So far, we have ignore flotation costs when estimating the component cost of capital, but some would argue that these costs should be included in a complete analysis of the cost of capital.

The first approach simply adds the estimated rupee amount of flotation costs for each project to the project's up-front cost. The estimated flotation costs are found as the sum of the flotation costs for the debt, preference, and equity shares used to finance the project. Because of the now-higher investment cost, the project's expected rate of return and NPV are decreased.

The second approach involves adjusting the cost of capital rather than increasing the project's cost. If the firm plans to continue to use the capital in the future, as is generally true for equity, then this second approach is better. The adjustment process is based on the following logic. If there are flotation costs, the issuing company receives only a portion of the total capital raised from investors, with the remainder going to the underwriter. When calculating the cost of common equity, the DCF approach can be adapted to account for flotation costs. For a constant growth equity shares, the **cost of new equity, k_e,** can be expressed as:

$$\text{Cost of equity from new equity issue, } k_e = \frac{D_1}{P_0(1\text{-}F)} + g$$

Here **F** is the percentage **flotation cost** required to sell the new stock, so $P_0(1\text{-}F)$ is the net price per share received by the company.

Cost of equity from new equity issue
$= k_e = \frac{D_1}{P_0(1\text{-}F)} + g$

If there is no floatation cost then

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

Or

$$\frac{\text{Next dividend per share}}{\text{Net proceeds received}} + \text{growth rate}$$

Value of Bond

Value of a bond depends on its cash flows and the discount rate. The expected cash flows consist of annual interest payments plus repayment of principal. The appropriate capitalization, or discount rate would depend upon the risk 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 to the cash flows of the company debenture.

Bonds maybe classified into three categories:

(a) Bonds with maturity, (b) Pure discount bonds and (c) Perpetual bonds.

Amortization of Bond

A bond may be amortized every year i.e. principal is repaid every year rather than at maturity. In such a situation, the principal will go down with annual payment and interest will be computed on the outstanding amount.

$$V_B = \sum_{t=1}^{n} C/(1+k_d)t \quad t=1$$

Composite, or Weighted Average Cost of Capital (WACC)

As we shall see in the chapter on capital structure and leverage, each firm has an optimal capital structure, defined as that mix of debt, preference, and equity shares that causes its stock price to be maximized. Therefore, a value-maximizing firm will determine its **optimal capital structure,** use it as a **target,** and then raise new capital in a manner designed to keep the actual capital structure on target over time.

The target proportions of debt, preference shares, and equity shares, along with the costs of those components, are used to calculate the firm's **weighted average cost of capital, WACC.**

$$WACC = w_d k_d(1 - T) + w_p k_p + w_e k_e$$

WACC represents the investors' opportunity cost of taking on the risk of putting money into a company. Since every company has a capital structure i.e. what percentage of funds come from retained earnings, equity shares, preference shares, debts and bonds, so by taking a weighted average, it can be seen how much cost/interest the company has to pay for every rupee it borrows/invest.

Example 21:

Suppose number of existing shares = 5,20,000

Existing capital structure	Percentage
Equity Share Capital	65%
Preference Share Capital	15%
Debenture	20%
	100%

This same percentage will continue in future. This best earnings per share (EPS).

Year	2003	2004	2005	2006
EPS	2.00	2.40	2.88	3.456

Next dividend per share will be equal to 50% of EPS of year 2006.

Current price per share = ₹ 21.60

15% new Debentures will be issued at market price ₹ 75 (Face value = ₹ 100)

New 13.8% Preference share will be allotted at ₹ 115 (Face value = ₹ 100)

Tax rate 50%. Find average cost of capital if the retained earnings will be used in a project.

Answer:

Based on past earnings we can get growth rate.

Year	EPS	Growth rate
2003	2	
2004	2.4	$\frac{E\ 2004}{E\ 2003} - 1 = \frac{2.4}{2} - 1 = 20\%$
2005	2.88	$\frac{E\ 2005}{E\ 2006} - 1 = \frac{2.88}{2.44} - 1 = 20\%$
2006	3.456	$\frac{E\ 2006}{E\ 2005} - 1 = \frac{3.456}{2.88} - 1 = 20\%$

The growth rate will be 20% p.a.

Next Dividend Per share (D_1) = 50% of EPS of 2006 = 50% of 3.456 = 1.728

Current Price (P_0) = 21.60

$K_e = \frac{D_1}{P_0} + g = \frac{1.728}{21.60} + 0.20 = 0.28 = 28\%$

Interest on Debenture = Face value × Interest rate

$= 100 \times 15\% = ₹ 15$

Cost of debts $= \frac{\text{Amount of Interest (1-tax)}}{\text{Market Price}} = \frac{15\ (1-0.50)}{75} \times 100 = 10\%$ p.a.

Cost of preference share $= \frac{\text{Amount of Preference Dividend}}{\text{Market value of Preference Share}} \times 100$

$= \frac{13.8\% \text{ of face value (₹ 100)}}{₹ 115} \times 100 = \frac{13.8}{115} \times 100 = 12\%$

If the given capital structure is maintained the cost of retained earnings will be equal to cost of existing equity i.e. 28%.

Overall cost for capital in new project

$= W_e k_e + W_p K_p + W_d K_d$

$= (0.65 \times 28) + (0.15 \times 12) + (0.20 \times 10) = 18.2 + 1.80 + 2 = 22\%$

Now, calculate the cost of project if the retained earnings of 2006 is used.

No. of equity shares	= 5,20,000 shares
EPS of 2006	= ₹ 3.456
DPS of 2006	= ₹ 1.728
Retained earnings per share	= ₹ 1.728
Total retained earnings	= ₹ 1.728 × 5,20,000 = ₹ 8,98,560
Proportion of equity invested in Project	= Project cost × 65%
₹ 8,98,560	= Project cost × 65%
Project cost	$= \frac{₹ 8,98,560}{65\%} = ₹ 13,82,400$

Marginal Cost of Capital

It may be defined as **"the cost of raising an additional rupee of capital".** To calculate the marginal cost of capital, **the intended financing proportion should be applied as weights to marginal components costs.** The marginal cost of capital should, therefore, be calculated in the **composite sense.** The marginal weights represent the proportion of funds the firm intends to employ.

To calculate the marginal cost of capital, the intended financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. When a firm raises funds in proportional manner and the component's cost remains unchanged, there will be no difference between average cost of capital (of the total funds) and the marginal cost of capital. The components costs may remain constant upto certain level of funds raised and then start increasing with amount of funds raised.

Example 22: Samurai Ltd. plans to use long-term sources of funds in following proportions.

Equity Funds	40%
Preference Capital	10%
Debt Funds	50%

Based on discussion with its merchant bankers and lenders, the company estimates the cost of its sources of finance for various levels of uses as follows:

Sources	***Range of new finance ₹ lakh***	***Cost***
Equity Funds	Less than 20	20%
	20 or more	22%

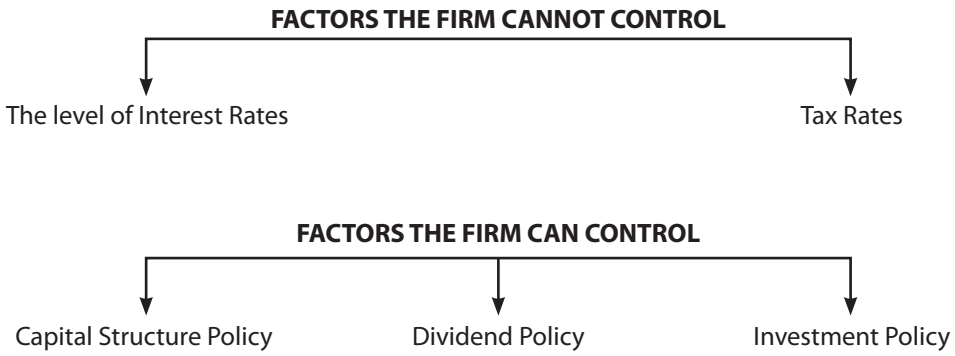
Preference Capital	Less than 4	10%
	4 or more	12%
Debt Funds	Less than 30	15%
	30 or more	16%

Prepare a schedule of marginal cost of capital.

Answer:

Range of funds				Cost of funds			
Total Capital ₹ lakh	**Equity ₹ lakh**	**Pref. capital ₹ lakh**	**Debt ₹ lakh**	**K_e %**	**K_p %**	**K_d %**	**K_o %**
0 – 40	0 – 16	0 – 4	0 – 20	20	10	15	16.5
40 – 50	16 – 20	4 – 5	20 – 25	20	12	15	16.7
50 – 60	20 – 24	5 – 6	25 – 30	22	12	15	17.5
Above 60	Above 24	Above 6	Above 30	22	12	16	18.0

Factors that affect the Composite Cost of Capital



Determination of Post-Tax Average Cost of additional Debt

Example 23: Gambaru Ltd. Wishes to raise additional finance of ₹ 20 lakhs for meeting its investment plans. The company has ₹ 4,00,000 in the form of retained earnings available for investment purposes.

The following are the further details:

Debt equity ratio 25:75. Cost of debt at the rate of 10% (before tax) up to ₹ 2,00,000 and 13% (before tax) beyond that. Earning per share ₹ 12, Dividend payout 50% of earnings to be paid., Expected growth rate in dividend 10%, Current market price per share, ₹ 60, Company's tax rate is 30% and shareholder's personal tax rate is 20%.

Required:

i. Calculate the post tax average cost of additional debt.
ii. Calculate the cost of retained earnings and cost of equity.
iii. Calculate the overall weighted average (after tax) cost of additional finance.

Answer:

Total Amount Required for Finance		=	20,00,000
Pattern of raising capital			
Debt	= 0.25 × 20,00,000	=	5,00,000
Equity	= 0.75 × 20,00,000	=	15,00,000
		=	20,00,000

Equity Fund (₹15,00,000)		
Retained earnings	=	₹ 4,00,000
New Equity (additional)	=	₹ 11,00,000
Total	=	₹ 15,00,000
Debt fund (₹ 5,00,000)		
10% debt	=	₹ 2,00,000
13% debt	=	₹ 3,00,000
Total	=	₹ 5,00,000

(i) Post Tax Average Cost of Additional Debt.

Overall K_d = Total Interest(1-t)/ ₹ 5,00,000 = [20,000 + 39,000] (1-0.3)/5,00,000 or (41,300/5,00,000) x 100 = 8.26% or **For 10%:** K_d = .10(1-.30) = 7%; **For 13%:** Kd = .13(1-.30) = 9.1%

Therefore Overall K_d = 7x2,00,000/5,00,000 + 9.1x3,00,000/5,00,000 = 8.26%

(ii) Cost of Retained Earnings and Cost of Equity

Ke = D_1/Po + g = 12(50%)/60 + .10 = 20%

Kr = Ke (1-tp) = 20(1-0.2) = 16% **where, tp stands for personal income tax of shareholders.**

(iii) Weighted Average Cost of Capital

	Amount	***After tax***	***Weight***	***Ko***
Equity Capital	11,00,000	20.00%	.55	11
Retained earning	4,00,000	16.00%	.20	3.2
Debt	5,00,000	8.26%	.25	2.065
Total	**20,00,000**			**16.2650%**

K_o = (3,25,300/20,00,000) x 100 = 16.27%

Note: In the above format 10% & 13% Debt can be taken separately, Answer will be same.

Note: It is given that the dividend of 50% is to be paid, so we assumed given dividend to be D1

Example 24: Adani Wilmar wished to raise additional finance of ₹ 10 lakhs for meeting its investment plans it has ₹ 2,10,000 in the form of retained earnings available for investment purposes. Further details are as following: (1) Debt/equity mix 30%/70% (2) Cost of debt: Up to ₹ 1,80,000 10% (before tax); Beyond ₹ 1,80,000 16% (before tax) (3) Earnings per share ₹ 4 (4) Dividend payout 50% of earnings is paid (5) Expected growth rate in dividend 10% (6) Current market price per share ₹ 44 (7) Tax rate 50%.

Required:

(a) To determine the pattern for raising the additional finance.
(b) To determine the post-tax average cost of additional debt.
(c) To determine the cost of retained earnings and cost of equity, and
(d) Compute the overall weighted average after tax cost of additional finance.

Solution:

(a) Pattern of raising additional finance.

Equity 70% of ₹ 10,00,000 = ₹ 7,00,000; Debt 30% of ₹ 10,00,000 = ₹ 3,00,000

The capital structure after raising additional finance:

The capital structure after raising additional finance:	***(₹)***
Equity Capital (7,00,000-2,10,000)	4,90,000
Retained earnings	2,10,000
Debt (Interest @ 10% p.a.)	1,80,000
(Interest @ 16% p.a.) (3,00,000 – 1,80,000)	1,20,000
Total Funds	10,00,000

(b) Determination of post-tax average cost of additional debt

K_d = I(1-t) Where, I = Interest Rate; T = Corporate tax-rate

On ₹ 1,80,000 = 10%(1-0.5) = 5% of 0.05; On ₹ 1,20,000 = 16% (1-0.5)=8% or 0.08

$$\textbf{Average Cost of Debt} = \frac{1,80,000 \times .05 + 1,20,000 \times .08}{3,00,000} = \textbf{6.2\%}$$

(c) Determination of cost of retained earnings and cost of equity applying Dividend growth model:

K_e = ₹2(1+.10)/ ₹ 44 + 10% = 15%

(d) Computation of overall weighted average after tax cost of additional finance

Particular	₹	*Weights*	*Cost of funds*
Equity (including retained earnings)	7,00,000	0.70	15%
Debt	3,00,000	0.30	6.2%

WACC = (Cost of Equity x % Equity) + (Cost of debt x % Debt)

= (15% x 0.70) + (6.2% x 0.30) = 10.5% + 1.86% = 12.36%

Note: Retained Earnings & Equity and 10% & 16% Debt can be shown separately. Answer will be same.

Treatment of Short-Term Debt

Example 25: From the following information, determine the appropriate weighted average cost of capital, relevant for evaluating long-term investment projects of the company.

Cost of equity	0.18	After cost of long-term debt	0.08
After tax cost of short-term debt	0.09	Cost of Reserve	0.15

Sources of capital	*Book Value (BV) (₹)*	*Market Value (MV) (₹)*
Equity: Capital	3,00,000	7,50,000
Reserve	2,00,000	-
Long-term debt	4,00,000	3,75,000
Short-term debt	1,00,000	1,00,000
	10,00,000	**12,25,000**

Answer:

Calculation of Weighted Average Cost of Capital or overall Cost of Capital:

Alternative 1 - Book value as weights

Element	*Amount (₹)*	*Weight*	*Specific cost of capital*	*Overall cost of capital*
Capital	3,00,000	0.3333	0.18	0.06
Reserve	2,00,000	0.2222	0.15	0.03
L/T debt	4,00,000	0.4445	0.08	0.04
	9,00,000	1.000		0.13

"Tell me and I'll forget; show me and I may remember; involve me and I'll understand."

– Chinese Proverb

Therefore, WACC = 13%

Alternative 2 - Market value as weights:

Element	*Amount*	*Weight*	*Specific cost of capital*	*Overall cost of capital*
Capital	4,50,000	0.40	0.18	0.0720
*Reserve	3,00,000	0.27	0.15	0.0405
L/T debt	3,75,000	0.33	0.08	0.0264
	11,25,000	1.00		0.1389

Therefore, WACC = 13.89%

***Note:** Market Value of equity share capital apportioned between capital and reserve in book value weighted.

Zero Coupon Bonds (ZCB)

Example 26: Suppose we are considering investing in a zero-coupon bond that matures in 5 years and has a face value of ₹ 1000. If these bonds are priced to yield 10%, what is the present value of the bonds?

Answer:

We know that value of a Zero Coupon Bond is = $\frac{\text{Face Value or Maturity Value}}{(1+K_d)^n}$ $\frac{100}{(1+.10)^5}$ = ₹ 621

"Intelligence plus character-that is the goal of true education."

– Martin Luther King Jr.

Problems and Solutions

Cost of Debt

Problem 1: OM steels Ltd. has issued 30,000 irredeemable 14% debentures of ₹ 150 each. The cost of floatation of debentures is 5% of the total issued amount. The company's taxation rate is 40%. **Calculate the cost of debt.**

Solution:

Calculation of net proceeds from debenture issue

		(₹)
Total issued amount	(30,000 debentures × ₹ 150)	45,00,000
Less: Flotation cost	$\left(₹\ 45,00,000 \times \frac{5}{100}\right)$	2,25,000
Net proceeds from issue		42,75,000
Annual interest charge	$\left(₹\ 45,00,000 \times \frac{14}{100}\right) = ₹\ 6,30,000$	

$$K_d = \frac{1(1-t)}{D} = \frac{₹\ 6,30,000(1-0.40)}{₹\ 42,75,000} = \frac{3,78,000}{42,75,000} = 0.0884 \text{ or } 8.84\%$$

Problem 2: Business Machines Ltd. has issued redeemable debentures of ₹ 100 each repayable at the end of 8 year period on a coupon rate of 14%. The flotation expenses is 10% of issue amount. **Calculate the cost of debt.**

Solution:

Year	Particulars	Cash flow	Discount factor @ 14%	Present Value ₹	Discount factor @ 18%	Present Value ₹
0	Net proceeds	90	1.000	90.00	1.000	90.00
1-8	Interest payments	(14)	4.639	(64.95)	4.078	(57.09)
8	Repayment on maturity	(100)	0.351	(35.10)	0.226	(26.60)
	Net present value			(–) 10.05		6.31

$$K_d = 14 + \frac{10.05}{10.05 + 6.31} \times 4 = 14 + \frac{10.05}{16.36} \times 4 = 14 + 2.46 = 16.46 \text{ or } 16.46\%$$

Cost of Redeemable Debentures

Problem 3: A company issues 25,000, 14% debentures of ₹ 1,000 each. The debentures are redeemable after the expiry period of 5 years. Tax rate applicable to the company is 35% (including surcharge and education cess).
Calculate the cost of debt after tax if debentures are issued at 5% discount with 2% flotation cost. [Nov-2015]

Solution: Calculation of Cost of Debt after Tax:

$$\text{Cost of Debt (Kd)} = \frac{I\,(1\text{-}t) + \left[\frac{RV - NP}{n}\right]}{\frac{RV + NP}{2}}$$

Where, I = Interest payment i.e. 14% of ₹ 1,000 = ₹ 140

t = Tax rate applicable to the company i.e. 35%