NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF BUSINESS AND HUMAN RESOURCES

COURSE CODE:MBF 720

COURSE TITLE: FINANCIAL MANAGEMENT 11

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Course Guide

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CONTENTS **PAGE**

Introduction

MBF 720: Financial management II is a semester work of three credit units. It will be available to all students taking the B.Sc programme in the school of business and human resource management.

This course of 16 units involves financial management as an aspect of management and finance which will be useful at both micro and macro organizational levels.

The course guide tells you what this course MBF 720 is all about, the materials to ensure you get the best and success. Other information contained in the course includes how to make use of your time and the information on tutor marked assignments. There will be tutorial classes. Full details concerning this will be conveyed to you at the appropriate time.

What You Will Learn in this Course

This course consists of concept of cost of capital, capital structure theory, dividend theory and policy, concept of operating and financial leverages, capital structure and the value of a firm, concept of projects, how feasible and viable a project is, project planning and appraisal. It also includes the risk and returns of projects, portfolio theory, how to finance small and medium scale enterprises and study on international financial management that will expatiate on the importance of this course in managing funds and finances in organizations.

Course Aims

This course will expose you to the concept of cost of capital, capital structure theory, dividend theory and policy, how to analyze project ideas, portfolio theory and how to finance small and medium scale enterprises so that it can be applied to our various businesses, enterprises and organizations.

The course will help you to value financial management as an aspect of management and finance. It is beneficial to small, medium and large scale organizations.

You will learn how to handle finances in different organizations, manage funds and avoid insolvency in various organizations.

The aim will be achieved by

1. Explaining the concept of cost of capital and methods of calculating it.
2. Identifying and discussing the capital structure theory and approaches of capital structure and the value of a firm.
3. Discussing the concept of operating and financial leverages and the degree of leverages and also analyzing leverage ratios.
4. Explaining dividend theory and policy alongside the value of a firm
5. Discussing projects, its feasibility and viability and project planning and appraisal.
6. Analyzing the risk involved in carrying out projects compared to the returns of the project.
7. Analyzing capital asset pricing model and portfolio theory with illustrations.
8. Highlighting ways of financing small and medium scale enterprises

9. Discussing what goes on in international financial management.

Course Objectives

By the end of this course, you should be able to:

- Distinguish between Equity Capital, Preference Share Capital and Debt Capital and analyse cost of Equity Capital considering Dividend Growth Model, Dividend Yield Model, Price Earning Model and Capital Asset Pricing Model.

10. Explain the meaning of capital structure and different components of capital structure and relationship between cost of capital and risk and discuss factors that determine capital structure decisions.
11. Discuss operating and financial leverages and do the analysis of leverage ratios
12. Explain the M-M Theory with taxation and Apply Pecking Order Theory in capital structuring and differentiate between debt and equity.

- Discuss what dividend theory is all about, highlight factors determining the dividend decisions of a firm, explain dividend theories and policies and briefly discuss the impact of dividend policies on the value of the firm.

13. Explain the types of projects highlight the importance pf project, project idea and identification and discuss the capital Investment process.
14. Give a detailed analysis on how to conduct feasibility studies and reports as well as the viability of projects and SWOT analysis, draw a project organisational structure.
15. Highlight the need for investment appraisal and explain the various appraisal techniques with calculations.
16. Give the meaning of risk, determine of risk and return of single asset, of a two-assets portion folio, a three-assets portfolio and ascertain the optimal portfolio of two assets, minimization of risk through diversification of portfolio
17. Give the meaning of Small and Medium Scale Enterprises; explain the features, Problems of small Scale Industries, Sources and Finance of SME's and Government Measures to enhance the status of SMI's.

- Define Foreign exchange management, explain the determinants of Exchange rates, how to Hedge the Foreign Exchange risk describe the theories of Foreign Exchange determination, and how to Calculate of Exchange Rate

Course Materials

- The Course Guide

- Study Units
- Textbooks
- The Assignment File

Study Units

There are 16 units of this course which you should study carefully:

Module 1

Unit 1: Cost of Capital
Unit 2: Capital Structure Theory
Unit 3: Operating and Financial Leverages
Unit 4: Capital Structure and Value Of The Firm
Unit 5: Degree of Leverages

Module 2

Unit 1: Dividend Theory
Unit 2: Dividend Policy and Value Of Firm
Unit 3: Projects
Unit 4: Feasibility and Viability
Unit 5: Project Planning

Module 3

Unit 1: Project Appraisal
Unit 2: Risk and Return
Unit 3: Capital Asset Pricing Model
Unit 4: Portfolio Theory
Unit 5: Financing SME
Unit 6: International Financial Management

The Assignment File

There will be an assignment in each unit. The exercises are tailored to help you have a full understanding of the course. Practice these assignments carefully, it

will help you assess the course critically, consequently increasing your knowledge of the course.

Tutor-Marked Assignment

In doing the tutor-marked assignments, you should apply what you have learnt in the content of the study units.

These assignments which are four in number are expected to be turned in to your tutor for grading. They constitute 30% of the total score.

Final Examination and Grading

At the end of the course, you will write an examination. It will attract the remaining 70%. This makes the total final score to be 100%.

Summary

MBF 720: Financial management II shows you some of the objectives and need and benefits financial management. Most importantly it shows you how to handle finances and how to manage them know matter how small.
At the end of this course, you would have learnt how to make proper use of funds and finances of an organization so as to achieve maximum results whether in small scale, medium scale and large scale enterprise.

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UNIT 1: COST OF CAPITAL

CONTENTS:

1.1 INTRODUCTION

The management of a company has the paramount responsibility of directing and controlling the company in the best interest of the owners (shareholders) and the investors. The main objective of a business firm is to maximize the wealth of its shareholders in the long run. The management is therefore expected to invest only in those projects which give a return in excess of cost of funds invested in the projects of the business. This cost of funds committed to the projects of the business is what is called Cost of Capital. The cost of capital refers to the rate of return the company has to pay to various suppliers of funds in the company. It can be described as the minimum rate of return that a firm must earn on its investments so that market value per share remains unchanged. In other words, it is the minimum required rate of return on the investment project that keeps the present wealth of shareholders unchanged. There are variations in the costs of capital due to the fact that different kinds of investment assume different levels of risk which is compensated for by different levels of return. Because different sources are opened to a business firm when raising funds, basically equity and debt, the determination of cost of funds becomes a phenomenon. Cost of capital is also referred to as cut-off rate, target rate, hurdle rate, minimum required rate of return and standard return. It consists of risk-free return plus premium for risk associated with the particular business. Risk premium represents the additional return paid to the providers of capital and debt in regards of the associated business and financial risks.

In the NPV (Net Present Value) method, an investment project is accepted if it has positive NPV. The projects NPV is calculated discounting its cashflows by the cost of capital referred to as discounting rate. However, in the IRR (Internal Rate of Return) method, the investment project is accepted if it has an IRR that is higher/greater than the cost of capital.

Meanwhile, the capital composition of a company is very essential. The capital structure of a typical company will include the following types of long term capital:

a) Ordinary (Equity) Share Capital
b) Preference Share Capital
c) Retained Earnings
d) Debentures and Bonds
e) Term Loans from Financial Institutions and Banks.

In determining the optimal finance combination of a company, we will need to calculate the cost of each particular finance being used and also the combined cost of capital i.e. the Weighted Average Cost of Capital (WACC).

1.2 Learning Objectives

- What cost of capital is
- Distinctions among Equity Capital, Preference Share Capital and Debt Capital
- Cost of Equity Capital considering Dividend Growth Model, Dividend Yield Model, Price Earning Model and Capital Asset Pricing Model
- Cost of retained earnings
- Cost of Redeemable and Irredeemable Preference Share Capital
- Cost of Redeemable and Irredeemable Debentures
- Convertible Loan Stocks
- Weighted Average Cost of Capital (WACC) of various sources of finance

1.3 COST OF EQUITY CAPITAL (KE)

This is the ordinary shareholders required rate of return which equates the present value of the expected dividends with the market value of the share. It can also be defined as the minimum rate of return that a company must earn on the equity share capital financial portion of an investment project to maintain the market price of the shares. Different methods are used in calculating cost of equity. These include:

a) Dividend Yield Method
b) Dividend Growth Model
c) Price Earning Method
d) Capital Asset Pricing Model (CAPM)

Dividend Yield Method

Under this method, cost of equity is seen as the discounting rate that equates the present value of all expected future dividends per share with the current market price or the net proceeds of the sale of a share. Dividend valuation model states that: ex-dividend share price = $do + \frac{d1}{(1+Ke)^1} + \frac{d2}{(1+Ke)^2} + \frac{dn}{(1+Ke)^n}$

Where, d = the constant dividend per share
Ke = Cost of equity share capital
n = year (time period)

Since this method assumes constant future dividend per equity share then

$MVe = \frac{d}{Ke}$

Therefore $Ke = \frac{d}{MVe}$

Where MVe = ex-dividend market share price. This method does not allow for any growth rate in dividend but rather emphasizes on future equity dividend expected to be constant.

Illustration 1.1

Ajegbe Ltd is expected to disburse a dividend of 300k on each equity share of 100k. The current market price of share is 800k. Calculate the cost of equity capital as per dividend yield method.

Solution

$Ke = \frac{d}{MVe}$ d = 300k or MVe = 800k

Ke = 300/800 = 0.375 = 37.5%

Illustration 1.2

Odidere Ltd issued 10,000 equity shares of 10k each at a premium of 2k each. The company has incurred issue expenses of N50. The equity shareholders expect the rate of dividend to 18% p.a. Calculate the cost of equity share capital.

Solution

Since the equity shares are newly issued

$$Ke = \frac{di}{NP}$$

NP = Net proceeds of each equity share

di = 10 x 0.18 = 1.8

$$NP = \frac{(10{,}000 \times 12) - 5000k}{10{,}000 \text{ equity shares}} = 11.50$$

$$Ke = \frac{1.80}{11.00} = 0.1565 \text{ or } 15.65\%$$

Note that the Market value per equity share is ex-div. Where the market value given is cum-div it should not be used. The amount of the dividend should be ascertained and deducted from the figure given to become ex-div.

Dividend Growth Model

In practice, growth in dividend yearly is expected. Dividend is not expected to remain unchanged in perpetuity. This method therefore makes provision for dividend growth.

Hence,

$$Ke = \frac{d1}{MVe} + g$$

where d1 = Expected dividend payable in year one per equity share

g = growth rate

MVe = Market

d1 which is the expected dividend payable in year one incorporates elements of growth. It is equal to the Latest/Current dividend paid plus growth in dividend.

$$di = do(1 + g)$$

where, do = Latest / Current dividend paid

g = growth rate

Therefore: $Ke = \frac{d1}{MVe} + g$ OR $\frac{do(1+g)}{MVe} + g$

Illustration 1.3

OSU Nig Plc has an authorized share capital of 450m of N1 each. 80% of the share capital had been issued and each share is currently valued at 320k. Dividend

amounting to N16m was recently paid. The estimated growth rate is 18%. Calculate the cost of equity capital.

Solution

Issues share capital = 80% of 50m = 40m shares = 40k
DPS = 16m / 40m shares

$$Ke = \frac{do(1+ g)}{MVe} + g$$

$$Ke = \frac{40k\ (1.18) + 0.18}{320k}$$

Ke = 32.75%

Illustration 1.4

The equity of Dangote Ltd are traded in the market at 90k each. The expected current year dividend per share is 18k. The growth in dividend is expected at the rate of 6%. Calculate the cost of equity capital.

Solution

$$Ke = \frac{d1}{MVe} + g \qquad \frac{18}{90} + 0.06 = 0.20 + 0.06 = 0.26 \text{ or } 26\%$$

Estimating the Growth Rate

There are two methods of estimating the growth rate

a) Dividend growth valuation method
b) Gordon's growth method/investment on earnings model.

Under Dividend growth valuation method:

$$\sqrt[n]{\frac{do}{dB}} - 1$$

where g = growth rate
dL = latest dividend
dB = Base dividend
n = number of years

under Gordon's growth method

g = r x b

where g = growth rate
r = return on investment
b = retention ratio/rate i.e. proportion of earnings retained.

Illustration 1.5

Given the following information about Obasanjo PLC.
Issued shares of N1 each N150,000
Current dividend 6,158
Market value per share 3.42
Current earnings 62,858
Net assets 315,000
Dividend – 5 years ago 2,473
Estimate the dividend growth rate using

1) dividend growth valuation method
2) Gordon's growth method

Solution

$$g = \sqrt[n]{\frac{dL}{dB}} - 1$$

r = 5, dL = 6,158 dB = 2,473

$$g = \sqrt[5]{\frac{6,158}{2,473}} - 1$$

$$g = \sqrt[5]{2.4900} - 1 = 20\%$$

NOTE: Where the dividend for the years are given year by year, then use n-1 (number of years data provided)

2) Gordon's

$g = r \times b$

$r = \frac{62,858 \times 100}{315,000} = 20\%$

$b = \frac{62,858 - 6158}{62,858} = 90\%$

$g = 0.20 \times 0.90 = 18\%$

Price Earning Method

This method incorporates the earnings per share (EPS) and the market price of the share. This is based in the assuring firm that the future earnings whether disbursed to the shareholders or ploughed back into the business will cause future growth in the earnings of the company as well as the increase in market prices of the share.

Therefore;

$$Ke = \frac{E}{M}$$

where E = Current earnings per share
M = Market price per share

Capital Asset Pricing Model

CAPM divides the required rate of return into two parts:

i) Risk free return
ii) Risk Premium

The risk premium is calculated by applying the project's beta factor (B) to the difference between the market return and the risk free rates of the return.

$Ke = Rf + B (Rm – Rf)$

Where Rf = Risk free rate of return
Rm = Market portfolio's expected rate of return
B = Risk measurement (Beta factor)
(Rm – Rf) = Market premium for risk
B(Rm – Rf) = Risk premium

1.4 COST OF RETAINED EARNINGS (KR)

Retained earnings represent the funds accumulated over years of the company by keeping part of the funds generated without distribution. It is the proportion of the total earnings of a company distributable to the equity shareholders but which is ploughed back into the business for further profitable investment opportunities. If the retained earnings are distributed among equity shareholders, the amount would have been reinvested to earn return on it. The cost of retained earnings therefore is the return forgone by the equity shareholders and it is the opportunity cost of funds not available for reinvestment by the individual shareholders. The cost of retained earnings is therefore equivalent to opportunity rate of earnings forgone by the equity shareholders. Hence, cost of equity includes retained earnings.

1.5 COST OF PREFERRED CAPITAL (KP)

The preference share capital represents the fixed dividend capital. It is easier to estimate because the interest received by the holder of the security is fixed by

contract and will not fluctuate in amount. It may be redeemable or irredeemable. Redeemable preference shares are shares the holders of which are refunded due sum at redemption in accordance with the terms under which the shares were issued and retained of the shares by the company.

Cost of Irredeemable Preference Shares

This is calculated as follows:

$$Kp = \frac{d}{MVp}$$

where Kp = Cost of preference share capital
d = Latest/Current dividend paid/payable
MVp = Market Value of preference shares ex-div

Cost of Redeemable Preference Shares

The cost of redeemable preference shares is the rate of interest (IRR) which equates the current market value with the discounted future cash receipts of the share.

$$MVp = \frac{d1}{(1+kp)^1} + \frac{d2}{(1+kp)^{12}} + \frac{d3}{(1+kp)^3} + \text{----} \frac{dn}{(1+kp)^n}$$

1.6 COST OF DEBENTURES CAPITAL

This is the minimum rate of return required by debenture holders in order to maintain their existing market value.

Cost of Irredeemable Debentures: It is given as:

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

Where, Kd = Cost of debt capital
I = Latest / Current interest paid/payable
MVd = Market value of debt ex-int
t = Corporation tax rate

Cost of Redeemable debt

$$MVd = \frac{Io(1-t)}{(1+kd)^1} + \frac{I_1(1-t)}{(1+kd)^2} + \frac{I_2(1-t)}{(1+kd)^n} + \text{----} I_n(1-t)$$

Illustration 1.6

XYZ Plc is financed by N10m, 10% redeemable debentures currently quoted at N100 each. The debentures would be redeemed in 10 years time at par Corporation tax is at 30%. Calculate the cost of the debentures.

Solution

YrCF	DF @ 5%	PV	DF @ 5%	PV
0 (100)	1	(100)	1	(100)
1-10 10	7.7217	77	6.7101	67
1-10 (3)	7.7217	(23)	6.7101	(20)
10 100	0.6139	61	0.4632	46
		15		(7)

Interpolation: IRR = R1 + (Positive NPV) x (R2 – R1)
+ NPV + -NPV

= 5 + 15 X (8-5)
22

= 7.05%

1.7 WEIGHTED AVERAGE COST OF CAPITAL

This is also known as the composite cost of capital as it represents the aggregate of the costs of various sources of finance in use. Using WACC, the proportion of total capital coming from each source of finance is weighted. The weighted costs are then added to give the overall cost of capital that is known as the WACC. WACC derives its importance from the argument that it is not appropriate to use the cost of specific fund as the cost for a project, particularly where such projects are to be financed from the internal resources of the company.

Method of Valuation

1) Weight based on market value
2) Weight based on book value

Illustration 1.7

Ade Cement Ltd has the following capital structure:

Particulars	Market values	Book values	Cost %
Equity share capital	80	120	18
Preference share capital	30	20	15
Fully secured debentures	40	40	14

Calculate the company's weighted average cost of capital based on both market values and book values.

WACC based on market values

Type	MV	Cost	HASH Total
Equity	80	18%	14.4
Preference	30	15%	4.5
Debenture	40	14%	5.6
	150		24.5

$$KW = \frac{HT}{MV} \times 100 = 24.5/150 \times 100 = 16.33\%$$

WACC based on book values

Type	MV	Cost	HASH Total
Equity	120	18%	21.6
Preference	20	15%	3.0
Debenture	40	14%	5.6
	180		30.2

Ke = 30.2/180 x 100 = 16.78%

1.8 CONVERTIBLE LOAN STOCKS

Convertible loan stocks are loan stocks that are changeable into ordinary shares at the option of the holder and under specific terms and conditions.

Illustration 1.8

Orimogunje Ltd has issued 14% convertible debentures of N100 each. Each debenture will be convertible into 8 equity shares of N10 each at a premium of N5 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 debenture.

Solution

Yr	Particulars	CF	DF @ 14%	PV	DF @ 15%	PV
0	Net proceeds	(95)	1.000	(95.00)	1.000	(95.00)
1-4	Interest less I(1-t)	8.40	2.914	24.48	2.855	23.98
4	Conversion value	20	0.592	71.04	0.572	68.64
				0.52		(2.38)

$$Kd = 14 + \frac{0.52}{0.52 + 2.38} \times 1$$

$$14 + \frac{0.52}{2.9}$$

$$= 14 + 0.18 = 14.18\%$$

1.8 SUMMARY

Cost of capital has been seen as the minimum required rate of return that a company must attain to maintain its market value and the value of its shares. The cost of equity capital is estimated by using different methods which include Dividend Yield Method, Dividend Growth Model, Price Earnings Method and Capital Asset Pricing Model. Dividend growth rate can be ascertained either by using dividend growth valuation model or Gordon's growth model. Cost of preference shares, cost of debts, cost of convertible loan stocks and weighted average cost of capital are also deal with.

1.9 SELF REVIEW QUESTIONS

1. Discuss briefly the different approaches to the computation of the cost of equity
2. How can you determine cost of equity in a growth company?
3. Cost of capital is the sum of the minimum for business risk plus a premium for financial risk. Explain
4. Retained earnings have no cost. Do you agree? Give reasons for your answer
5. N1.10m ordinary shares currently valued at 3.00k per share financed CAB LTD. A dividend of N6m is due for payment. Calculate the cost of equity capital.
6. Oluwole Nig Plc is financed by 60m ordinary shares currently valued at 156k per share. The results of the last five financial years are as follows:

Yr	Earnings	Dividend
2004	N20m	N15.6m
2003	N18m	N15m
2002	N16m	N13.2m
2001	N15.4m	N12.3m
2000	N13.9m	N11.1m

Calculate the company's cost of capital.

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UNIT 2: CAPITAL STRUCTURE THEORY

Learning Objectives

At the end of this unit, students should have understood:

- The meaning of capital structure and different components of capital structure
- Relationship of cost of capital and risk

- Gearing and financial risk
- Optimum capital structure
- Factors influencing capital structure decisions
- Net income and net operating income approaches of capital structuring
- Modigliani and Miller's view on capital structuring without taxation
- Arbitrage process under MM theory

CONTENTS

2.1 INTRODUCTION

Capital structure ordinarily implies the proportion of debt and equity in the total capital of a company. In other words, capital structure of a company is made up of equity and debt. Capital structure borders on how a company finances its operations and it is usually made up of ordinary share capital, preference share capital and debt capital.

Equity consists of the following: equity share capital, share premium, surplus profits, and reserves and so on. On the other hand, debt of a company may consist of all borrowings from the government statutory financial corporations and other agencies, term loans from banks and other financial institutions, debentures and all deferred payment liabilities. Ordinarily, increase in debt in the capital structure implies greater amount of interest payment. Therefore, capital structure theory becomes a topic of interest because the introduction of fixed interest debt in a company's capital structure increases its financial risk. This is partly due to the fact that interest must be paid whatever happens to earnings. Since acceptance of more debt means payment of greater amount of interest, the company must have to think twice about its effects on profitability.

2.2. FACTORS DETERMINING CAPITAL STRUCTURE DECISIONS

Control: The number of equity shares held by an individual shareholder determines his level of control and voting rights in the company. When the shareholders do not wish to dilute their control, the company will rely more on debt funds. This is because by funding through equity the control of the existing shareholders will be threatened.

Growth: Companies with high growth rate will require more funds for its expansion schemes which will be met through raising debt. The company will have to rely on debt than on equity and internal earnings.

Profitability: A company with higher profitability will have low reliance on outside debt and it will meet its additional requirement through internal generation.

Government Policy: Government policies and regulations play a major role in a company's capital structure. Monetary and fiscal policies of government have strong implication on the capital structure decisions of a company.

Legal Provisions: In raising equity capital, a company has to fulfill some certain legal terms and conditions which make equity capital funds more complicated than raising debt. A company may opt for debt in an attempt to sideline the cumbersome process.

Company Size: The companies with small capital base will rely more on owners' funds and internal earnings. Large companies have to depend on capital market.

2.3 OPTIMUM CAPITAL STRUCTURE

The optimum capital structure is that capital structure or combination of equity and debt that leads to the maximization of the value of the firm. The optimum capital structure minimizes the overall cost of the firm and maximizes the value of the firm. The introduction of debt to capital structure increases the earnings per share as the interest on debt is tax deductible, which results in increase in share price. However higher levels of debt funds in capital structure result in greater financial risk and leads to higher cost of capital and depress the market price of company's share. The firm must therefore endeavour to achieve and maintain the optimum capital structure not dispensing with the value maximization objective of the firm.

2.4 GEARING AND FINANCIAL RISK

A company is a geared company if there is debt in its capital structure and when fixed interest debt is introduced into a company's capital structure, the financial

risk is increased. Financial risk is the increased risk of equity holders due to financial gearing. It does not arise from a company's investment; it is due solely to the capital structure or more specifically to the level of gearing. The financial risk of a company's capital structure can be measured by a gearing ratio. Gearing ratio shows the proportionate relationship between fixed interest and equity capital in the finance of a business.

Forms of Gearing

$$1^{st}\text{ Gearing Ratio} = \frac{\text{Fixed interest capital + Pref. Share Capital}}{\text{Shareholders funds}}$$

$$2^{nd}\text{ Gearing Ratio} = \frac{\text{Fixed interest capital + Pref. Share Capital}}{\text{Capital Employed}}$$

$$3^{rd}\text{ Gearing Ratio} = \frac{\text{Total Debt}}{\text{Shareholders funds}}$$

Total debt includes all liabilities of the company. It does not however include preference share which for this ratio is taken as part of the shareholders funds.

$$4^{th}\text{ Gearing Ratio} = \frac{\text{Interest on debt}}{\text{EBIT}}$$

Advantages of Debt Capital

1. The administrative and issuing costs are normally lower than raising equity capital.
2. It has cost advantage due to the ability to set debt interest against profit for tax purposes.
3. The pre-tax rate of interest is invariably lower than the return required by the equity capital suppliers.

2.5 CAPITAL STRUCTURE THEORIES

There are two main theories about the effect of changes in gearing on the WACC and share value. These are:
1. The Net Income Approach (Traditional view).
2. The Net Operating Income Approach.

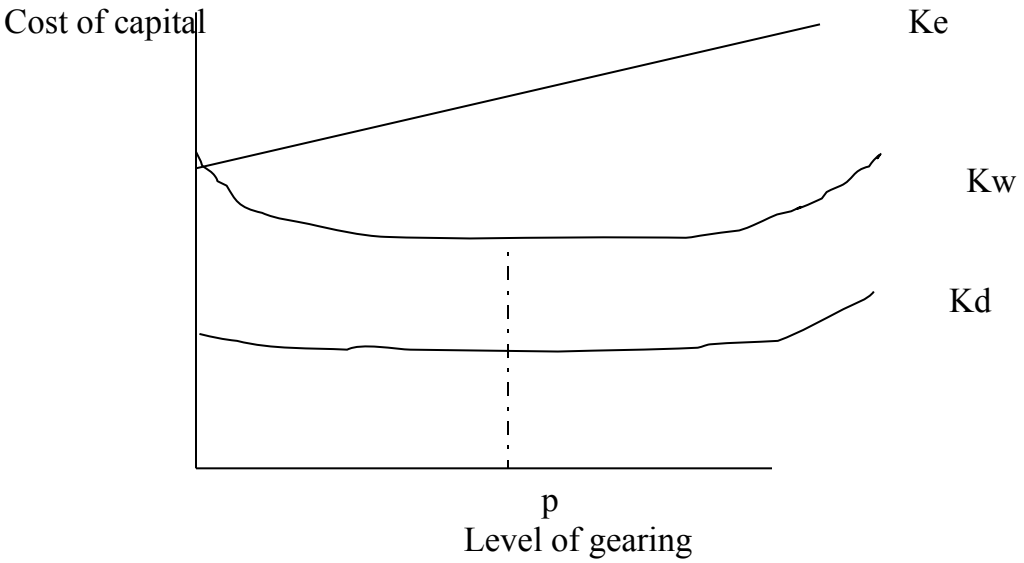
Basic Assumptions of the Theory of Capital Structure

1. The gearing of a company is changed immediately by issuing debt to purchase shares or by issuing shares to purchase debt.
2. The company pays out all its earnings as dividends.
3. Business risk is constant regardless of how the company invests its funds.

4. Taxation and its effect on cost capital are ignored.
5. There are no transaction costs and a company can alter its capital structure without any transaction costs.

Net Income Approach

A decision about capital structure, according to this approach, is relevant to the valuation of the firm. This approach views that an alteration in the capital structure of a firm causes change in the overall cost of capital (WACC) and also in the total value of the firm. This approach states that debt capital is cheaper than equity and that as such a company can increase its value by borrowing up to a reasonable limit. According to this approach, the value of the firm is equal to the market value of equity plus the market value of debt.



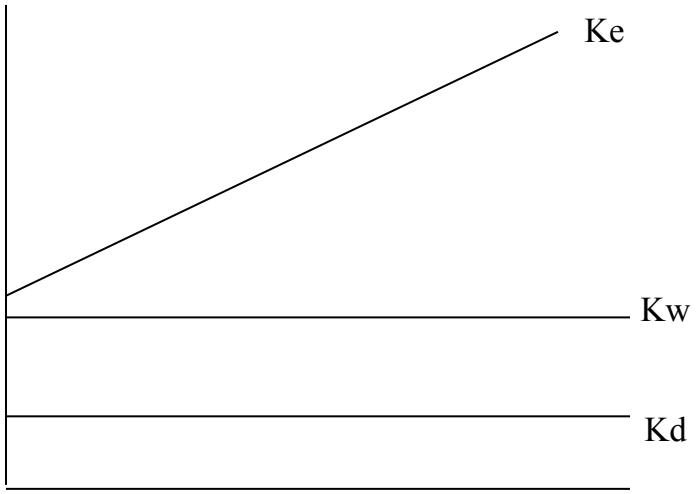
Under this approach, the following assumptions hold:
1. The cost of debt will remain constant until a significant point is reached when it would start to rise.

2. The WACC will fall immediately an external source of finance is introduced and will be rising thereafter as the level of gearing increases.

3. The company's market value and the market per share will be maximized where WACC is at the lowest point (p).

Net Operating Income Approach

According to this approach, value of the firm is independent of its capital structure. It states that the way a company finances its operations is irrelevant in the determination of the company's market value. It assumes that the weighted average cost of capital remains unchanged irrespective of the level of gearing. It derives its strength from the assumption that increase in debt capital increases the expected rate of return by the stockholders and the benefit of using relatively cheaper debt funds is offset by the loss arising out of the increase in cost of equity. Under this approach, optimal capital structure does not exist as WACC remains constant.



1. Cost of debt will remain constant regardless of the level of gearing.
2. The WACC will remain unchanged as the gearing increases.
3. The cost of equity will rise in such a way as to keep the WACC constant.

$$\text{The value of firm} = \frac{\text{EBIT}}{\text{Ko}}$$

Value of Equity share = Value of firm – Value of debt
Where EBIT = Earnings Before Interest and Tax
Ko = Overall cost of capital.

Illustration 2.1

A company has N10, 000 debts at 10% interest and earns N10, 000 a year before interest is paid. There are 4,500 issued shares and weighted average cost of capital of the company is 20%.

a) (i) What is the company's market value?
(ii) What is the cost of its equity capital?

(iii) What is the market value per share of its equity?

(b) Suppose the company issues N10, 000 additional debt at 10% interest to repurchase shares at the price calculated in (iii) above. If the WACC remains unchanged:
(i) Calculate the number of shares that were repurchased.
(ii) What is the new cost of the equity capital?
(iii) What is the new market value per share of its equity?

Solution

(a) (i) Earnings before interest and tax = N10,000
WACC = 20%
Market value of firm $= \frac{N10,000}{0.20} = N50,000$

(ii) Market value of firm = 50,000
Less: Market value of debt = 10,000

Market value of equity 40,000

$Ke = \frac{d}{MVe}$

Dividend = Total earnings – Interest
= N10, 000 – N1000 = N9000

$Ke = \frac{N9000}{N40,000} \times 100 = 22.5\%$

(iii) Market value per share $= \frac{N40,000}{4,500} = N8.89$

(b) (i) Number of repurchased shares $= \frac{N10,000}{N\ 8.89} = 1,125$ shares

(ii) The new cost of equity capital
New market value = N40, 000 – N10, 000 = N30, 000
New dividend = N9000 – 10%(10000) = N8000
New Ke $= \frac{N8000}{N30,000} \times 100 = 26.67\%$

(iii) New market value per share
$= \frac{N30,000}{4,500 - 1,125} = \frac{N30,000}{3,375} = N8.89$

Illustration 2

Ota ltd and Sango ltd are identical in all respects including risk factors except for debt/equity mix. Ota ltd having issued 12% debentures of N3, 000,000 while Sango ltd issued only equity capital. Both companies earn 24% before interest and taxes on their total asset of N5, 000, 000. Assuming the corporate effective tax rate of 40% and capitalisation rate of 18% for an all-equity company. Compute the value of Ota and Sango ltd using (i) Net Income approach and (ii) Net Operating Income approach.

Solution

(i) Valuation of companies under Net Income approach

Particulars	**Ota**	**Sango**
EBIT (5,000,000 x 0.24)	1,200,000	1,200,000
Less: Debenture interest @ 12%	360,000	
Profit before tax	840,000	1,200,000
Less: tax @ 40%	336,000	480,000
Net Income available to Equity shareholders (dividend)	504,000	720,000

Market value of equity

$$MVe = \frac{d}{Ke}$$

Where d = Net income available to equity shareholder

Ke = Equity capitalisation rate

$$\text{Ota ltd} = \frac{504,000}{0.18} = N2,800,000$$

$$\text{Sango ltd} = \frac{720,000}{0.18} = N4,000,000$$

Market value of firm = MVe + MVd

Where MVe = Value of equity

MVd = Value of debt

Ota = 2,800,000 + 3,000,000 = N5,800,000
Sango = 4,000,000 + 0 = N4,000,000

(ii) Valuation of Companies under Net Operating Income Approach

Particulars		Ota	Sango
Value of Firm = EBIT / Ko	(1,200,000(1-0.4)) / 0.18	4,000,000	4,000,000
Less: Value of debt	(3,000,000 (1-0.4))	1,800,000	
Value of Equity		2,200,000	4,000,000
Add: Value of debt		3,000,000	
Total Value of company		5,200,000	4,000,000

Modigliani and Miller Theory – M-M's Theory

The original normative theory of company valuation and capital structure was put forward in form of a behavioural justification of the Net Operating Income approach by Franco Modigliani and Melton H. Miller (MM) in 1958. MM argues that a company's WACC remains unchanged at all levels of gearing, which implies that no optimal capital structure exists for a particular company. By using Arbitrage theory, they supported their argument that capital structure is irrelevant in determining the market value of a company. A change in debt-equity has no influence on the cost of capital and the market value of the firm.

Assumptions of the M-M Theory

- The capital market is perfect. The implication is that cost of insolvency is nil, information is freely available to all investors, there are no limits of borrowing, for every transaction there is a seller and a buyer.
- All securities are infinitely divisible.
- There are no transaction costs.
- Homogenous expectations. The investors have the same expectations, which are the same with that of the company.
- The debt is cheaper that equity. Increase in debt level will increase the cost of debt. The increased debt will increase the financial risk and expectations of the equity holders will be more. Thus, the WACC will remain constant for all levels of leverage.
- There are no personal taxes and corporate income taxes.
- All investors are only price takers.
- The stock markets are perfectly competitive.

M-M Theory: No Taxation

By MM Theory, the increase in cost of equity is just enough to offset the benefit of low cost debt when there is increase in the level of debt. Then average cost of capital is constant for all levels of leverage.
From the assumptions of the M-M theory, three propositions are set out:

Proposition I

This states that the market value of any firm is independent of its capital structure, altering the gearing ratio cannot have any effect on the company annual cash flow. Company's value is determined by the assets in which the company has invested and not how those assets are financed.
The value of the geared company is as follows:

$$MVg = MVu$$

$$MVg = \frac{\text{Profit before interest}}{\text{WACC}}$$

$$MVu = MVg = \frac{\text{Earnings in ungeared company}}{Ku}$$

Where:

MVg = Market value of a geared company
MVu = Market value of ungeared company
Ku = Cost of equity in an ungeared company

Proposition II

The rate of return required by shareholders increases in proportion to the debt-equity ratio increase. The cost of equity rises exactly in line with any increase in gearing to offset any benefits conferred by the use of cheap debt.

The cost of equity of a geared firm is calculated as follows:

$$Kg = Ku + \left[(Ku - Kd)\frac{x\ D}{MVeg}\right]$$

Where:

Kg = Cost of capital in a geared company

Kd = Cost of debt
D = Value of Debt
MVeg = Market value of a geared company

Proposition III

The cut-off rate for new investment will in all cases be average cost of capital and will be unaffected by the type of security used to finance the investment.

ARBITRAGE

The process of buying an asset or security in one market and selling the same in another market to derive benefit from the price differential is referred to as arbitrage. The arbitrage procedure involves that an investor will sell his shares in the company having the higher market value and move to the company having the lower market value lending or borrowing in order to carry out the arbitrage transaction. The word arbitrage is a technical term that refers to a situation where two identical commodities are selling in the same market for different prices. At equilibrium, the increase in demand will force up the price of the lower priced goods and increase in supply will force down the price of the high priced goods.
If two firms with same level of business risk but different levels of gearing sold for different values, then shareholders would move from over-valued firm to under valued firm to maintain financial risk at the same level. The process of arbitrage would drive the price of the two firms to a common equilibrium total value.

Illustration:

The capital structure of XYZ ltd and PQR ltd are given below:

Particulars	XYZ	PQR
Equity capital	3,000,000	4,000,000
Debt 16%	3,000,000	
Total	6,000,000	4,000,000

Both companies are in the same class of business risk with earnings before interest of N1, 800,000. Mr. X is holding equity of 5% in XYZ ltd. He sold his shares and borrowed on interest at 16% p.a. Explain how Mr. X will be better off in switching his holding to PQR ltd under MM theory.

Solution

XYZ Ltd profits available for distribution

N

Profit before interest	1,800,000
Less: interest @ 16%	480,000
	1,320,000

Mr. X's share of profit 1,320,000 x $\frac{5}{100}$ = N66,000

Value of shares sold = $\frac{5}{100}$ x 3,000,000 = N150,000

Value of shares to be bought in PQR = $\frac{5}{100}$ x 4,000,000 = N200,000

Amount borrowed = 200,000 – 150,000 = N50,000

Mr. X's Net Gain

	N
Total earnings in PQR ltd	1,800,000
Mr. X's share in PQR (1,800,000 x $\frac{5}{100}$)	90,000
Less: interest on personal loan (80,000 x $\frac{16}{100}$)	8,000
Net earnings of X in PQR ltd	82,000

Net Gain = N82,000 – N66,000 = N16,000

Mr. X could increase his income by N16,000 while maintaining total risk at the same level.

2.8. SUMMARY

Capital structure of a company consists of debt and equity components raised from long-term sources. The significant advantage of debt funds is fixed interest obligation and tax deductible. The debt equity ratio is a commonly used determinant of capital structure. In traditional approach, the optimum capital structure is determined at a profit where WACC is minimum and at this point the value of firm is maximised. The net operating income approach on the other hand, states that the value of firm is independent of its capital structure. MM theory is considered as modern approach to capital structure. MM argue that the process of arbitrage will prevent the different market values for equivalent firms.

2.9 SELF REVIEW QUESTIONS

- ❖ What are the factors to be considered in planning the capital structure of a company.
- ❖ Critically examine the Net Income and Net Operating Income Approaches to capital structure.
- ❖ Distinguish between Net Operating Income approach and MM Approach.
- ❖ Briefly explain arbitrage notion of MM Theory.

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UNIT 3: OPERATING AND FINANCIAL LEVERAGES

Learning Objectives

After dealing with this unit, students must have understood:

- The meaning of leverage

- Ascertainment of operating and financial leverages.
- Analysis of leverage ratios
- What trading on equity' is
- Distinction between debt and equity
- Impact of gearing on cost of capital and EPS of the firm.

CONTENTS

3.1. INTRODUCTION

Leverage refers to the ability of a firm to enhance returns to the owners in introducing long-term funds having a fixed cost. In other words, leverage is the employment of fixed assets or funds for which a firm had to meet fixed costs or fixed ratio of interest obligation, irrespective of the level of activities attained or the level of operating profit earned. Leverage ratios can be classified into two groups (a) Activity Leverage and (b) Structural Leverage.

3.2. LEVERAGE RATIOS

a) Activity Leverage.

This includes three ratios

i. Operating Leverage.
ii. Financial Leverage.
iii. Total Leverage.

i. Operating Leverage.

This has to do with the normal operation of a firm. It arises from the operating activity of the firm. It relates to the sales and profit variations. Operating leverage is the responsiveness of firm's EBIT to the changes in sales value.

i.e. Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}}$

OR $\frac{\text{Contribution}}{\text{Operating Profit.}}$

Operating leverage of a firm is determined by the fixed cost and variable cost mix of the firm. If the firm has high level of fixed cost and low variable cost, the

operating leverage would be higher. The low operating leverage is dictated by high variable cost and low fixed cost. The percentage change in EBIT resulting from a percentage change in sales can be measured and this is called degree of operating leverage.

$$\text{Degree of Operating leverage} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}}$$

$$\text{Or} = \frac{\%\Delta EBIT}{\%\Delta Q}$$

$$\text{Or} = \frac{Q\,(P - V)}{Q\,(P - V) - F}$$

Where, Q = Quantity produced and sold
P = Selling price per unit
V = Variable cost per unit
F = Operating fixed costs

Operating Leverage is present in the firm if

$$\frac{\%\Delta \text{ EBIT}}{\%\Delta Q} > 1$$

Illustration 3.1

Firms A and B manufactures the same product and their cost sheets are given below

	A	B
Units manufactured and sold	20,000	20,000
	N	N
Direct material	10	10
Direct labour	5	5
Variable overheads	5	5
	20	20
Contribution	10	10
Selling price	30	30

Assuming the fixed overheads of 100,000 150,000
Calculate the operating leverages for the two firms.

Solution

	A	B
	N	N
Contribution for 20,000 units	200,000	200,000
Less: Fixed overheads	100,000	150,000
EBIT	100,000	50,000
Contribution	200,000	200,000

EBIT	100,000	50,000
Operating leverage	2	4

Firm A's operating leverage is twice of B as the fixed overheads are higher. The higher the operating leverage ratio the more risky the situation.

(ii) Financial Leverage

This has to do with the financing activities of a firm. It refers to the use of debt in the capital structure. The financial leverage is an indicator of responsiveness of firm's EPS to the changes in its profit before interest and tax. When this ratio is considered along with the operating ratio, it gives a fair idea about the firm's earning, its fixed costs and the fixed interest expenses. The degree of financial leverage is an attribute of the firm's exposure to financial risk.

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

Where EBIT = Earnings Before Interest and Tax
EBT = Earnings Before Tax

The degree of financial leverage is expressed as follows:

$$\text{DFL} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}}$$

$$\text{Or} = \frac{\%\Delta \text{ EPS}}{\%\Delta \text{ EBIT}} \quad \text{or} \quad \frac{\Delta \text{ EPS/EPS}}{\Delta \text{ EBIT/EBIT}}$$

EPS is estimated as below:

$$\text{EPS} = \frac{(\text{EBIT} - \text{I})(1 - t) - \text{Dp}}{\text{N}}$$

Thus Degree of financial leverage can also be expressed as follows:

$$\text{DFL} = \frac{\text{EBIT}}{(\text{EBIT} - \text{I})(1 - t) - \text{Dp}}$$

Where I = Interest on long-term debt
t = Corporate tax rate
Dp = preference dividend.

Illustration 3.2

The following information is available for Orimogunje Ltd for the year ended 31st March, 2005.

Interest on debt	N400,000
Preference dividend	N200,000
Corporate tax	40%

Calculate the degree of financial leverage.
(i) if EBIT is N1,000,000
(ii) if EBIT is N1,500,000

Solution

$$DFL = \frac{EBIT}{EPS} = \frac{EBIT}{(EBIT - I)(1 - t) - Dp}$$

(i) $$DFL = \frac{1,000,000}{(1,000,000 - 400,000)(1 - 0.4) - 200,000}$$

$$= \frac{1,000,000}{600,000\ (0.6) - 200,000}$$

$$= \frac{1,000,000}{160,000} = 6.25$$

(ii) $$DFL = \frac{1,500,000}{1,100,000\ (0.6) - 200,000}$$

Favourable or unfavourable financial leverage can arise depending on the firm's earnings on the assets and fixed financing cost paid. It is favourable when the firm earns more on the assets purchased than the fixed financing cost paid. On the contrary, excess of financing costs over profits results in unfavourable or negative leverage. Higher financial leverage means higher EBIT resulting in higher EPS, if other things (variables) remain the same. Financial leverage generally raises expected EPS, but it also increases the riskiness of securities as the debt-asset ratio rises. Financial leverage has its impending effect on a firm's WACC and value.
Increase in financial leverage will reduce WACC and bring about increase in the market price of equity shares and value of the firm. On the contrary, decrease in financial leverage will cause increase in WACC and decline in the value of the firm.

(iii) Total Leverage

Total leverage may be defined as the potential use of fixed costs, both operating and financial which magnifies the effect of sales volume change on the EPS of the firm. The total leverage is also called "Combined Leverage". Total leverage degree can be calculated as follows:

$$DTL = \text{Operating Leverage} \times \text{Financial Leverage}$$

$$\text{Or} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Or} = \frac{\text{Contribution}}{\text{EBT}} \quad \text{or} = \frac{\Delta EPS/EPS}{\Delta Q/Q}$$

Substituting the value EPS:

$$QTL = \frac{Q(P - V)}{Q(P - V) - F - I - \frac{Dp}{1 - t}}$$

(b) Structural Leverage

This encompasses ratios that express the relationship between owner's capital and outsider's stake in the firm. These ratios are also called capital gearing ratios. They are:

1. Debt-Equity ratio
2. Total debt-equity ratio
3. Debt-Net worth ratio.

1. **Debt-Equity Ratio.**

This ratio is the most significant of leverage ratios as it gives the composition of the long-term funds of the firm in terms of the stake of the owners and outsiders in the business.

$$\frac{\text{Long term Debt}}{\text{Shareholder funds}}$$

Shareholder funds include equity capital and free reserves. A high ratio indicates large outside stake in the business. The preference capital is usually excluded from long term debt but if the ratio is to show effect of use of fixed interest sources on earnings available to the shareholders then, it is to be included. On the other hand, if the ratio is to examine financial solvency, then preference shares shall form part of the capital.

2. **Total Debt-Equity Ratio**

Here, total debt includes not only long-term debt but also current liabilities.

$$\frac{\text{Long-term Debt + Short-term liabilities}}{\text{Shareholders Funds}}$$

The inclusion of current liabilities in debt-equity ratio is justified by the fact that the sundry creditors can exert pressure on the management.

3. **Debt-Net worth Ratio**.
This ratio relates the long-term debt with the network of the firm that is, the capital and free reserves less intangible assets.

$$\frac{\text{Long-term Debt}}{\text{Net worth}}$$

This ratio is justified on the basis that it excludes invested capital in fictitious assets like deferred expenditure.

3.3 INTEREST COVER AND INCOME GEARING

This ratio is calculated to analyse the company's ability to meet interest obligations. It is measured as a ratio of profit before interest and tax to interest charges.

$$\frac{\text{Profit Before Interest and Tax}}{\text{Interest Charges}}$$

The inverse of the interest cover is called income gearing indicating the proportion of pre-tax earnings committed to prior interest charges.

$$\frac{\text{Interest charges}}{\text{Profit Before Interest and Tax}} \times 100$$

Capital Gearing Ratio

This ratio is the proportion of the fixed return capital to the total capital. It is given as:

$$\frac{\text{Fixed Return capital}}{\text{Total Capital}}$$

$$= \frac{\text{Long-term debt + Preference Capital}}{\text{Long-term debt + Preference Capital + Equity Capital +Reserves}}$$

Illustration 3.3

Busayo and Papa Ltd's balance sheet shows the following structure of finance for the year ended 31st March, 2009.

N

Equity share capital (5,000,000 of N1 each)	5,000,000
Pref. Share capital (12%) (100,000 share of N10 each)	1,000,000
Share premium	2,000,000
General Reserve	1,500,000
Non-Convertible Debentures (14%)	4,000,000
Current Liabilities	500,000
Total assets	14,000,000

The profit earned during the year before interest payments and tax at 40% amounted to N3,400,000. Board of Directors recommends a dividend at 18% on equity shares. You are required to calculate
(a) Capital gearing ratio
(b) Income gearing ratio

Solution

(a) Capital gearing ratio = $\frac{\text{Long-term debt + Pref. Capital}}{\text{Long-term debt + Pref. Capital + Equity Capital + Reserves}}$

$= \frac{40 + 10}{40 + 10 + 50 + 20 + 15} \times 100 = \frac{50}{135} \times$

The gearing ratio is small and the company's financial risk is lesser.

(b) Income Gearing ratio

$= \frac{\text{EBIT}}{\text{Fixed Interest}} = \frac{34}{5.60} = 6.07$ times

3.4 SUMMARY

The fixed interest debt component is used in total capital structure to enhance the return to the equity shareholders. But the risk will increase in times of unfavourable business condition.
Leverage refers to the ability of a firm in employing long-term funds having a fixed interest to enhance returns to the owners. It is expressed as Contribution/Net Profit.
If the operating leverage is higher the company is subject to greater degree of business risk.

Financial leverage refers to the use of debt component in capital structure and the effect of payment of fixed interest on firm's profitability. It is EBIT / EBT.

The higher the combined leverage, the firm is subject to greater risk which includes both business risk and financial risk.

3.4 SELF REVIEW QUESTIONS

- Explain the concept of operating and financial leverage.
- Distinguish between Structural leverage and financial leverage.
- Distinguish between Structural leverage and Capital gearing ratio.
- Given that the fixed expenses of Busayo and Papa in illustration 3.3 is N400,000; calculate
    - Operating leverage
    - Financial leverage
    - Total leverage
    - Interest Cover

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UNIT 4: CAPITAL STRUCTURE AND VALUE OF THE FIRM

Learning Objectives:

At the end of this study, students must have understood:

- M-M Theory with taxation.
- Application of Pecking Order Theory in capital structuring
- Modified Pecking Order suggested by Myers

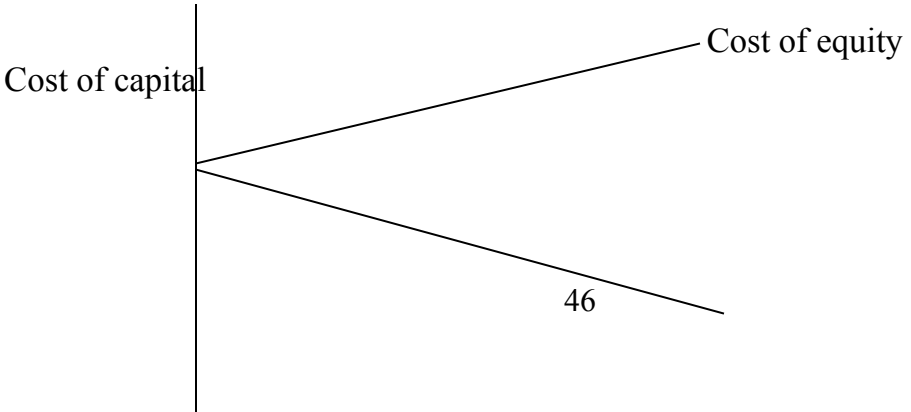
CONTENTS

4.1 INTRODUCTION

In unit 2, MM theory has been treated with the tax relief being ignored. The assumption that there is no corporate tax is unrealistic for a corporate firm. From this perspective, MM has modified their theory by considering tax relief available to a geared company when the debt component is existing in the capital structure.

4.2 MM THEORY WITH CORPORATE TAXATION

Here, the MM theory demonstrates a situation of a firm where corporate taxation is put under consideration. The tax burden on the company will lessen to the extent of relief available on interest payable on the debt, which makes the cost of debt cheaper and reduces the WACC of the firm to the lower where capital structure of a company has debt component.



WACC

_____ Cost of Debt (After tax)

_____

Gearing

As the level of gearing increases the WACC will be reducing and the company's market value will be maximized at 100% level of gearing. The increase in the value of the company is the present value of further tax relief referred to as a tax shield. They assumed that the value of the geared company will always be greater than an ungeared company with similar business risk, but only by the amount of debt-associated tax saving of the geared company. So, at equilibrium price the market value of a geared company is equal to the market value of its ungeared counterpart plus the debt assisted tax shield.

At equilibrium

$MVg = MVu + Dt$

Where,

MVg = Market value of the geared company
MVu = Market value of an ungeared company
D = Market value of debt capital
t = Corporation tax rate

Cost of Capital of a Geared Company

$Kg = (Ke \times \% \text{ of Equity}) + (1 - t)(Kd \times \% \text{ of Debt})$

Where

Kg = WACC
Ke = Cost of Equity capital
Kd = Cost of debt capital (Pre-tax)

Cost of Equity Capital of a Geared Company

$$Keg = Ku + (1 - t)(Ku - Kd) \times \frac{D}{Veg}$$

Where,

Keg = Cost of Equity capital in a geared company
Ku = Cost of capital of an ungeared company
Kd = Cost of debt capital (Pre-tax)
D = Debt capital
t = Corporation tax

Illustration 4.1

Mr. Fash Ltd has the following capital structure:

	N
Equity Capital	3,000,000
Debt (16%)	6,000,000
	9,000,000

Corporate tax rate is 40%. The cost of equity is assumed to be 24%. Calculate the WACC of the company.

Solution

$$Kg = (24\% \times \frac{30}{90}) + (1 - 0.4)(16\% \times \frac{60}{90}) = 8\% + 6.4\%$$

$$= 14.4\%$$

WACC of a geared company in a tax world is also given as:

$$Kw(g) = Kw(u)\left[1 - \frac{Dt}{MVe + MVd}\right]$$

Kw(g) = WACC of ageared company
Kw(u) = WACC of an ungeared company
Vd = Market value debt
Ve = Market value of Equity
t = Corporation tax rate

Illustration 4.2

Yar'Adua owns 1% of the equity of Atiku Plc a geared company with 1m N1 ordinary shares having a market value of N1.10 per share and N600,000 10% debentures valued at N80. Yar'adua transfers his funds to Obasanjo Plc, an ungeared company. Both firms are in the same type of business susceptible to the same degree of business risk and both firm generate income before debenture interest of N200,000.

Obasanjo Plc is financed by 1.2 million N1 ordinary shares with a market value of N1.05 per share.

Yar'adua on selling his shares in Atiku Plc would have to borrow sufficient funds in order to buy 1% of Obasanjo Plc. You are required to calculate:

a) Yar'adua's present income from Atiku Plc.
b) His income on switching funds to Obasanjo Plc.
c) The gain to Yar'adua on switching
d) The equilibrium position (Assume only Obasanjo plc's equity changes in value).

Solution

	Atiku Plc	Obasanjo Plc
	N	N
Equity	1,100,000	1,260,000
Debt	480,000	-
	1,580,000	1,260,000
EBIT	200,000	200,000
Less: Interest	60,000	-
	140,000	200,000
Less: Tax at 40%	56,000	80,000
Dividend	84,000	120,000

(a) Yar'adua's present income in Atiku plc
= 1% of 84,000 = N840

	N
(b) To invest 1% in Obasanjo plc = 1% of 1,260,000	12,600
Sales in Atiku plc 1% of 1,100,000	11,000
To borrow	1,600
Income from Obasanjo plc 1% of N120,000	1,200
Less: Interest N1600 x 12.5%	(200)
	1,000

Note: The interest rate on borrowing = Kd
Kd (Cost of debt) is pre-tax
Kd used is pretax i.e. $Kd = \frac{I}{MVd}$ as against

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

$Kd = \frac{10}{80} = 12.5\%$

(c)Gain on switching funds

Net income after switching	1,000
Income before switching	840
	160

(d) Equilibrium position

$MVg = MVu + Dt$

Since it is Obasanjo plc's market value that must change

$MVu = MVg - Dt$

$MVu = 1,580,000 - (480,000 \times 0.4)$

= 1,580,000 – 192,000
= 1,388,000

4.3 MM THEORY WITH PERSONAL TAXATION

MM theory considered only corporate taxes. However, Miller (1977) included the effect of personal as well as corporate taxes in capital structure theory. He argued that the existence of tax relief on debt interest but not on equity dividends would make debt capital more attractive than equity capital to companies. Companies must be ready to offer a higher return on debt in order to attract greater supply of debt. When the company offers an after-personal-tax return on debt at least equal to the after-personal-tax return on equity, equity supply will switch over to debt supply to the company. This is based on the assumption that interest payments on debt are allowed as a tax deduction whereas dividends on equity capital are not allowed for tax deduction.

4.4 PECKING ORDER THEORY

This theory was proposed by Donaldson in 1961 and modified by Meyers in 1984. The theory asserts that a company's capital structure is more dependent on internal cashflows, cash dividend payment and acceptable investment opportunities (NPV > 0).
This theory states that when a company wants to finance its long-term investments, it selects by following a well defined order of preference with respect to the sources of finance it uses. At the initial stage, the firm will prefer to use internally generated funds. If the internal funds are insufficient to meet its investment requirements then it will prefer raising external funds in the form of term loans and then non-convertible debentures and bonds and then convertible debt instruments.

The last to be considered is in the form of new equity capital. This theory says therefore that:

(i) Firms prefer internal financing to external financing
(ii) If firms choose external financing, they will issue the safest security first i.e they will choose debt before equity financing.
(iii) As a firm sources for external funds, it will follow the pecking order of securities.

Pecking Order Assumptions

- There are no costs involved in using internally generated funds.
- It is expensive to raise external funds.
- Raising of debt is relatively cheaper than raising of equity funds.

- Raising of term loans from banks and financial institutions is cheaper than issuing debt securities for raising finances.
- Issue of equity capital involves relatively high issue cost.
- Servicing of debt funds is cheaper than servicing of equity funds.

4.5 SUMMARY

Originally, MM theory has ignored the corporate and personal taxation, but later Miller modified the theory by considering tax relief available to a geared firm.
As per Pecking order theory, if the firms do require external financing they will issue the safest security first in order of term loans, unsecured debentures, secured debentures, convertible debentures, preference shares, convertible preference shares and finally in the form of new equity shares.

4.6 SELF REVIEW QUESTIONS

- How are corporate taxation and personal taxation incorporated in MM theory?
- Write short notes on Pecking Order theory of capital structure.
- Sango Ltd has earning before interest and tax (EBIT) of N3,000,000 and a 40% tax rate. Its required rate of return on equity in the absence of borrowing is 18%. In the absence of personal taxes, what is the value of the company in an MM world
  (a) With no leverage.
  (b) With N4,000,000 in debt.
  (c) With N7,000,000 in debt.

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UNIT 5: DEGREE OF LEVERAGES

Learning Objectives.

After the end of this unit, students must have understood:

- Meaning of Trading on Equity
- Impact of Gearing on cost of capital and EPS of the firm.
- Distinction between Debt and Equity.

CONTENTS

5.1 INTRODUCTION

In unit 3, the meaning and various forms of leverages have been considered. This unit further discusses the degree of leverage especially how it affects the return to the equity shareholders. Before further discussions, distinction between debt and equity should be made.

5.2 DISTINCTION BETWEEN DEBT AND EQUITY

Debt and equity are different on the following grounds:

1. Debt capital is repayable to the providers while equity capital is not repayable
2. The interest on debt is mandatory but dividends on equity are not compulsory.
3. Interest on debt is tax deductible while dividend on equity is not.
4. Introduction of debt in a firm's capital structure increases the financial risk. However, equity cannot increase a firm's financial risk.
5. Debt has a relatively cheaper issuing cost.
6. With the issue of debt, there is no control dilution whereas; new issue of equity may lead to control dilution.
7. Debt has a less future financing flexibility compared to equity.
8. It is often easier to issue debt to financial institutions than equity.

5.3 TRADING ON EQUITY

Trading on equity refers to the practices by which a firm uses borrowed funds and preference capital carrying a fixed change in a way to obtain a higher return to the equity shareholders. The concept of trading on equity has direct impact on

shareholders wealth because all investing, financing and dividend decisions are taken in view of maximization of wealth of the owners. The debt funds are less risk bearing compared to equity funds since the providers of debt have prior claims on income and assets of the firm over equity holders.
While the financial leverage explains the impact of EPS, trading on equity shows the impact on equity capital. It is calculated by taking difference of rate of return on equity capital by having equity and debt components in capital structure to rate of return on equity by having only equity share capital in the capital structure.

Illustration 5.1

Profitability Statement of Onikoko Ltd.

Financial Alternatives	A1	B1	C1
	Nm	Nm	Nm
Total Assets	600	600	600
Equity share capital	600	400	200
12% Debentures	-	200	400
	600	600	600
Earnings before interest and tax	200	200	200
Less: Interest on debentures at 12%	-	24	48
Earnings before tax	200	176	152
Less: Tax at 40%	80	70.4	60.8
	120	105.6	91.2
Return on Equity	20%	26.4%	45.6%

In alternative A where there is no debt component, the company can earn only 20% return on equity. In B, by having debt component, the return on equity increases. In C, it rises further but it is important to note that if the debt component exceeds the desired level, the firm is prone to financial risk and bankruptcy risk.

5.4 GEARING

This term refers to the amount of debt finance a company uses relative to its equity finance. A company is highly geared where there is high level of debt component in its capital structure. It can be calculated with the help of debt-equity ratio or capital gearing ratio i.e. (long-term debt/capital employed).

There are some problems associated with high level of gearing:

1. A highly geared company is subject to financial risk.
2. There is an increased possibility of bankruptcy risk.

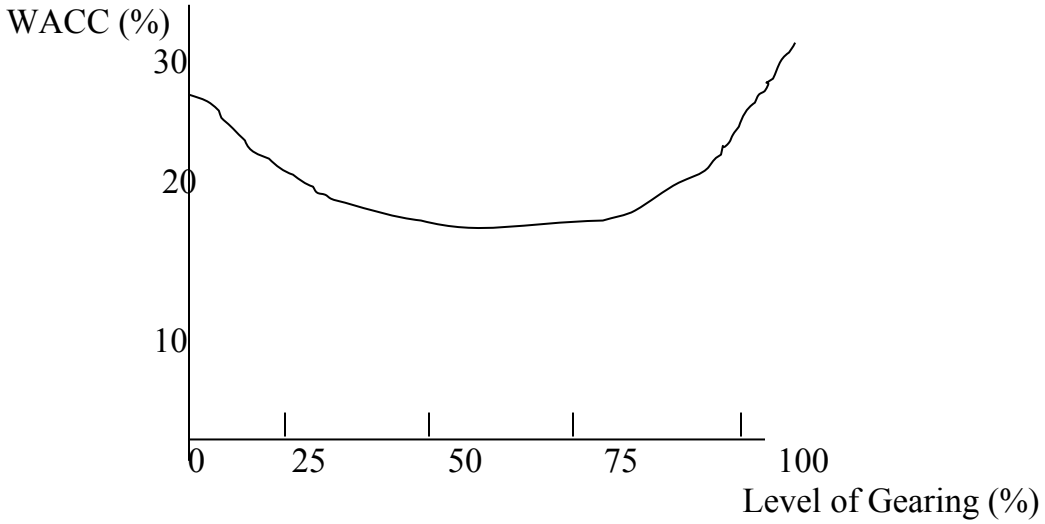
3. Due to high levels of financial and bankruptcy risk a firm is exposed to, its equity shares stock market prices will be quoted less.
4. The profitability and earnings of the company will be threatened due to changes in interest rates of different debt components.

If the level of gearing increases, the expected return of equity shareholders will also increase along with the increase in financial risk and bankruptcy risk. The expectation of providers will also be more to compensate for taking higher levels of financial risk and bankruptcy risks.

Gearing and Cost of Capital

Empirically, the proportion of debt in a firm's capital structure has relatively little impact on the cost of capital.

Graphically



So long as the existing gearing of the company is within the optimum range say 30% and 60%, the proportion of debt in a company's capital structure has little effect on a company's cost of capital.

Gearing and EPS

Gearing has considerable effect on the earnings attributable to the equity shareholders. A highly geared firm must earn enough profits to cover the interest on debt before any profits available for distribution to the equity holders.

Illustration 5.1
Dauda Ltd is setting a project with a cost of N5,000,000. It is considering the following three alternatives for financing project:

Alternatives	1	2	3
Equity	5,000,000	4,000,000	2,000,000
Debt (15%)	-	1,000,000	3,000,000
	5,000,000	5,000,000	5,000,000

The company estimated earnings per year N2,000,000, the corporate tax is 40%. Calculate the earnings per share in the three different alternatives.

Solution

	1	2	3
	N	N	N
Earnings before interest and tax	2,000,000	2,000,000	2,000,000
Less: Interest 15%	-	150,000	450,000
	2,000,000	1,850,000	1,550,000
Less: Corporate tax 40%	800,000	740,000	620,000
Net profit after interest and tax	1,200,000	1,110,000	930,000
EPS	2.4	2.8	4.65

From the above illustration, high levels of gearing leads to an increase in EPS for equity shareholders. Meanwhile, the debt in capital structure increases the risk of equity shareholders.

5.5 SUMMARY

The debt component should be used in capital structure to enhance the return to the equity shareholders which is termed trading on equity. Also, gearing represents the ratio which shows the proportion of debt capital in a firm's capital structure relative to its equity finance.

5.6 REVIEW QUESTIONS

1. Write short notes on Trading on equity.
2. What are the differences between debt and equity capital.
3. Explain briefly the impact of gearing on the cost of capital of a firm.
4. Explain briefly the impact of gearing on the earnings of a firm.

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UNIT 6: DIVIDEND THEORY

Learning Objectives

After the end of this unit, students must have understood:

- What dividend theory is all about.
- Factors determining the dividend decisions of a firm.
- MM Theory of dividend irrelevancy.
- Dividend relevancy suggested by Gordon and Linter.
- Other theories on dividend policy.

CONTENTS

6.1 INTRODUCTION

Dividend theory (Policy) tries to provide answer to the questions; which is better "the payment of dividend now or the retention of earnings for capital gain?" This theory explores the possibility of attaining an optimum dividend payout ratio that maximizes the combined value of dividends paid plus capital gain.
Dividend policy has been considered very important in the firm's objective of maximizing shareholders wealth. Dividends paid out to the shareholders represents cash outflow which depletes the available cash resources. The reduction in the available cash will have implication on the investment opportunities of the firm because investment projects of the firm also heavily depend on the available cash resources.

The financial manager of a company therefore has a role of striking a balance between dividend payout and retention of earnings, though the two serve the same purpose of maximizing the shareholders' wealth. While retained earnings are used to finance expansion, dividends payment increases the purchasing power of the shareholders. Although dividend and retained profits move in opposite directions they still go hand in hand. It is impossible to formulate one without having an effect on the other. A company must watch the profit distributed to the shareholders (dividends) to satisfy the minimum required internally generated funds to take care of investment opportunities and also it must restrict it self-financing through retained profits at least to the extent that it must satisfy a minimum requirement for dividends.

6.2 FACTORS DETERMINING THE DIVIDEND DECISIONS

1. **Legal Provisions**: Company law allows the payment of dividend only out of distributable profits, calculated on conventional accounting principles.
   (a) profits arising from the use of the company properly although it is a wasting asset;
   (b) revenue reserves;
   (c) realized profit on a fixed assed sold

   These are distributable profits to the shareholders, it is forbidden to distribute dividend out of capital (Section 379 – 382 of CAMD). As per the provisions, a company must transfer a certain percentage of profits of current year to reserves before declaring a dividend.

2. **Liquidity:** A company will be unable to pay a dividend if cash is not available to do so. A company requires cash in order to pay dividend. The liquidity position of the company will influence the dividend payout of a particular year. It is noteworthy that the availability of cash only induces dividend payout, a company may borrow e.g. by bank overdraft to meet up with dividend requirements if cash is not available.

3. **Government:** Government through some guidelines restricts the amount of dividend payable to shareholders by restricting dividend payment to a certain percentage of the profits after tax. However, from 1988 dividend payment has been deregulated.

4. **Internal Re-investment Opportunities**: When a company is faced with viable investment opportunities to be financed by only external funds which is not available or only available by submitting strict business terms on conditions or by incurring high transaction costs, then the company may have to fore-go the payment of dividend. Dividend may have to be restricted to provide financing for such investments.

5. **Loan Redemption**: If debentures or preference share capital are due for redemption, it will require funds and might cause a reduction in the level of dividend payout.

6. **The Risk Factor**: Where a company is high business and financial risk inherent, it may have to offer higher dividend rates in order to encourage investors to undertake the risk involved.

7. **Taxation:** Shareholders in high income bracket will require to receive their returns in the form of capital profit because of the high tax rate their high incomes may be subjected to but shareholders in low income bracket will be pleased to receive annual returns as high as expected since they are indifferent.

8. **Level of Inflation**: As the level of inflation rises, shareholders would expect commensurate increase in dividends.

9. **Control**: If a high level of dividend is paid, a company might be forced to issue new share capital to raise finance. This can have the effect of reducing the control of the company by existing shareholders. If control is a significant factor, dividend payouts are liable to be relatively low.

10. **Dividend Policy of Similar Companies**: In dividend decisions, companies tend to follow the policy of a similar company.

6.3 DIVIDEND SUPREMACY OR RELEVANCY THEORY

The proponents of this theory, Professor James E. Walter and M.J. Gordon (1959) argued that dividends were all that mattered in the determination of share prices. It is based on the fundamental theory of share values.

(a) the market value of a company's shares depends on
  (i) the size of dividends paid
  (ii) the growth rate in dividends
  (iii) the shareholders' required rate of return.

(b) the growth rate in dividends depends on return on investment and the rate of earnings retained.

(c) Shareholders will want their company to pursue a retention policy that maximizes the value of their shares.

Assumptions of Dividend Relevance Theory

1. The firm finances all investments through retained earnings.
2. The firm maintains constant IRR and WACC.

3. All earnings are either distributed as dividends or reinvested internally immediately.
4. The corporate tax does not exist.

6.4 DIVIDEND IRRELEVANCY THEORY

In 1961, Franco Modigliani and Melton H. Miller (M-M) argued against the claim that an active dividend policy should be pursued as a means of maximizing shareholders wealth. Their argument is that the value of a firm is unaffected by dividend policy and that in a tax-free world, shareholders are indifferent between dividends and capital gains. They presented the following points to strengthen their arguments:

1. If earnings were distributed as dividends, each existing shareholders would gain the exact amount paid to him in terms of income but would suffer a proportionate loss in the form of reduction in his relative share of the company. This is so because the absence of retained earnings implied that new shares or loan stocks would have to be issued to finance an internal investment programme. On the other hand, earning retention will cause the value of existing shares to appreciate since new investment would be financed without resulting to supplementary issues. So, shareholders should be indifferent between payment of dividend and retained earnings.

2. When a firm adopts a dividend policy, it may be to the detriment of the shareholders by way of jeopardizing their consumption preference. If a firm pays more cash dividends than an investor needed for immediate consumption, he would return the surplus by buying extra shares with the fund. If fewer dividends are declared, he could attain his consumption level by selling a proportionate fraction of his total shares in the market. Therefore, shareholders should be indifferent between payment of dividend and retained earnings.

3. MM pointed out that investors are indifferent as to the manner in which the returns are obtained, dividends or capital gains. The changes in dividend payments represent a signal to investors concerning management's assessment of the future earnings and cash flows of the company.

4. They argued that if a company with investment opportunities decides to pay a dividend, so that retained earnings are insufficient to finance all the investments, obtaining additional funds from outside sources would make up the shortfall in funds. The consequent loss of value in the existing shares, as a result of obtaining finance instead of using retained earnings is

exactly equal to the amount of the dividend paid. A company should therefore be indifferent between paying a dividend and retained earnings.

Assumptions of the MM Theory

18. There is perfect capital market where investors act rationally and have access to perfect and costless information.
19. No floatation cost on securities issued by a company.
20. Risks of uncertainty do not exist.
21. No taxation. Or if there is taxation, the same tax rate is applicable to capital gain and dividend income.
22. The company will maintain a fixed investment policy.

6.5 OTHER THEORIES OF DIVIDEND

(a) Active Theory of Dividends

Under this theory dividends are accorded priority before the company will commit itself to its capital needs. It follows therefore that viable projects can be undertaken only after the payment of dividends.

(b) Residual Theory of Dividends

According to this theory, a firm should execute all positive NPV projects before giving consideration to the payment of dividends. Before funds could be used in dividend payment, the firm must ensure that all viable projects have been undertaken.

(c) 100% payout Theory

Rubner (1966) registered his opinion through this theory. This theory advocates a policy of 100% payout: The argument is that shareholders prefer dividends and that 100% payout should be made to individuals.

(d) 100% Retention Theory

Clarkson and Elliot (1969) put forth their argument that given taxation and transaction costs, dividends are a luxury that neither shareholders nor companies can afford and hence the firm can follow a dividend policy of 100% retention.

(e) Investor Rationality Theory

This theory is based on the psychological preferences of individual investor. The investor can select dividend payout ratio that conforms to his/ her desired consumption level.

(f) Tax Differential Theory

According to this theory, dividends are effectively taxed at higher rates than capital gains. Investors therefore require higher rates of return on stocks with high dividend yields. A firm should pay a low (or zero) dividend in order to minimize its cost of capital and maximize its value.

6.6 SUMMARY

Dividend depletes the cash resources which can otherwise be available for the investment in profitable projects.

Dividend policy determines the distribution of net cashflows generated from successful trading between dividend payments and corporate retentions.

Before a company determines its dividend policy, it should consider certain factors. MM argued that share value is a function of the level of corporate earnings. If there is a higher dividend pay out, the firm should issue new shares which will depress the stock market price of the share. The reduction in value of share is just equal to the dividend distributed per share.

6.7 SELF REVIEW QUESTIONS

1. Explain the relationship between earnings, cashflows and dividend pay outs.
2. Write short notes on:
   (a) Dividend payout ratio.
   (b) Dividend yield ratio.
   (c) Price earning ratio.
3. What are the assumptions of dividend relevancy theory?
4. Discuss the various dividend determinants.
5. Explain the basic tenets of dividend irrelevancy theory.

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Unit 7: DIVIDEND POLICY AND VALUE OF FIRM

Learning Objective

After this study, students must have understood.

- Impact of dividend policies on value of firm
- Various Dividend Policies
- Gordon Growth Valuation Model
- Walter's Valuation Model
- Dividend Payment Procedure

CONTENTS

7.1 INTRODUCTION

The dividend policy of a firm has been given ample recognition that different theories emanated to prove its relevancy in the determination of the value of firm. M-M by their theory, dividend irrelevancy theory decried the important role entrusted with dividend policy by dividend Relevancy Theory. They argued that whatever dividend decisions taken by a firm will have no influence on its share value.

However, we are now much concerned with the dividend relevancy theory. This theory claims that a company can increase its value by determining and attaining an optimum dividend value of dividends paid plus capital gain. The dividend relevancy theory applies two models:

1) Gordon Growth Valuation Model
2) Walter's Valuation Model

The important dividend policies generally followed by corporate firms as discussed below.

7.2 DIVIDEND POLICIES

Constant Dividend Payout Policy

This policy is also known as 'Constant payout ratio method'. By this method, a fixed percentage of the net earnings is paid every year. If earning vary, the amount of dividends also varies from year to year. The company follows a regular practice of retained earnings because there is always a constant gap between earnings per share and dividend per share.

Constant Dividend Rate Policy

This advocates the payment of dividend at constant rate even when earnings vary from year to year. This may be possible only when the earnings pattern of the company does not show wide fluctuation.

Multiple Dividend Increase Policy

This is a policy of very consistent but very small dividend increases to give the illusion of movement and growth. This policy gives a sense of hope to the investors as the market reward consistently increases.

Regular Dividend plus Extra Dividend Policy

This policy favours the division of the announced dividends of a firm into a regular and extra dividend. The regular dividend is the dividend that will continue at the announced level. The extra dividend payment will be made as circumstances permit.

Uniform Cash Dividend plus Bonus Shares Policy

Under this policy, a minimum rate of dividend per share is paid in cash plus bonus shares issued out of accumulated reserves. However, the issue of bonuses shares depends upon the amount kept in reserves over a period say 3 or 5 years.

7.3 DIVIDEND RELEVANCY THEORY

This theory incorporates two models:
1) Gordon's Growth Valuation Model
2) Walter's Valuation Model

Gordon's Growth Valuation Model

This model stems out of dividend situation with growth. Dividend relevancy theory takes cognizance of a situation where it is assumed that there is no growth

in dividend. Here the market value of a firm is given by the present value of the future dividends paid out to shareholders. Ideally, dividend is expected to grow. The Gordon growth model is a theoretical model used to value ordinary equity shares. The main proposition of the model is that the value of a share reflects the value of future dividends accruing to that share. Hence, the dividend payments and its growth are relevant in valuation of shares.

Assumptions of Gordon Growth Model

1. The firm is an all equity firm i.e the firm is not geared.
2. Retained earnings is the only source of financing
3. Future annual growth rate dividend is expected to be constant
4. The growth rate of the firm is the product of retention rate and its return on investment
5. Corporate taxes do not exist
6. The retention rate to remain constant.

In valuation of share,

$$MVe = \frac{Do(1+g)}{Ke-g} = \frac{D1}{Ke-g}$$

where MVe = Current ex-dividend market price of share
Do = Current years dividend
D1 = Expected dividend
Ke = Cost of equity, capital
g = Expected future growth rate of dividends

Meanwhile, the model has been criticized on the following grounds:
1. The constant dividend growth and earnings growth is a fallacy
2. The model implies that if Do is zero, the value of share is zero
3. The model ignores the allowance for corporate taxation
4. The capital gains are ignored by the model

Illustration 7.1

Baba Ijebu Ltd is an established company having its share quoted in the major stocks exchanges. Its share current market price after dividend distributed at the

21% p.a having a paid up capital of 500,000 of 10k each. Annual growth rate in dividend expected is 3%. The expected rate of return on its equity capital is 16%. Calculate the value of Baba Ijebu Ltd's share based on divided growth model.

Solution

$$MVe = \frac{Do\,(1+g)}{Ke - g}$$

$$\text{Dividend distributed} = \frac{5000{,}000k \times 21}{100} = 1{,}050{,}000$$

$$MVe = \frac{1{,}050{,}000\,(1 + 0.03)}{0.16 - 0.03} = 8{,}319{,}231k$$

$$\text{Value per share} = \frac{8{,}319{,}231}{500{,}000} = 16.64k$$

Illustration 7.2

The shares of a gas company are selling at N20 per share. The firm had paid dividend @ N2 per share last year.

i) Determine the cost equity capital of the company

ii) Determine the estimated market price of the equity share if the anticipated growth rate of the firm (a) rises to 8% (b) fall to 3%

Solution

i) $$Ke = \frac{Do\,(1 + g)}{MVe} + g$$

$$Ke = \frac{2(1 + 0.05)}{20} + 0.05 = 15.5\%$$

ii)a. If the growth rate raises to 8%

$$MVe = \frac{2(1 + 0.08)}{0.155 - 0.08} = N28.8$$

b. If growth rate falls to 3%

$$\frac{2(1 + 0.03)}{0.155 - 0.03} = \frac{2.06}{0.155 - 0.03} = 16.48$$

Illustration 7.3

Ogbogbon Ltd is foreseeing a growth rate of 12% per annum in the next 2 years. The growth rate is likely to fall to 10% for the third year and fourth year. After that the growth rate is expected to stabilize at 8% per annum. If the last dividend paid was N1.50 per share and the investor's required rate of return is 16%, find out the intrinsic value per share of Ogbogbon Ltd as of date.

Solution

Years 0 1 2 3 4 5
Discount factor @ 16% 1 0.86 0.74 0.64 0.55 0.48

Calculation of Present Value of Dividend

i) @ 12% p.a in the first 2 years
= [1.88 (1.1) x 0.64] + [1.88 (1.1)2 x 0.55] = 1.32 + 1.25 = 2.57

ii) Market value of equity share at the end of 4th year

$$P4 = \frac{Ds}{Ke - g}$$

Where P4 = Market price of equity share at the end of 4th year
Ds = Dividend in 5th year
g = Growth rate
Ke = required rate of return

$$P4 = \frac{2.28(1+0.08)}{0.16 - 0.08} = N30.75$$

Present value of P4 = 30.75 x 0.55 = N16.91
Intrinsic value of equity share = 2.83 + 2.57 + 16.91 = N22.31

Illustration 7.4

PS Plc expects to achieve earnings next year of N2.4m and these will continue in perpetuity without any growth at all, unless a proportion of earnings are retained. If the company retains Y3 of its earnings an annual growth rate in earning and dividends of 9% p.a in perpetuity could be achieved.
Alternatively, if the company were to retain 2/3 of its earnings an annual growth rate in earnings and dividends of 12% p.a in perpetuity could be achieved. The return currently required by PS Plc shareholders is 16%. If retentions of 1/3 were

made, the required return would rise to 19% and if retentions were 2/3 of earnings, the return required would be 24%.

Required

a) No retention

$$Ke = \frac{d}{MVe}$$

$$MVe = \frac{d}{Ke}$$

$$MVe = \frac{2,400,000}{0.16} = N15m$$

b) Retention 1/3 Growth 9% p.a

$$Ke = \frac{do\ (1+g)}{MVe} + g$$

$$MVe = \frac{do\ (1+g)}{Ke-g}$$

$$MVe = \frac{1,6000,000}{0.19 - 0.09} = N16m$$

c) Retention 2/3 growth 12% p.a

$$MVc = \frac{800,000}{0.24 - 0.12} = N6,666,667$$

Walter's Valuation Model

Walter argued that retention influence stock price only through their effect on future dividends. The model recognizes the importance of internal rate of return and cost of capital for valuation of shares and dividend decisions. The optimum dividend policy of a firm by this model is determined by the relationship of rate of return on firm's investment and cost of equity capital. Under this model, the determination of expected market price on a share is given as:

$$Mr = \frac{D + r_a\ (E - D)}{r_c}$$

where Mr = current market price of equity share

E = Earnings per share

D = Dividend per share

(E – D) = Retained earnings per share

ra = rate of return on firm's investment

rc = cost of equity capital.

Walter's model implies that:

a) If ra > rc i.e if the firm can earn higher IRR then cost of capital, the firm can return the earnings. When ra > rc, the price per share increases as the dividend payout ratio decreases. The optimal payout ratio when ra>rc is nil (zero) because shareholders would accept low dividends.

b) When ra<rc i.e. the cost of capital is more than firm's IRR, the optimum dividend policy would be to distribute the entire earnings as dividend. When ra < rc, the price per share increases and the dividend payout ratio increases. Shareholders would vote for higher dividend so that they can utilize the more profitable investment opportunities.

c) If ra = rc i.e. If IRR of the firm is equal to its cost of capital, the price per share does not vary with changes in dividend payout ratio. The optimal payout ratio is irrelevant and it does not matter whether the earning is retained or distributed.

Assumptions of Walter's Valuation Model

1) Retained earning is the only source of finance
2) Business risk is constant
3) Return on investment is constant
4) The firm is a going-concern
5) All earnings are either distributed as dividends or invested internally immediately.

Illustration 7.5

The earnings per share of a company is N8 and the rate of capitalisation applicable is 10%. The company has before if an option of adopting (i) 50% (ii) 75% and (iii) 100% dividend payout ratio. Compute the market price of the company's quoted shares if it can earn a return of (a) 15% (b) 10% and (c) 5% on its retained earnings.

Solution

$$Mr = D + ra\,(E - D)$$

$$\frac{rc}{rc}$$

i) When the Dividend payout ratio = 50%

a) where ra = 15%

$$Mr = \frac{4 + \frac{0.15}{0.10}(8 - 4)}{0.10} = N100$$

b) where ra = 10%

$$Mr = \frac{4 + \frac{0.10}{0.10}(8 - 4)}{0.10} = N80$$

c) where ra = 5%

$$Mr = \frac{4 + \frac{0.05}{0.10}(8 - 4)}{0.10} = N60$$

ii) when the Dividend payout ratio = 75%

a) where ra = 15%

$$Mr = \frac{4 + \frac{0.15}{0.10}(8 - 6)}{0.10} = N90$$

b) where ra = 10%

$$Mr = \frac{6 + \frac{0.15}{0.10}(8 - 6)}{0.10} = N80$$

c) where ra = 5%

$$Mr = \frac{6 + \frac{0.15}{0.10}(8 - 6)}{0.10} = N70$$

(iii) when the dividend payout ratio = 10%

a) where ra = 15%

$$Mr = \frac{8 + \frac{0.15}{0.10}(8 - 8)}{0.10} = N80$$

b) where ra = 10%

$$Mr = \frac{8 + \frac{0.10}{0.10}(8 - 8)}{0.10} = N80$$

c) where ra = 5%

$$Mr = \frac{8 + \frac{0.05}{0.10}(8 - 8)}{0.10} = N80$$

7.4 DIVIDEND PAYMENT PROCEDURE

Dividends are generally paid twice in a year that is, interim dividend and final dividend.

Declaration Date: It is the date in which the forthcoming dividend is announced

Date of Record: This designates when share transfer book are to be closed

Ex-div date: This is the date when the shareholders register is closed for the transfer of shares. Purchase of shares after this date confers collection of dividend on the old owner or seller.

Dividend Notice: This shows the amount of dividend payable after deducting appropriate withholding taxes.

Payment date: this is the day dividend cheques are mailed out.

7.5 SUMMARY

Gordon Growth Valuation Model progress that the value of a share reflects the value of future dividends accruing to that share and the market price of the share is equal to the sum of its discounted future dividend payments.

Walter's Model Assets that in the long-run the share prices reflect only the present value of expected dividends and the retentions influence share price only through their effect on future dividends. According to Walter, the optimum dividend policy of a firm is determined by the relationship of firm's IRR and its cost of capital.

7.6 SELF REVIEW QUESTIONS

- Dividend growth valuation Model's proposition is that value of a share

reflects the value of future dividends accruing to that share. Explain

- What are the essential of Walter's dividend model?

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Drury C. *Management and Cost Accounting* (1987)

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UNIT 8: PROJECTS

Learning Objectives

After this study, students must have understood:

- The meaning of projects
- Different kinds of projects
- Capital Investment process
- New concepts in /financing and Execution of projects

CONTENTS

8.1 INTRODUCTION

A firm's project is an investment which could involve assets acquired for purposes of capital appreciation or income generation without activities in the form of production, trade or provision of services. Projects are basically capital investments. Capital investment decisions border on capital expenditures which involve large some of money, have long time spans and carry some degree of risk and uncertainty. The planning and control of capital expenditure is termed capital budgeting. Capital budgeting is the art of finding assets that are worth more than they cost to optimize the wealth of a business enterprise. For making a radical decision regarding the capital investment proposals at hand, the decision maker needs some techniques to convert the cash outflows and cash inflows of a project into meaningful yardsticks which can measure the economic worthiness of projects.

8.2 TYPES OF PROJECTS

Classification of project has been done based on the following criteria:

(i) Purpose
(ii) Size
(iii) Ownership

(i) Depending on the purpose, the projects can be classified as follows:

(a) **Balancing Project**

Balancing equipment is installed when there is imbalanced capacity utilization of the plant and machinery due to unutilized capacity in some units.

(b) **Replacement Project**

If any equipment is deteriorated due to obsolescence or is no longer economically useful, it is replaced with a new equipment which may be equivalent to old machine or it may also be more efficient than the old one. Replacement project is considered in respect of individual machine.

(c) **Expansion Project**

When the current production levels of existing plant could not meet the growing demand for the product in the market, and such growth is of permanent nature, the management would decide to increase the capacity of the plant by installing additional equipment and facilitator thereby the total production in increased.

(d) **Diversification Project**

When a firm invest in project which is not connected with the existing line of business but to entirely setup a new project. Such a project is called a diversification project.

(e) Due to technological development, wear and tear, the old plant and machinery that was installed several years back, would require modernization.

8.3 CAPITAL INVESTMENT PROCESS

The strategic capital investment process is discussed below:

- **Search for Investment Opportunities**: This first thing to do is recognizing the investment opportunities. This involves a continuous search for investment opportunities which are compatible with the firm's objectives. Although business may pursue many goods, survival and profitability are two most important objectives.

- **Screening the Alternatives**: Each proposal is then subjected to screening process in order t assess whether it is technically feasible, resources required are available and the expected returns are adequate to compensate for the risks involved. The alternatives will be screened and it is neither feasible nor desirable to conduct a full scale evaluation of opportunities.

- **Analysis of Feasible Alternatives:** If a proposal satisfies the screening process, it is then analysed in more detail by gathering technical, economic and other data. Projects are also classified into new projects, expansions or improvements and ranked within each classification with respect of probability, risk and degree of urgency.

- **Evaluation of Alternatives**: This stage will involve the determination of proposal and its investments, inflows and outflows. The technique selected should be the one which enables a manager to make the best decision in the light of prevailing circumstances.

- **Authorization:** One evaluation is completed then proposal will be forwarded to a higher level of management for authorization to take up the project.

- **Implementation and Control:** The project will be implemented and its progress is monitored with the aid of feedback reports. These reports will include critical path analysis, capital expenditure progress reports, performance reports, conquering actual performance against plans set.

8.4 NEW **CONCEPTS IN FINANCING AND EXECUTION OF PROJECTS**

- **Build, Own and Operate (B.O.O):** Here, the entrepreneur will build the project from his own resources and he will own the project subsequent to its commercial launching.

- **Build, Operate and Transfer (B.O.T**): When the government is unable to finance a project due to scarcity of funds, the private sector is invited by the government to undertake the project and the government allows them to

operate for certain period after which the project is transferred to the government.

- **Lease, Rehabilitate, Operate and Transfer (L.R.O.T):** Here, the government will give a running plant for rehabilitation to put the plant on profitability track or for increasing its production capacity.

- **Engineering, Procurement and Construct (E.P.C):** Here, the contractor takes the complete responsibility to construct, erect, commission and supply the plant and keeps it ready to operate by the owners. The contractor carries the responsibility of providing engineering designs, procurement of materials, erection and commissioning the project and handing over to the owner.

- **Turnkey Contract** : When a project is handled and completed by a single contractor so that the owner merely turns the key and operates the plant, it is called turnkey contract. Turnkey contract may help in cutting down the number of responsibility centres to the extent of one. If reduces the number of agencies the owner is required to coordinate.

8.5 SUMMARY

Capital investment involves a cash outflow in the immediate future in anticipation of returns at future date. It involves huge amounts of money and having a long span of time for cash inflow and carry some degrees of risk and uncertainty with the cashflows. The capital investment process involves search for investment opportunities, screening and evaluation of alternatives and selection of right alternative for implementation.

8.6 SELF REVIEW QUESTIONS

1) Describe the steps in capital investment decision making process
2) What is a project?
3) Explain the types of project according to size and ownership
4) What are the new concepts in financing and execution of projects?

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Drury C. *Management and Cost Accounting* (1987)

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UNIT 9: FEASIBILITY AND VIABILITY

Learning objectives

At the end of this unit, students must have understood:

- Feasibility study report
- Techniques for project control
- Micro and Macro considerations of a project

CONTENTS

9.1 INTRODUCTION

Before a project idea is considered for detailed study, the promoter must verify certain factors. Once the entrepreneur comes to the conclusion that the project can be taken up for detailed study, he can start with conducting of feasibility study.

9.2 FEASIBILITY STUDY REPORT

This report is not very elaborate but it contains substantial information for selection of the project. The report normally contains the following details:

a) Study of the configuration of the project idea in all aspects
b) Identifying the type and size of the project with justification
c) Study of location
d) Study of demand of products/services
e) Survey of material requirements
f) Project schedule
g) Project cost and sources of finance
h) Profitability and cashflow analysis
i) Cost benefit analysis
j) Identifying and quantifying risk element
k) Social cost benefits
l) Study of economic, political and legal environments.

This report is called ‘Pre-investment report. It is prepared for establishing due prima face project’s viability with sufficient back up for the purpose of evaluation of investment proposal by the entrepreneur.

9.3 TECHNIQUES FOR PROJECT CONTROL

These techniques include:

1) Watch and measure the achievement at short intervals
2) Ascertain current variances and predict future variances
3) Ascertain root causes of variances
4) Take actions to offset the ill-effects of past variances
5) Prevent future potential variances
6) Track and measure the quantitative output and cost inputs
7) Evaluate targets, output and input in financial term
8) Introduction of incentives for good performance
9) Doing away with red-tapison and bureaucratic procedures
10) Periodic review meetings and taking appropriate actions.

9.4 REASON FOR PROJECT FAILURES

1) Substantial overrun of the projects which makes the project not feasible to implement further
2) Changes in technology during the implementation of the project
3) Wrongful estimation of the cost of project and its profitability
4) Lack of experienced management team
5) Lack of delegation of authority and responsibility
6) Lack of proper project monitoring systems
7) Failure to obtain government clearances and permission
8) Lack of sufficient knowledge of the project to promoter

9.5 SUMMARY

A detailed project report is prepared containing the details about the plan of action, details about technical, financial, marketing, management and social aspect.

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Ravi M.K. *Financial Management*. 6th ed. Taxmann allied Services (P.) Ltd.(2007)

Van Horne J.C. and Wachowicz J.M. *Fundamentals of Financial Management* (1996)

SUNIT 10: PROJECT PLANNING

Learning Objectives

After this study, students must have understood:

- Project Organisation Structure
- Benefits of Project Management
- Selection of project location
- Choice of technologies
- SWOT Analysis
- Project Visibility
- Feasibility study report

CONTENTS

Project Organisation Structure

Matrix Organisation Structure: This is a formal way of hierarchy and sharing authority between the project manager and his team of functional managers, who are answerable to the project manager as well as the functional heads. The matrix organisation seeks to achieve twin objective of official use of resources and effective realization of project objectives.

Task Force Organisation Structure: A task force is created by drawing personnel from various functional departments and putting them under the project manager.

10.3 BENEFITS OF PROJECT MANAGEMENT

Project management is essentially involved in executing the project and thereby accomplish the goals of the organisation in time. The benefits of project management are given below.

1) Project management provides techniques for making trade-offs between conflicting goals and enterprises priorities, besides enabling better control and coordination.
2) It helps in minimizing surprises and conflicts
3) It helps in reducing time, lowering costs and producing higher order results

4) It reduces the need for continuous reporting
5) It helps in expressing problems in advance

10.4 SELECTION OF PROJECT LOCATION

The following are the factors considered for the selection of location for setting up a project.

1) **Proximity of Inputs:** In some industries, bulky raw materials are used as inputs in the process and such industries will come up near their input source.

2) **Proximity of Market:** Market may be a determining factor of a project's location because setting of such a project may be very important. Project Market may be a determining factor of a project's location because setting of such a project may be very important. Project which manufacture perishable products are located near the places of consumption.

3) **Availability of Power:** Before deciding the location of a project, it is to verified about the adequate power supply. The cost of power will play a major role in selection of location for a project

4) **Availability of Transport:** Adequate transport facilities are required for movement of input and output. The project site should be well connected my rail, road sea and air transport facilities.

5) **Communication facilities:** The project site must be located where all modern communication facilities like telephone, telex, fax, internet, etc are available

6) Manpower availability

10.5 CHOICE OF TECHNOLOGY

The following factors will influence in the choice of technology

1) **Plant capacity**: To meet a given capacity requirement perhaps only a certain production technology may be viable.

2) **Principal Inputs:** The choice of technology depends on the principal inputs available for the project.

3) **Investment Outlay and Production Costs:** The effect of alternative technologies on investment outlay and production cost over a period of time should be carefully assessed.

4) **Inlay by other units:** The technology adopted must be proven by successful use by other units

5) **Production mix:** The technology chosen must be judged in terms of the total product-mix generated by it, including saleable by-products

6) **Latest Developments:** The technology adopted must be based on latest developments in order to ensure that the likelihood of technological obsolescence in the near future is minimized.

7) **Ease of absorption – appropriateness:** The ease with which a particular technology can be absorbed, can influence the choice of technology.

10.5 SWOT ANALYSIS

'SWOT' stands for Strengths, Weaknesses, Opportunities and Threats. By conducting SWOT analyses, the strengths and weaknesses of the proposed project is highlighted. While strength and weaknesses constitute variables of factors which are internal to the proposed project, opportunities and threats constitute those external factors which are usually imposed by the environment with either direct or indirect influence on the project. Some of the aspects considered in SWOT analysis are as follows:

1. Internal financial resources
2. Availability of funds in the capital market
3. Extent of support from banks and financial institutions
4. Existing and proposed level of investments and its impact on ROI, EPS and market value of the firm.
5. The business and financial risk attached to the firm.
6. Technology developed internally or possibility to obtain reliable technical know-how at cheaper cost.
7. Brand loyalty of existing products
8. Source of raw material and other infrastructural facilities.
9. Market share, distribution network
10. Severity of completion

11. Cost of production and managerial competence
12. Cost of capital
13. Governmental clearances and permission
14. Macro and Micro-economic environment in which the business operates.

10.7 PROJECT VISIBILITY

The project activities starts prior to the zero data. Zero data of a project means a date is fixed up from which the implementation of the projects begins. A project cannot be seen by the public most of its life time. A project can be seen by the public only at the end of its implementation stage and recognizes the fact of coming up of a project. A project becomes visible slowly as it grows, bringing the idea into reality, by using men, machines, money and managerial skill.

10.8 VARIANCE AND PERFORMANCE ANALYSIS

1) **Variance analysis:** The traditional analysis involves comparison of actual costs with budgeted costs to determine the variance. This approach is inadequate for project control, because it tells only what happened in the past and does not answer what will happen in future and does not give indications about the rate of work.

2) **Performance analysis**: This is a modern approach where analysis is done for the project as a whole projects on schedule, behind and ahead of schedule. It also indicates whether cost of a project as a whole is as per budget.

Illustration 10:1

The following information has been gathered on an on-going project

Budgeted cost of work schedule (BCWS)	50
Budgeted cost of work performed (BCWP)	40
Actual cost of work performed (ACWP)	44
Budgeted cost of total work (BCTW)	100
Additional cost of completion (ACC)	66

Determine:

(a) Performance variance
(b) Efficiency variance
(c) Performance index
(d) Efficiency index
(e) Estimated cost performance index

Solution

(a) Performance variance
= BCWP – BCWS = 40-50 = -10

(b) Efficiency variance
= BCWP – ACWP = 40-44 = - 4

(c) Performance index
= BCWP/BCWS = 40/50 = 0.80

(d) Efficiency Index
= BCWP/ACWP = 40/44 = 0.9091

(e) Estimated cost performance index
= BCTW/(ACWPT ACC) = 100/(44+66) = 0.9091

10.9 SUMMARY

The capital investment process involves search for investment opportunities, screening and evaluation of alternatives and selection of right alternative for implementation.

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Ravi M.K *Financial Management*. 6th ed. Taxmann allied Services (P.) Ltd. (2007)

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UNIT 11: PROJECT APPRAISAL

Learning Objectives

After studying this unit, students should have understood:

- Need for capital investment appraisal

- Cashflows associated with the project
- Payback period and its reciprocal
- Accounting rate of return
- Distinction between NPV and IRR
- Discounted payback period
- Terminal value method

CONTENTS

11.1 INTRODUCTION

Our major concern here has to do with investment decision and which is called capital expenditure decision and which is under the umbrella of capital budgeting. Capital budgeting involves all investments in long-term projects. It is the process of selecting alternatives long-term investment opportunities. This decision entails scrutiny that tends to find out whether or not money should be invested in long-term projects. In capital investment decisions, a firm is faced with different alternatives out of which the firm must select these ones that optimize its shareholders' wealth. This is done by examining cash generation of the project which is called investment appraisal.
In appraising a project, various techniques have been developed ranging from the traditional to discounted cashflow techniques. Meanwhile, to permit realistic appraisal, the value of cash payment or receipt, must be related to the time when the transfer takes place. The process of converting future sums into their present equivalent is known as discounting which is used to determine the present value of future cashflows.

11.2 INVESTMENT APPRAISAL TECHNIQUES

There are two method of appraisal
i) The traditional technique
ii) Discounted cash flow technique

11.3 THE TRADITIONAL TECHNIQUES

There are two method, under this technique:
a) Payback Period Method
b) Accounting Rate of Return

Payback Period Method

This refers to the length of time which it takes the cash inflows from a capital investment project to equate the cash outflows. It is usually expressed in years. It concentrates on how quickly a project repays its outlay. When deciding between two or more competing projects, the usual decision is to accept the one with the shortest payback. The basic element of payback period method is a calculation of recovery time by accumulation of the cash inflows year by year until the cash inflows equate the amount of the original investment.
Payback period can be calculated in two ways depending on whether the cashflows are constant or non – constant.

Illustration 11.1

Adamawa Plc is to undertake a project requiring N1,000,000 outlay. What is Payback period if
a) the project generates N250,000 annually
b) the project has the following cashflow profile

Yr	Cashflow
1	200,000
2	220,000
3	230,000
4	220,000
5	195,000

Solution

a) Payback period $= \frac{\text{Outlay}}{\text{Annual cashflow}}$

$= \frac{\text{N1,000,000}}{\text{N250,000}} = 4 \text{ years}$

b)

Yr	Outlay	CF	Balance
0	(1,000,000)	-	(1,000,000)
1		200,000	(800,000)
2		220,000	(580,000)
3		230,000	(350,000)
4		220,000	(130,000)
5		195,000	-

$$PBP = 4\text{years} + \frac{130,000}{195,000} \times 12$$

$$= 4 \text{ years, } 8 \text{ months}$$

Decision Rules

When it is an independent project:

1) Accept the project if the project ahs a PBP that is equal to or less than that set by the management
2) Reject if the project has a PBP that is greater than that set by the management.

When there are mutually exclusive projects:

1) Choose the project with the least PBP
2) The PBP should be equal to or less than that set by the management

Advantages of PBP

1) It is simple to calculate and understand
2) It does not involve assumptions about future interest rates
3) Unlike ARR, it uses cash profit instead of accounting profit
4) It is the most suitable when the future is very uncertain.

Disadvantages

1) It ignores the time value of money
2) There are no rules for setting the maximum accepted PBP by the management
3) It ignores the cashflows after the payback period

4) It makes no attempt to measure a percentage return on the capital invested and is often used in conjunction with other methods.

Payback Period Reciprocal

$$\text{Payback Period Reciprocal} = \frac{1}{\text{Payback Period}} \times 100$$

If a project has a payback period of 2.5years

i.e. Payback Period Reciprocal $= \frac{1}{2.5} \times 100 = 40\%$

The higher the PBP reciprocal, the more worthwhile the project.

Bailout Payback Period

If necessary, a machine may have to be scrapped before its payback period. In this case, the cashflow and the salvage value of the machine is taking together in bailout decision.

Illustration 11.2

Project A costs N200,000 and Project B costs N300,000 both have a ten year life. Uniform cash receipts expected are A N40,000 p.a. and B N80,000 p.a. Salvage values expected are A N140,000 declining at an annual rate of N20,000 and B N160,000 declining at an annual rate of N40,000.

Solution

The bail-out payback period is reached when the cumulative cash receipts plus the salvage value at the end of a particular year is equal to the initial investment.

Project A initial investment = N200,000

	Cumulative Cashflow	+ Salvage value	
End of yr 1	40,000	+ 140,000	= 180,000
2	80,000	+ 120,000	= 200,000

Bailout Payback period for A is 2 years

Project B initial investment = N300,000

	Cumulative Cashflow	+ Salvage value	
End of yr 1	80,000	+ 160,000	= 240,000
2	160,000	+ 120,000	= 280,000
3	240,000	+ 80,000	= 320,000

Bailout PBP for B is 3 years
:. Therefore Project A is chosen

Accounting Rate of Return

This technique is assessed by calculating the return on investment (ROI). It is based on return on capital employed. It makes use of the accounting concepts of accounting profits and capital employed. IT can be calculated as follows:

$$ARR = \frac{\text{Average Annual Profit After Tax}}{\text{Average or Initial Investment}} \times 100$$

$$\text{Average Investment} = \frac{\text{Initial Investment} + \text{Salvage values}}{2}$$

Sometimes, initial investment is used in place of average investment.

Illustration 11.3

Omotola Plc is to undertake a project requiring an investment of N100,000 on necessary plant and machinery. The project is to last for 5 years at the end of which the plant and machinery will have net book value of N20,000. Profit before depreciation are as follows:

Yr	Profit (N)
1	40,000
2	44,000
3	48,000
4	52,000
5	58,000

1. You are required to calculate the ARR of the project

Solution

(i) Calculation of depreciation

Cost	N100,000
NBN	20,000
	80,000

Average depreciation = $\frac{\text{N80,000}}{\text{5 years}}$ = N16,000

(ii) Calculation of Average Investment

Initial Investment	=	N100,000
+ NBV	=	20,000
		120,000

Average investment = N120,000/2 = N60,000

(iii) Calculation of Average Profit

Yr	Profit (N)	Depreciation (N)	Net profit (N)
1	40,000	16,000	24,000
2	44,000	16,000	28,000
3	48,000	16,000	32,000
4	52,000	16,000	36,000
5	58,000	16,000	42,000
		162,000	

Average Profit = $\frac{\text{N162,000}}{\text{5 years}}$ = N32,400

ARR = $\frac{\text{Estimated Average Profits}}{\text{Estimated Average Investment}}$ x 100

$\frac{\text{N32,400}}{\text{60,000}}$ x 100 = 54%

Decision rules

a) When only one project is involved
   1. Accept if the project ahs an ARR that is equal to or greater than that set by the management

2. Reject if the project has an ATT that is less than that set by the management

b) When more than one project is involved
Select the project with the highest ARR

Advantages of ARR

1. It is simple to calculate and understand
2. It considers the profit over the entire life of the project
3. IT uses ready available accounting date.
4. It could be used to compare performance for many companies

Disadvantages of ARR

1. It takes no account of the time value of money
2. It uses accounting profit rather than cash as the measure of benefit
3. There are no rules for setting the minimum acceptable ARR by the management
4. There is no clear definition in accounting of profit and capital employed.

11.4 DISCOUNTED CASHFLOW TECHNIQUES

These are investment appraisal techniques which use discounted cashflows to evaluate projects. These techniques involve:
a) Net Present Value Method
b) Internal Rate of Return Method
c) Discounted Payback Period Method
d) Terminal Value Method

Net Present Value

The Net Present Value (NPV) technique recognizes that different naira arising at different time period will not command the same value. It is obtained by discounting all cash outflows and inflows attributable to a capital investment project by a chosen percentage. By this method, the net cashflows from the investment is discounted by the minimum required rate of return and the initial investment is deducted to arrive at the NPV. If the NPV is positive, the project is acceptable but unacceptable is the NPV is negative. In the discounting process, discounting factor is used:

$$Dcf = \frac{1}{(1 + r)n}$$

Where dcf = discounting factor
r = minimum rate of return

n = number of years over which we discounts

Illustration 11.4

Semijeje is to undertake a project worth N10m having the following cashflow profile:

Yr	Cashflows
1	5,000,000
2	6,000,000
3	8,000,000

However, if the discount rate of 25% is applied in order to account for the time value of money, should the project be accepted?

i) Calculation of discounting factor

Yr	D.F
1	$\frac{1}{(1+0.25)} = 0.800$
2	$\frac{1}{(1+0.25)^2} = 0.640$
3	$\frac{1}{(1+0.25)^3} = 0.512$

ii) Calculate of NPV

Yr	CF	DCF@25%	PV
0	(10,000,000)	1	(10,000,000)
1	5,000,000	0.800	4,000,000
2	6,000,000	0.640	3,840,000
3	8,000,000	0.512	4,096,000
		NPV	1,936,000

The project should be accepted.

Decision rules

a) For only one project

1) Accept if the project has a positive NPV
2) Reject if the project has a negative NPV

b) For more than one project, select the project with the highest NPV

Advantages of NPV

1. It recognizes the time value of money
2. It uses all the cashflows over a project's lifespan
3. It gives a clear accept/reject recommendation
4. It gives absolute measure of profitability

Disadvantages of NPV

1. It is relatively more difficult to calculate and understand
2. It may not give dependable results
3. The selection of discounting rate is subjective.

Internal Rate of Return Method (IRR)

IRR is the percentage discount rate used in capital investment appraisals which brings the cost of a project and its future cash inflows into equality. It is the rate of return which equates the present value of anticipated net cashflows with the initial outlay. It is also known as the cut-off rate, the hurdle rate, the target rate, the marginal efficiently cost of capital etc. It is the rate at which NPV is equal to zero. IRR is calculated using a two-step approach.

Step 1: Trial and Error
Here, two different rates that will produce two opposing NPVs (one positive and the other negative) are applied.
Step 2: Interpolation
From step 1, relevant figures relating to the formula below are applied to generate the IRR.

$$IRR = R_1 + \frac{N_1}{N_1 - (N_2)} \times (R_2 - R_1)$$

where R1 = Lower rate
R2 = Higher rate
N1 = the NPV of the lower rate
N2 = the NPV of the higher rate

Illustration 11.5

Calculate the IRR of a project having the following cashflows:

Yr	NCF
0	(3,610)

1	1,000
2	2,000
3	3,000

Solution

Trial and Error

Yr	NCF	DCF@15%	PV	DCF@26%	PV
0	(3,610)	1	(3,610)	1	(3,610)
1	1000	0.87	870	0.79	790
2	2000	0.76	1520	0.63	1,260
3	3000	0.66	1980	0.50	1,500
			760		(60)

Interpolation

$$IRR = R_1 + \frac{N_1}{N_1 - (N_2)} \times (R_2 - R_1)$$

R1 = 15, R2 = 26, N1 = 760, (N2) = (60)

$$\therefore Irr = 15 + \frac{760}{760 - (-60)} \times (26-15)$$

$$= 15 + \frac{760}{820} \times 11$$

$$= 15 + 10.2 = 25.20\%$$

Decision rules

a) In a case of only one project: to accept a project, if it has an IRR that is greater than the cut-off rate stipulated by the management or if its IRR is higher than the cost of borrowing.
b) In a case of more than one project. Select the projects that have an IRR that is greater than the cut-off rate indicated.

Discounted Payback Period Method

In this method, the cashflows generated from a project are discounted back to present value term. The discounted cash inflows are then matched with the original investment in order to identify the period taken to payback the outlay. This method overcomes the shortcoming of not accounting for the time value of money but it

still does not take into account those cashflows which occur subsequent to the payback period.

Illustration 11.6

Gateway Ltd is implementing a project with an initial capital outlay of N7,600. Its cash inflows are as follows

Yr	1	2	3	4
Cashflows (N)	6,000	2,000	1,000	5,000

The expected rate of return on the capital invested is 12% p.a. Calculate the discounted payback period of the project

Yr	Cash inflow N	Discount factor N	Present value
1	6,000	0.893	5,358
2	2,000	0.797	1,594
3	1,000	0.712	712
4	5,000	0.636	3180
	NPV	10,844	

The discounted PBP is 3 years i.e 5358 + 1594 = 712

Terminal Value Method

Under this method it is assumed that each cashflow is re-invested in another project at a predetermined rate of interest. It is also assumed that each cash inflow is reinvested elsewhere immediately until the termination of the project. The present value of the sum total of the compounded reinvested cashflows is greater compared with the values of the original outlay.

Illustration 11.7

Original outlay N8,000
Life of the project 3 years
Cash inflows N4000 p.a for 3 years
Cost of capital 10% p.a.

Expected interest rates at which the cash inflows will be re-invested.

Year end	1	2	3
Rate	8	8	8

Solution

i) Calculation of the compounded sum

Year	Cash inflow	Int. Rate	Yrs for investment	Comp. factor	Comp. sum
1	4,000	8	2	1.166	4,664
2	4,000	8	1	1.080	4,320
3	4,000	8	0	1.000	4,000
					12,984

The present value of N12,954

$= \frac{N12,954}{(1.10)^3} = N9,755$

Since the present value of reinvested cashflows N9,755 is greater than the original cash outlay of N8,000, the project would be accepted.

11.5 SUMMARY

In appraising a project, various techniques have been developed ranging from the traditional to the discounted cashflows techniques. The traditional techniques do not take into account the time value of money. However, under the discounted cashflow techniques, the future net cashflows generated by a capital project are discounted to ascertain their present values.

11.6 SELF REVIEW QUESTIONS

1) What is Payback Period?
2) Write short notes on a Average Rate of Return
3) Explain the concept of time value of money and its relevance
4) Distinguish between IRR and NPV
5) Under what situation investment decisions are mainly guided by Payback Period Method.

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UNIT 12: RISK AND RETURN

Learning Objectives

In the end of this study, students must have understood

- Meaning of risk
- Determination of risk and return of single asset

- Determination of risk and return of a two-assets portion folio
- Determination of risk and return of a three-assets portfolio
- Ascertainment of optimal portfolio of two assets
- Minimization of risk through diversification of portfolio
- Relationship between risk and return

CONTENTS

12.1 INTRODUCTION

Risk is seen as the degree of probability of occurrence assigned to an investing or financing decision from the knowledge of the past or existing events. The term risk is used to describe an option where the outcome is not known with certainty in advance but the probability of its occurrence ranges between 0 and 1. It implies the possibility of receiving lower than expected return on investment or not receiving any return at all or even not getting the principal amount back.

The difference between risk and uncertainty has been that, uncertainty cannot be quantified while risk can be quantified of the likelihood of future outcomes. Risk denotes a positive probability of something bad happening while uncertainty does not necessarily imply a value judgment or ranking of the possible outcomes. Therefore, risk is present when future events occur with measurable probability. On the other hand, uncertainty is present when the likelihood of future events is indefinite or incalculable.

12.2 RISK AND RETURN OF A SINGLE ASSET

Return of an Asset

A firm's investment's should earn reasonable and expected rate of return. Certain investments like bank deposits, debentures, bonds etc carry a fixed rate of return payable periodically. In case of investments in shares of companies, the

periodically payments in the form of dividends are not assured, though it may ensure higher returns than fixed income investments. The rate of return of a particular investment is calculate as follows:

$$R = \frac{D}{Po} + \frac{P1 - P2}{Po}$$

where R = Annual rate of return of a share
D = Dividend paid at the end of the year
Po = Market price of share at the beginning of the year
P1 = Market price of share at the end of the year
In the above formula,
D/Po represents dividend yield and
$\frac{(P1 - Po)}{Po}$ represents capital gain or loss

Illustration 12.1

Mr Ororun has purchased 100 shares of N10 each of Kinetic Ltd in 2001 at N78 per share. The company has declared a dividend @ 40% for the year 2008-9. The market price of share as at 1-4-2008 was N104 and on 31-3-2009 was N128. Calculate the annual return on the investment for the year 2008-9.

Solution

Dividend received = N10 x 40/100 = N4

$$R = \frac{D}{Po} + \frac{P1 - Po}{Po} = \frac{4}{104} + \frac{4\ (128-104)}{104} = 0.2692 \text{ or } 26.92\%$$

Risk of an Asset

Risk has been statistically express in terms of standard deviation of return. The mean of the probable returns gives the expected rate of return and the standard deviation or variance measures risk. Low standard deviation means low risk and a risk averse investor will look for return where the range is low. Risk is therefore equaled with volatility in expected returns.

Illustration 12.2

The rate of return of equity shares of Hill Top Ltd for past six years are given below.

Yr2004 2005 2006 2007 2008 2009

Returns 12 18 -6 20 22 24

Solution

Calculation of the mean (Average Rate of Return)

$$R = \frac{\Sigma R}{N} = \frac{12 + 18 - 6 + 20 + 22 + 24}{6} = 15$$

Yr	Return R	(R – R)	$(R - R)^2$
2004	12	-3	9
2005	18	3	9
2006	-6	-21	44.1
2007	20	5	25
2008	22	7	49
2009	24	9	81

$E(R-R)^2 = 614$

Variance = $\sigma^2 \frac{614}{6} = 102.23$

Standard deviation = $\sigma = \sqrt{\sigma^2} = 102.33$

$\sigma = 10.12$

In investment risk analysis, expected returns rather than actual or realised returns on investment are used. Expected return is the ate of return on investment attached with associated probabilities.

E(R) = PR = probability X returns

Illustration 12.3

The possible returns and associated probabilities of securities X and Y are given below:

Security X		Security Y	
Probability	Return (%)	Probability	Return(%) 0.05
0.10	5		6

0.15	10	0.20	8
0.40	15	0.30	12
0.25	18	0.25	15
0.10	20	0.10	18
0.05	24	0.05	20

Calculate the expected return and standard deviation of security X and Y.

Solution

Calculation or Expected Return and Standard deviation of X

Probability (P)	R	PR	(R-R)	P(R-R)2
0.05	6	0.30	-9.5	4.5125
0.15	10	1.50	-5.5	4.5375
0.40	15	6.00	-0.5	0.1000
0.25	18	4.50	2.5	1.5625
0.10	20	2.00	4.5	2.0250
0.05	24	1.20	8.5	3.6125
	R 15.5		16.35	

Expected Return of security X (R) = 15.5
Standard deviation of security X

$$\sigma^2 = 16.35$$
$$\sigma_x = 16.35 = 4.04$$

Calculation or Expected Return and Standard deviation of Y

Probability (P)	R	PR	(R-R)	P(R-R)2
0.10	5	0.50	-7.25	5.2563
0.20	8	1.60	-4.25	3.6125
0.30	12	3.60	-0.25	0.0188
0.25	15	3.75	2.75	1.8906
0.10	18	1.80	5.75	3.3063
0.05	20	1.00	7.75	3.0031
	R 12.25			17.09

Expected Return of security Y (R) = 12.25
Standard deviation of security Y

$$\sigma^2 = 17.09$$
$$\sigma_y = 17.09 = 4.134$$

:. Security A has higher expected return and lower level of risk as compared to security Y.

12.3 RISK AND RETURN OF A PORTFOLIO

A portfolio is a collection of securities
1) Two-Asset Portfolio

Return
The expected return from a portfolio of two or more securities is equal to the sum of the weighted returns from the individual securities.

$E(Rp) = W_A(R_A) + W_B (B_B)$

where $(E(Rp)$ = Expected return from a portfolio
W_A = Proportion of wealth/funds invested in security A
W_B = Proportion of funds invested in security B
R_A = Expected return of security A
R_B = Expected return of security B
$W_A + W_B = 1$ or 100%

Illustration 12.4

A company's share gives a return of 20% and B company's share gives 32% return. Mr Otunba invested 25% in A's shares and 75% of B's shares. What would be the expected return of the portfolio.

Portfolio Return

$Hp = E(Rp) = W_A(R_A) + W_B (B_B)$
$= 0.25 (20) + 0.75 (32) = 29\%$

Risk of Two-Asset Portfolio

The securities consisting in a portfolio are associated with each other. So, in determining the portfolio risk, the covariance between the returns of the investments is considered. Covariance of two securities is a measure of their co-movement. It is the degree to which the securities vary together.

The risk of two-asset portfolio is given them

$$\sigma p = W_A^2 \sigma_A^2 + W_B \sigma_A^2 + 2 W_A W_B R_{AB} \sigma_A \sigma_B$$

where
σp = Standard deviation of the portfolio
W_A = Proportion of funds invested in security A

W_B = Proportion of funds invested in security B
σ_A = Standard deviation of security A
σ_B = Standard deviation of security B
r_{AB} = correlation coefficient between A and B

The correlation coefficient is given as

$$r_{AB} = \frac{Cov_{AB}}{R_A R_B}$$

where $Cov_{AB} = NEAB - (EA)(EB) = P(A-A)(B-B)$
where N = number of observation
E = summation

The degree of correlation between securities is very important in portfolio selection because it dictates how possible it is to diversify risk (unsystematic).

Illustration 12.5

The table below is related to a portfolio comprising 40% of securities A and 60% of security B.

Prob.	Expected return Security A (%)	Expected return Security B (%)
0.2	12	15
0.6	15	20
0.2	18	25

Calculate the portfolio expected return and risk.

For Security A

R	P	PR	(R-R)	$(R-R)^2$	$P(R-B)^2$
12	0.2	2.4	-3	9	1.8
15	0.6	9.0	0	0	0
18	0.2	3.6	3	9	1.8
	R = 15			3.6	

σ_A^2 = variance of A = 3.6
σ_A = 3.6 = 1.8974

For Security B

R	P	PR	(R-R)	$(R-R)^2$	$P(R-B)^2$
15	0.2	3	-5	25	5
20	0.6	12	0	0	0

25 0.2 5 5 25 5

R = 20 10

σ_B^2 = variance of B = 10

σ_B = 10 = 3.1623

Coefficient of correlation $= \frac{\text{Covariance AB}}{\sigma_A \sigma_B}$

Covariance AB =

P	A-A	B-B	P(A-A) (B-B)
0.2	-3	-5	3
0.6	0	0	0
0.2	3	5	3

$\therefore r_{AB} = \frac{6}{\sigma_A \sigma_B}$

$r_{AB} = \frac{6}{1.8974 \text{ X } 3.1623}$

i) Expected Return of the Portfolio

$Np = Rp = W_A(R_A) + W_B (R_B)$

$= 0.4 (15) + 0.6 (20)$

$= 6 + 12 = 18$

Risk (standard deviation)

$\sigma p = W_A^2 \sigma_A^2 + W_B \sigma_A^2 + 2 W_A W_B R_{AB} \sigma_A \sigma_B$

$= (0.4)^2 (1.8974)^2 + (0.6)^2 (3.1623)^2 + 2(0.4) (0.6) (1.8974) (3.1623) (1)$

$= (0.16) (3.6) + (0.36) (10) + 2.8801$

$= 0.576 + 3.6 + 2.8801$

$= 7.0561$

$\sigma p = 7.0561 = 2.6563$

Return of a Three-Asset Portfolio

For the portfolio consisting three securities A, B, and C

$Np = W_A R_A + W_B R_B + W_C R_C$

Risk of A Three-Asset Portfolio

For a portfolio consisting three securities A, B and C:

$$\sigma p = \sqrt{W_A^2\ \sigma_A^2 + W_B\sigma_A^2 + W_c\sigma_c^2 + 2W_AW_B\ \sigma_A\sigma_B r_{AB} + 2W_AW_C\sigma_A\sigma_C r_{AC} + 2W_BW_C\sigma_B\sigma_C\ r_{BC}}$$

Optima Portfolio

The investor can minimize his risk on the portfolio. Minimization of portfolio risk is attainable by selecting negatively correlated securities. The diversification of unsystematic risk using two security portfolio depends upon the correlation that exists between the returns of those two securities. Optimal portfolio can be achieved where:

$$WA = \frac{\sigma_B^2 - Cov_{AB}}{\sigma_A^2 + \sigma_B^2 - 2\ Cov_{AB}}$$

Note that where W_A is the proportion of funds invested in security A, then the proportion invested in B is $1 - W_A = W_B$

12.4 PORTFOLIO DIVERSIFICATION AND RISK

Diversification can be regarded as a strategy adopted by rational investors by spreading and committing their funds in several investments in such a way that if a given line goes bad such an investor, a portfolio is held by an investor in order to diversify risk. And in order to diversify risk for the creation of an efficient portfolio (one that allow the firm to achieve the maximum return for a given level of risk or to minimize risk for a given level of return) the concept of correlation must be understood.

In a portfolio consisting of two securities, if the two securities move together, they are positively correlated. If they move in opposite directions, they are negatively correlated. The existence of perfectly correlated (where r = 1 or -1) is rare. In order to diversify risk and thereby reduce the firm's overall risk, the projects that are best combined or added to the existing portfolio of projects are those that have negative correlation of A and B.

If $R_{AB} = 1$ No unsystematic risk can be diversified

$R_{AB} = -1$ All systematic risk can be diversified

$R_{AB} = 0$ No correlation between the returns of A and B.

Note that $r\ -1 \leq r_{Ab} \leq 1$

Also, combining projects with correlations falling between perfect positive correlation ($r_{AB} = 1$) and perfect negative correlation ($r_{AB} = -1$) can reduce the overall risk of a portfolio.

12.5 **INDIFFERENCE CURVES AND INVESTOR'S ATTITUDE**

The indifference curve is the curve which shows the combination of expected return and risk that the individual investor will find to be of equal benefit. It shows the different combinations of risk and return which will leave individual equally satisfied. All the points lying on a given indifference curve offer the same level of satisfaction.

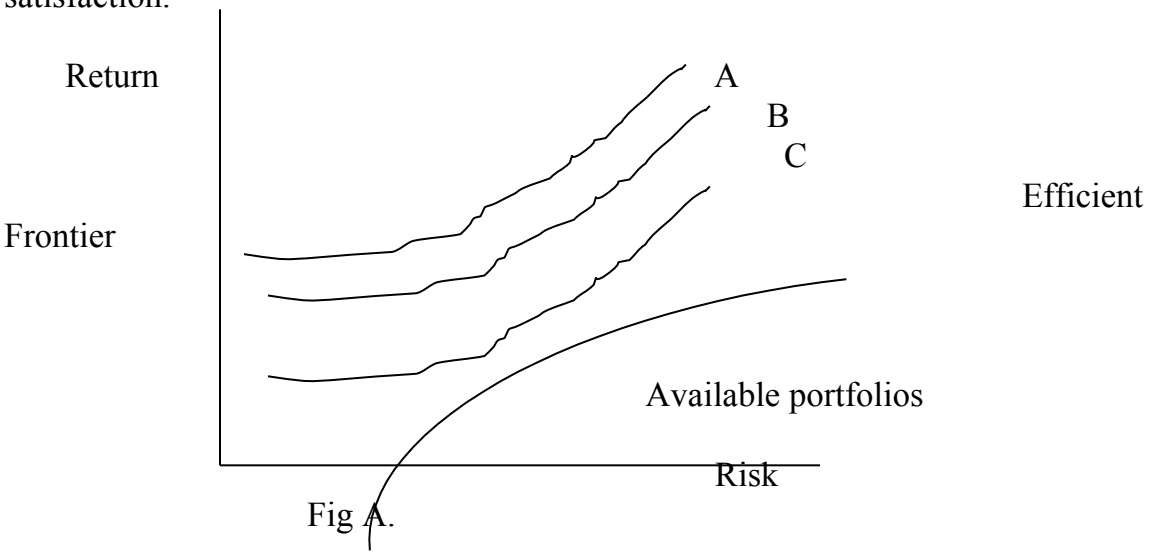
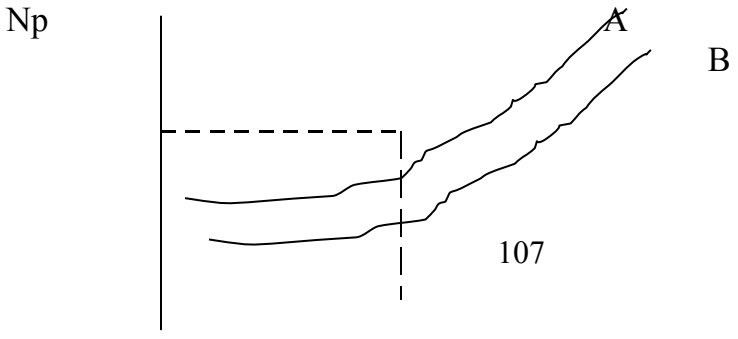


Fig A.

Indifference Curve Compared



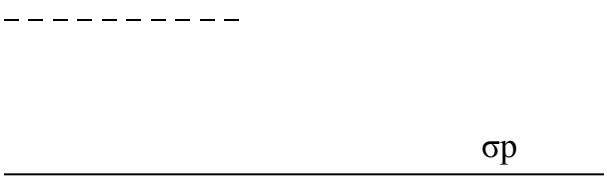


Fig B

The indifference curves shows here are typical in that every point on each curve has a higher expected return or a lower risk than other points on the curve. Also, an investor would choose combination of risk and expected return on one curve with equal indifference, but he would prefer combination of return and risk on indifference curve A than on B because curve A offers higher returns for the same degree or risk and less risk for the same amount of expected returns).
In Fig A, An investor would prefer a portfolio of investments on indifference curve A to a portfolio on curve B, which in turn is preferable to a portfolio on curve C.

12.6 **RISK-RETURN RELATIONSHIP**

The risk and return constitute the framework for taking investment decision. Dealing with the return to be achieved requires estimate of the return on investment over the time period. Risk denotes deviation of actual return from the estimated return, This deviation of actual return from expected return may be on either side. However investor's are concerned with the downside risk. The risk under consideration is made up of two parts.

1. Unsystematic risk
2. Systematic risk

1. Unsystematic risk is also known as diversifiable, unique, specific, residual and non-market risk. It is caused by events such as:

i. Quality of management
ii. Location
iii. Nature of products

This part of risk is internal and is related to the firm and industry.

2. Systematic risk is also known as non-diversifiable, non-specific, general and market risk. It is caused by events such as:

i. Inflation
ii. Economic problems
iii. Political problems
iv. War
v. Death of the president

This is also known as unavoidable risk and it is external to the firm and industry. The risk and return tends to be positively related. Risk assures exogenous position in risk-return function while return depends on risk level for its determination. It is generally believed that there is consistently risk-return trade-off i.e. the greater the risk accepted, the greater must be the potential return as reward for committing ones funds to an uncertain outcome.

12.7 SUMMARY

Uncertainty means it is not known exactly what will happen in future and it cannot be quantified, while risk means future happening can be assumed under probability and the likelihood of future outcomes can be quantified. The risk of an asset is expressed in terms of standard deviation. The mean of the probable return gives the expected rate of return and the standard deviation measures the risk. The expected return from a portfolio of two or more securities is equal to the weighted average of the expected returns from the individual securities.

SELF REVIEW QUESTIONS

1) How do you ascertain the risk and return of a portfolio?
2) Write short notes on Covariance
3) How do you ascertain the optimal portfolio?
4) What is the necessity for portfolio diversification?
5) Write short notes on indifference curves.

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UNIT 13: CAPITAL ASSET PRICING MODEL

Learning Objectives

In the end of this unit, students must have understood:

- The meaning of Capital Asset pricing Model (CAPM)
- Classification of risks into systematic and unsystematic risks
- Distinction between Security Market Line and Characteristics Line
- Determination of Beta coefficient

- Risk – return trade - off using CAPM
- Use of Arbitrage Pricing Model in ascertainment of expected return

CONTENTS

13.1 INTRODUCTION

The Capital Asset Pricing Model was developed by three economists W.F Sharpe, J.N Linter and Jack Treynor between 1965 and 11966 in an attempt to simplify the assumption of portfolio theory as they relate to investment in securities. The model is based on the portfolio theory developed by Harry Markowitz. It emphasizes that the risk factor in portfolio theory is a combination of two risks i.e systematic risk and unsystematic risk. And that the combination of both types of risk provides total risk.

.: Total risk = systematic risk + unsystematic risk
This model also suggests that a security's return is directly related to its systematic risk which cannot be neutralized through diversification. So, the total variance (risk) is equal to market related variance plus company's specific variance. The model employs beta coefficient (B).

A risk free security has a B of O, while the risk premium is also O. the market portfolio has a B of 1 and a risk premium of (Rm – Rf). A problem arises as regards the risk premium if a security does not have a B of O or 1. this is what the CAPM attempts to solve.

13.2 CLASSIFICATION OF RISKS

According to the CAPM's theorists, the risk associated with portfolio rate of return can be decomposed into two:
i) Systematic risk

ii) Unsystematic risk

i) Systematic Risk

Systematic risk arises out of external and uncontrollable factors. It is the portion of total variation in return caused by factors that affect the price of all securities. The movement or variation is generally due to the response to economic, social and political changes. This risk cannot be avoided because it relates to economic trends which affect the whole market. During economic boom, prices of all stocks indicate rising trend and in recession, the prices of all stocks will be falling. This type of risk is associated with the following factors:

a) Market Risk: This is in connection with changes in demand and supply, expectations of the investors, information flow, investor's risk perception, variation in price caused by social, political and economic events is referred to as market risk.

b) Interest Rate Risk: Generally price of securities tend to move universally with changes in the rate of interest. The return on investment depends on the market rate of interest. Also, the cost of corporate debt depends on the interest rates prevailing, maturing periods e.t.c. The uncertainty of future market value caused by fluctuations in the general level of interest is known as interest rate risk.

c) Purchasing Power Risk: This is a risk due to inflation. The risk in prices due to inflation will cause increase in cost of production and reduction in profit due to lower margins. The investor's expectations will also change with the changes in the levels of purchasing power. This risk is inherent in all securities and it is uncontrollable by the individual investors.

ii) Unsystematic Risk

This is that portion of total risk which results from known and controllable factors. All the factors responsible for this risk are related to the firm or industry. Unsystematic risk is specific to individual stocks and can be diversified as the investor increases the number of stocks in his or her portfolio. Investors are not compensated for unsystematic risk because they are expected to be rational in holding diversified portfolio to diversify away risk. While systematic risk attributable to broad macro factors affecting securities, unsystematic risk is attributable to factors unique to a security. The following factors are possible for unsystematic risk:

a) **Business Ris**k: Business risk is associated with volatility of revenue and profits of a particular company due to its market conditions, product mix, labour

supply e.t.c. It has to do with the efficiency with which a firm conducts its operations within the broader environment.

b) **Financial Risk**: This risk is associated with the financing activities of the firm. It is associated with the capital structure of the firm. An ungeared company has no financial risk. Financial risk will also arise due to short – term liquidity problems, shortage of working capital, bad debt e.t.c.

c) **Default Risk**: The default risk arises due to default in meeting the financial obligations as and when due for payment.

13.3 ASSUMPTION OF CAPM

1. Investors are rational and risk averse.
2. Investors seek to maximize utility which is a function of risk and expected return.
3. Risk is measured by the standard deviation of returns.
4. There is a linear relationship between the return obtained from an individual security and the average rate of return from all securities in market.
5. The stock market is efficient (i.e security values reflect all known information, which is available to all investors at no cost). No individual investor dominates the market.
6. All investors can borrow and lend infinitely large sum of money at the same risk free rate.
7. There is no taxation.
8. There are no transaction costs.
9. All investors view securities in the same way with respect to return, risk and correlation with other securities. Investor's expectations are homogeneous.
10. The CAPM is a one – period model. Though it is not useless in multi – period situation.

13.4 BETA FACTOR

CAPM states that an investor shall:

1. not be rewarded if he accepts alpha (unsystematic) risk because it is avoidable
2. be rewarded if he undertakes beta (systematic) risk because it is unavoidable.

Beta is a measure of the systematic risk of a security that cannot be avoided through diversification. It is a measure of risk of an individual stock relative to the market portfolio of all stocks. The formula for beta (β) is made of two parts;

- The risk free rate
- The risk premium

So, $E(Ri) = Rf + Bi [E(Rm) – Rf]$
Where,

$E(Ri)$ = the expected return on security i
Rf = the risk free rate
$E(Rm)$ = the expected return on the market portfolio
Bi = the beta of security i
$E(Rm) – Rf$ = the market risk premium

Formulae for beta

i) where β is made the subject of the above formulae

$$\beta i = \frac{E(Ri) - Ri}{E(Rm) - Rf}$$

ii) where regression analysis is used

$$\beta i = \frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2}$$

where $x = \Sigma(Rm) – Rf$
$y = \Sigma(Ri) – Rf$
n = the number of period's data in the question

iii) where expected returns are known with probability (p)

$$Bi = \frac{\Sigma p (Ri - Ri)(R_m - R_m)}{\Sigma p (R_m - R_m)^2}$$

where,
Ri = Forecast return from security i
Ri = Expected return from security i
Rm = Forecast return from the market
Rm = Expected return from the market
P = Probability distribution

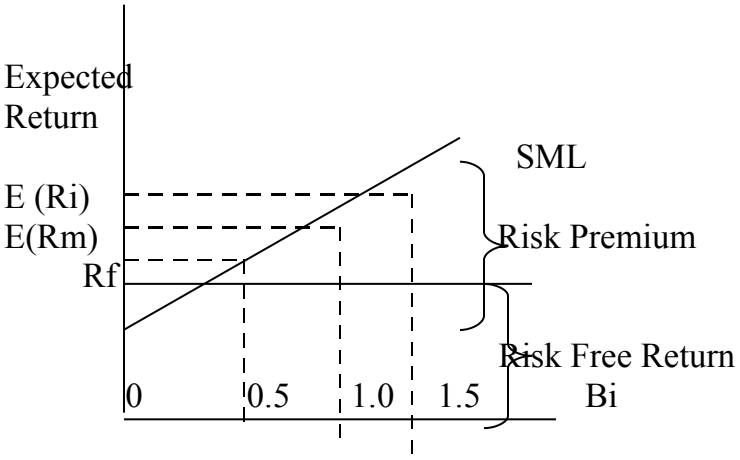
iv) where from formulae iii

$$Po = \frac{Cov\ (r_i, r_p)}{Var\ (_{rp})}$$

where ri = the rate of return of security i
rp = the rate of return of the portfolio
Cov (ri, rp) = the covariance between the rates of return

13.5 **SECURITY MARKET LINE**

The SML is the line representing the relationship between expected return of a security and market risk (B). The expected return of a security increases linearly with the market risk. The SML is an upward sloping straight line with an intercept at the risk free return securities and passes through the market portfolio.
Graphically it is explained thus:



This linear relationship is derived from the formulae:

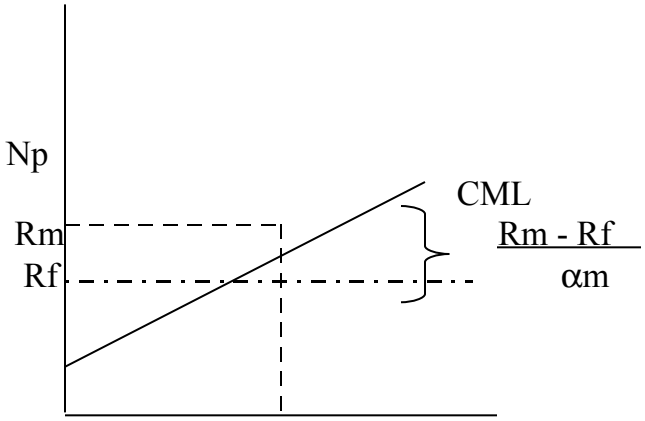
$$E(Ri) = Rf + Bi\ (Rm - Rf)$$

The market itself has an underlying beta (B) of 1.0, and individual stocks are ranked according to how much they deviate from the macro market. A stock that swings more than the market (more volatile) overtime has a beta whose absolute value is above 1.0. If a stock moves less than the market, the absolute value of the stock's beta is less than 1.0.

More specifically, a stock that has a beta of 1.5 follows the market in an overall decline or growth but does so by a factor of 1.5; meaning when the market has an overall decline of 3%, a stock with a beta of 1.5 will fall by 4.5%. Betas can also be negative, meaning the stock moves in the opposite direction of the market. A stock with a beta of -3 would decline 9% when the market goes up by 3% and vice versa.

13.6 **CAPITAL MARKET LINE**

The CML represents the trade off between risk and return available in the capital market. It defines the linear relationship that exists between expected return on a portfolio and that portfolio risk. The slope of the CML is the rate of exchange between expected return and risk and is given by:

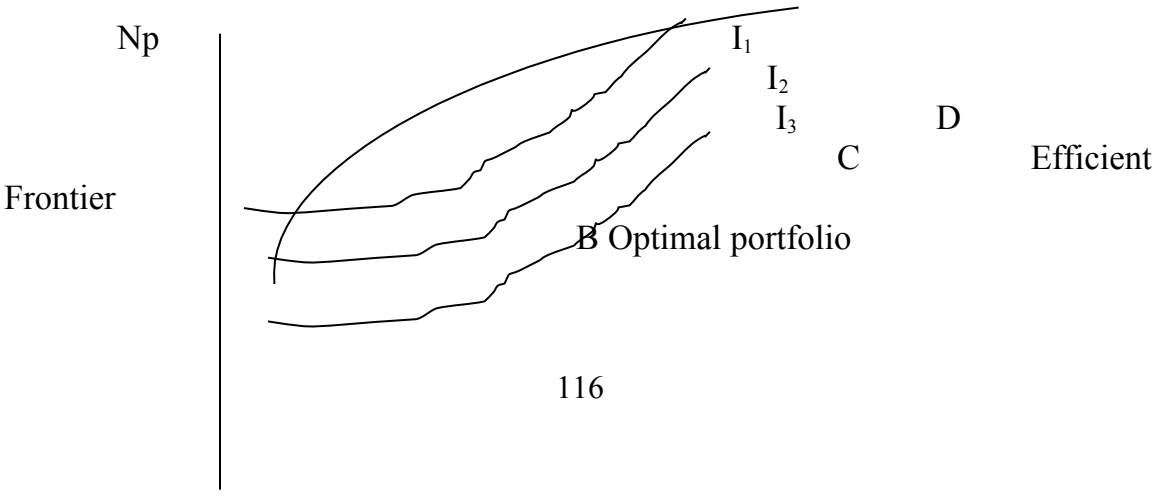


13.7 **EFFICIENT FRONTIER**

In selection of a portfolio, comparisons between combinations of portfolios are essential. As a rule, a portfolio is not efficient if there is another portfolio with:
a) a higher expected value of return and a lower standard deviation (risk)
b) a higher expected value on return and the same standard deviation (risk)
c) the same expected value of return but a lower standard deviation (risk)

If an investor's portfolio is not efficient he may through diversification"
a) increase the expected value of return without increasing risk
b) decrease the risk without decreasing the expected value of return
c) obtain some combination of increase of expected return and decrease risk.

This is possible by switching to a portfolio on the efficient frontier.



A Indifference curves

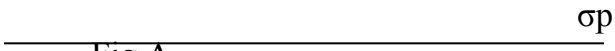


Fig A.

The above graph depicts efficient frontier and the different levels of indifference curves for an investor. The individual investor will want to hold that portfolio of securities that places him on the highest indifference curves, choosing from the set of available portfolios.

A, B, C, and D define the boundary of all possible investments which are the efficient proposals lying on the efficient frontier. The optimal portfolio is achieved at a point where the indifference curve is at tangent to the efficient frontier.

13.8 **LIMITATIONS OF CAPM**

1 Beta is difficult to measure accurately for an individual company.
2 Beta values may be unstable overtime.
3 CAPM is a theoretically one period model. As one period model, it should be used with caution for the appraisal of multi period projects.
4 There might be problems in determining the appropriate risk free rate of return.
5 In the real world, a perfect market does not exist and thus, calculating expected return on market portfolio will not be visible.
6 The model only considers systematic risk. It assumes that investors always hold balanced portfolio which eliminate unsystematic risk.
7 There are possibilities of conflicts in the decision reached with WACC.
8 In practice, the cost of insolvency cannot be ignored. Also, the possibility of insolvency is related to a firm's total risk rather than its systematic risk.

13.9 **ARBITRAGE PRICING MODEL**

The arbitrage pricing model (APM) is similar to the CAPM with their origins being significantly different. While CAPM is a single – factor model, the APM is a multi – factor model with a whole set of beta values one for each factor unlike CAPM that uses a single beta value.

Arbitrage Pricing Theory (APT) out of which the APM arises, states that the expected return on an investment is dependent upon how that investment reacts to

a set of individual macro – economic factors and the risk premium associated WITH EACH OF those macro – economic factors.
In the case of APM, the expected return on a particular investment is given by:

$E(Ri) = R_f + B_{fi} (R_{fi} – R_f) + B_{FL} (R_{F2} – RF) + ...B_{FN}(R_{FN} – RF)$

Where f1 and f2 e.t.c individual macro – economic factor
n = the number of identified factors.
A major problem with the use of APM is that the identity of those macro – economic factors is unclear.

13.10 SUMMARY

Markowitz mean variance model suggests that investors are basically concerned with risk and return relating to the investment and company diversification of portfolio, the trade off is possible between risk and return.
The optimal investment is achieved at a point where the indifference curve of an investor is at tangent to the efficient factor.

13.11 SELF REVIEW QUESTIONS

1 Distinguish between market risk and issuer risk.
2 Write short note on market portfolio.
3 Write short note on capital market line.
4 Distinguish between capital market line and security market line.

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UNIT 14: PORTFOLIO THEORY

Learning Objectives

In the end of this unit, students must have understood:

- Mean Variance Analysis
- Concept of Efficient Frontier
- Separation Theorem
- Usage of CAPM and APM

CONTENTS

14.1 INTRODUCTION

In 1952, Harry Markowitz in an article drew attention to a general and common practice of portfolio diversification. Modern Portfolio Theory (MPT) concentrates on portfolio management which is concerned with efficient management of investment in the securities.

A portfolio is the collection of several securities on behalf of an investor. Portfolio management deals with the process of selection of securities from the number of opportunities available with different expected returns and carrying different levels of risk and the selection of securities is made with a view to provide the investors the maximum yield for a given level of risk or ensure minimized risk for a given level of returns.

14.2 MARKOWITZ MEAN – VARIANCE MODEL

According to Harry Markowitz, investors are mainly concerned with two properties of an asset that is, risk and return. Though, it is possible to trade off between risk and return through diversification. By this theory, the risk of individual asset is not really important; what is very important is the contribution of each individual asset to the investor's total risk. For selecting the right portfolio from different assets, he developed Mean Variance Analysis.
The portfolio selection problem can be divided into two stages:

- Calculate the mean – variance of the efficient portfolios.
- Select one such portfolio.

The idea behind the mean – variance analysis is to ascertain the expected return and risk of portfolios for comparison. The mean of the forecast value of returns is the expected returns while the variance or standard deviation represents the risk.
As we know:

$Np = W_A(R_A) + W_B(R_B)$

Variance = $\sigma p^2 = W_A^2 \sigma_A^2 + W_B \sigma_A^2 + 2 W_A W_B R_{AB} \sigma_A \sigma_B$

where, WA = Proportion of funds invested in A

WB = Proportion of funds invested in B

σ_A = Standard deviation of A

σ_B = Standard deviation of B

RA = Forecast returns of A

RB = Forecast returns of B

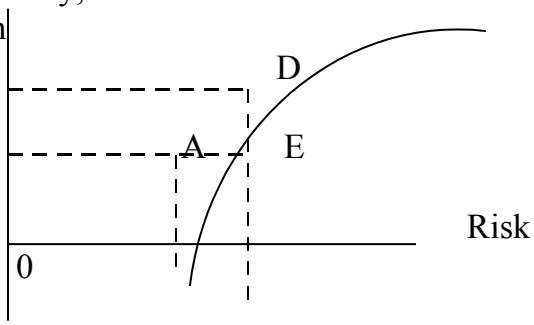
r_{AB} = Correlation co-efficient

Np = Expected returns on the portfolio

14.3 CONCEPT OF EFFICIENT FRONTIER

In practice, a rational investor will seek to minimize risk and maximize return. He will therefore prefer the project having the higher return at the same level of risk with another and where two securities have the same return, he will select the one with the lower risk.

Graphically, Efficient Frontier



Investment A will be preferred to investment E because it has the lower level of risk at the same level of return with investment E. Security D will be preferred to security E because it has the same level of risk with E but higher return. Both securities A and D dominate security e and where all shareholders o investors prefer a particular security based on the same criterion or criteria, the preferred security is said to have a stochastic dominance over the less preferred security.

The choice between security A and security D depends on the attitude of the investors in that there is no clear choice not only between A and D but also all securities that fall along the curve that is known as the efficient frontier. So, a risk – taker will prefer security D which has the higher return and higher risk. A risk averse investor will select A which has both lower risk return to security D.

14.4 SEPERATION THEOREM

The attitude of individual investors towards bearing risk affects only the amount that is loaned or borrowed. It does not affect the optimal portfolio of risky assets. Investors would select portfolio of risky assets no mater what the nature of their indifference curves is. The reason is that when a risk – free security exists, and borrowing and lending are possible at the rate, the market portfolio dominates all others. As long as they can freely borrow and lend at the risk – free rate, two investors with very different preferences will both choose portfolio of risky assets. Thus, the individual utility preferences are independent of or separate from the optimal portfolio of risky assets.

This condition is known as the separation theorem. It states that the determination of an optimal portfolio of risky assets is independent of the individual's risk preferences. Such a determination depends only on the expected returns and standard deviations for the various possible portfolios of risky assets.

In essence, the individual's approach to investing is in two phase:

1. Determination of an optimal portfolio of risky assets.
2. Determination of the most desirable combinations of the risk – free security and the portfolio.

14.5 APPLICATION OF CAPM AND APM

Recalling the Capital Asset Pricing Model

$E(Ri) = Rf + Bi (Rm – Rf)$

Illustration 14.1

Oreoluwa ltd an investment company has invested in equity shares of a chip company.

Its Risk free return (Rf) = 10%
Expected total return (Rm) = 16%
Market sensitivity index (Bi) = 1.5

Calculate the expected rate of return on the investment made in the security

$E(Ri) = Rf + Bi (Rm – Rf)$
$= 10 + 1.5 (16 – 10)$
$= 10 + 1.5 (6) = 19\%$

Implications of Beta Values

1. A portfolio with beta greater than one is more volatile than the market and will have a higher return than the market.
2. A portfolio with beta less than one is not as risky as the market and will have a lower return than the market.
3. A portfolio with beta equal to one has the same risk with the market and will have the same return with the market.
4. A portfolio with beta equal to zero is risk free.

Asset Beta

An asset beta reflects a company's business risk. It is the weighted average beta of equity and beta of debt including any relevant tax effects. The difference between a company's asset beta and equity beta reflects the financial risk. Only systematic risk cannot be diversified away is considered in an asset beta.
Thus:

$$ßa = \frac{ße\ (MVe)}{MVe + MVd\ (1-t)} + \frac{ßd\ [MVd\ (1+t)]}{MVe + MVd\ (1-t)}$$

$$\therefore\ ßa = ßa + (ßa - ßd)\ \frac{MVd\ (1-t)}{MVe}$$

where ßE = Beta of Equity
ßa = Asset of beta
ßd = Beta of debt
MVe = Market value of debt (ex-int)
MVe = Market value of equity (ex-div)
t = Corporation tax rate

Illustration 14.2

The most recent balance sheet of Olekoko Plc shows the following:

	N
Net Assets	67,500
Represented by:	
Ordinary shares of 50k	52,500
10% debentures	15,000
	67,500

The beta of the company's asset is 0.85 while that of the debt is 0.20. Return on government bond is currently 12% while the return on the market securities is 17%. The ordinary shares are currently quoted at N2.10 per share while the market value of the debentures is 89%. Using the capital asset pricing model, determine the company's appropriate cost of capital assuming the rate of company tax is 30%.

Solutions

i. Calculation of No of shares

Number of shares $= \frac{\text{N52,500}}{\text{50k}} = 105{,}000$ shares

ii. Total market value of equity

100,000 x N2.10 = N220,500

iii. Total market value of debt

$\text{N15,000} \times \frac{89}{100} = \text{N13,350}$

iv. Calculation of the beta of equity

$ße = ßa + (ßa - ßd)\ \frac{MVd\ (1 - t)}{MVe}$

$Be = 0.85\ (0.85 - 0.20)\ \frac{13{,}350\ (1 - 0.30)}{220{,}500}$

$= 0.85\ (0.65)\ \frac{13{,}350\ (0.70)}{220{,}500} = 0.8775$

v. Calculation of the cost of equity

$E(Ri) = Rf + Bi\ (Rm - Rf)$

$= 12 + 0.8775\ (17 - 12)$

$= 12 + 0.8775\ (5)$

$= 12 + 4.39 = 16.39\%$

vi. Calculation of cost of debt

$Kd = I\ (1 - t) \div MVd = 10\ (1 - 0.3) \div 89$

$= \frac{10(0.7)}{89} = 7.87\%$

vii. Calculation of the company's cost of capital (WACC)

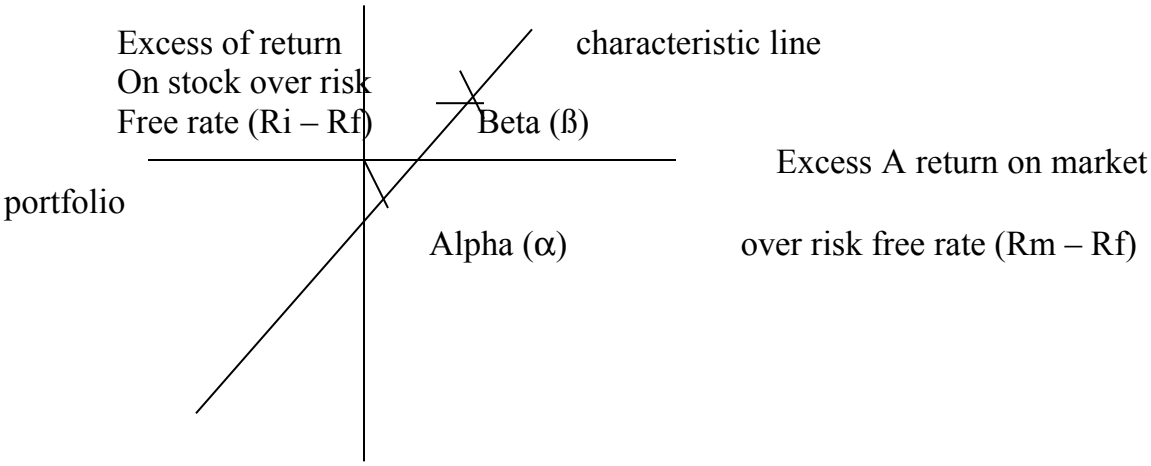
	MIV	COST	HASH	TOTAL
EQUITY	220,500	16.39		36,140

DEBT	13,350	7.87	1,051
	233,850		37,191

$$Kw = \frac{37,191}{233,850} \times 100 = 15.90\% = 16\%$$

Characteristic Line

A line that best fits the points representing the returns on the assets and the market is called characteristic line. The slope of the line is the beta of the asset which measures the risk of a security relative to the market. The greater the beta co-efficient value, the greater the slope of the characteristic line and the greater the systematic risk for an individual security.



The characteristic line equation for the individual security is given below:

$(Ri - Rf) = \alpha: \beta i (Rm - Rf)$

Illustration 14.3

The ratios of return on the security of company X and market portfolio for 10 periods are given below:

Period	Return of X (%)	Return on Market Portfolio
1	20	22
2	22	20
3	25	18
4	21	16

5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

i) what is the beta of security X?
ii) what is the characteristic line for security X?

Solution

Rx	Rm	(Rx – Rx)	(Rm – Rm)	(Rx – Rx) (Rm – Rm)	$(Rm - Rm)^2$
20	22	5	10	50	100
22	20	7	8	56	64
25	18	10	6	60	36
21	16	6	4	24	16
18	20	3	8	24	64
-5	8	-20	-4	80	16
17	-6	2	-18	-36	324
19	5	4	-7	-28	49
-7	6	-22	-6	132	36
20	11			357	706
ΣRx	ΣR_M			Σ	$(R_X-R_X)(R_M-R_M)$

$\Sigma(R_M - R_M)^2$

$$\beta_x = \frac{COV_x\, m}{\sigma^2_m}$$

$$Cov_{xm} = \frac{\Sigma (R_X-R_X)(R_M-R_M)}{n-1} = \frac{357}{9} = 39.67$$

$$\sigma^2_m = \Sigma \frac{(R_M-R_M)^2}{n-1} = \frac{706}{9} = 78.44$$

$$ß_x = \frac{39.67}{78.44} = 0.506$$

ii. From the linear equation

$Y = \alpha + ß_x$

$15 = \alpha = 0.506\ (12)$

$\alpha = 8.928\%$

:. Characteristics line of $X = \alpha + \beta(Rm)$

$= 8.928 + 0.506Rm$

Arbitrage Pricing Model (APM)

Recalling the Arbitrage Pricing Model

$E(Ri) = R_f + B_{fi}(R_{fi} - R_f) + B_{FL}(R_{F2} - RF) + ...B_{FN}(R_{FN} - RF)$

Where f1, f2 and fn represent the individual macro – economic factors which may include:

- Changes in the level of industrial production in the economy
- Changes in the shape of the yield curve
- Changes in the default risk premium
- Changes in the inflation rate
- Changes in the real interest rate
- Level of personal consumption
- Level of money supply in the economy

Illustration 14.4

As an investment manager, you are given the following information:

Factors	Expected Risk Premium
Market	6.40%
Interest rate	-0.60%
Yield spread	5.10%

Stock	Market (B1)	Interest rate (B2)	Yield spread (B3)
A	1.0	-2.0	-0.2
B	1.2	0	0.3
C	0.3	0.5	1.0

Required:

a) Calculate the expected return for each of the three stocks

b) Consider a portfolio with equal investment in stocks A, B and C

i) what are the factor risk exposures for the portfolio?

ii) what is the portfolio's expected return?

Solution

a) $R_A = 12+1(6.4) -2(-0.6) – 0.2 (5.10) = 18.58\%$

$R_B = 12 +1.2 (6.4) + 0(0.6) + 0.3 (5.10) = 21.21\%$

$R_C = 12 + 0.3 (6.4) + 0.5 (-0.6) + 1(5.10) = 18.72\%$

b) i. $\beta 1 = 1/3 (1 + 1.2 + 0.3) = 0.83$

$\beta 2 = 1/3 (-2.0 + 0 + 0.5) = 0.50$

$\beta 3 = 1/3 (-2.0 + 0.3 + 1.0) = 0.37$

ii. $Rp = 12 + 0.83 (6.4) – 0.50 (-0.6) + 0.37 (5.10) = 19.50\%$

14.6 SUMMARY

Markowitz mean variance model suggests that investors are basically concerned with risk and return relating to the investment and by diversification of portfolio, the trade off is possible between the risk and return.

Investors prefer portfolios on the efficient frontier with least possible risk to earn expected rate of return.

14.7 SELF REVIEW QUESTIONS

1) What factors necessitate Arbitrage Pricing Model?

2) Write short note on characteristic line

3) Write short note on separation theorem

4) Distinguish between security risk and market risk.

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UNIT 15: FINANCING SMEs

Learning Objectives

After this study, students must have understood:

- The meaning of Small and Medium Scale Enterprises
- Features of Small Scale Enterprises
- Problems of small Scale Industries

- Sources and Finance of SMEs
- Government Measures to Enhance The Status of SMIs

CONTENTS

15.1 INTRODUCTION

Small and Medium Scale Enterprises (SMEs) can be defined as having three characteristics:

- Firms are likely to be unquoted
- Ownership of the business is restricted tom a few individual
- They are not micro business that are normally regarded as those very small business that act as a medium for self – employment of the owners

The economy of any country depends on the contributions of all sectors of the economy particularly the small and medium scale enterprises.

15.2 FEATURES OF SMALL SCALE INDUSTRIES

1. They usually have low set up cost.
2. They rely on local raw materials.
3. Employment operation.
4. They accelerate rural development and contribution to stemming urban migration and problems of congestion in large cities.

5. They provide links between agriculture and industries.
6. They mobilize private savings and harness them for productive purposes.
7. They supply parts and components for large – scale industries.
8. They contribute to domestic capital formation.

15.3 PROBLEMS OF SMALL SCALE INDUSTRIES

The small scale industries are based with many problems among which are:

1. Management problems: all important entrepreneurial and operational decisions are taken by one person and there is lack of formal training in management and production skills.
2. Financing problems: this constitutes major problem. Their low business credibility, poor management, inefficiencies, limited collateral security, high risk of failure make it difficult for them to raise capital from usual sources and often force them to secure loans at higher interest rates from their lenders.
3. Most of them tend to initiate rather than innovative.
4. They engage in production of non – standardized products.
5. Most of them are concentrated in urban centres and could therefore not tap the local advantages e.g cheap labour, access to primary products e.t.c.
6. Little access to or inability to apply new technologies.

15.4 SOURCES OF FINANCE FOR SMEs

At one time or another in the life of an enterprise, the owners of SMEs would need money. Generation of funds for the successful operation of these enterprises involves the following:

1. Owner financing
2. Loans
3. Trade credit

4. Equity financing
5. venture capital
6. Leasing
7. Factoring

Owner Financing: This comes in the form of owners contribution in the case of a sole proprietor. This money is needed as pointed out to provide working capital to acquire fixed assets and to pay for promotional expenses. This is the same as equity financing.

15.5 GOVERNMENT MEASURES TO ENHANCE THE STATUS OF SMIs

The government has introduced schemes and policies to encourage more lending to small firms and special sectors of the economy and these are:

- Central Bank of Nigeria guidelines on sectoral allocation of loans and advances.
- The loan scheme of National Directorate of Employment.
- The Agricultural Credit Guarantee Schemes.
- Establishment of Development Banks such as BOI and NACRDB.
- Establishment of SMEDAN.
- Establishment of small and medium scale equity investment scheme.
- Establishment of ADB Export stimulation fund scheme, IDA and IFC.

15.6 SMALL AND MEDIUM SCALE INDUSTRIES EQUITY INVESTMENT SCHEME

The Bankers Committee on December 21, 1999,at its 264th meeting resolved that all banks in Nigeria should set aside 10% of their profit before tax for equity investments in small and medium industries.

Consequently, the scheme SMIEIS was launched and on August 2001, the Small and medium Enterprises Development Agency of Nigeria SMEDAN was established to address the problems associated with the SMEs.

THE OBJECTIVES

The objectives of the SMIEIS scheme among others are to:

- Facilitate the flow of funds for the establishment of new Small and medium Industries (SMI) projects reactivation, expansion and modernization or restructuring of on – going projects.
- Stimulate economic growth, develop local technology and generate employment for capable and suitable Nigerians.
- Eliminate the burden of interest and other financial charges for the entrepreneurs.
- Provide financial advisory, technical and managerial support to the entrepreneurs.

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UNIT 16: INTERNATIONAL FINANCIAL MANAGEMENT

Learning Objectives

After this study, students must have understood:

- Foreign exchange management
- Determinants of Exchange rates
- Hedging the Foreign Exchange risk
- Theories of Foreign Exchange determination
- Calculation of Exchange Rate

CONTENTS

16.1 INTRODUCTION

Due to the fact that all countries are not equally endowed with the different natural resources, no country is self-sufficient in its demand and supply of goods and services and that is why factors of production such as labour and capital are seen moving freely across the national frontiers. All the countries trade in goods and services, borrow and lend, invest and accept investments with other countries with nominal or full control to govern the currency flow and trade. Since different countries have their own currencies, with different purchasing power, the settlement of payments cannot be made with the currency of any one country. It is from this that the concept of foreign exchange rate emerges.

16.2 FOREIGN EXCHANGES MANAGEMENT

It is clear that no country can produce all that she needs. Countries individually, produce such goods in which such a country has comparative advantage and sells those goods to other countries while also buying the goods the other countries have comparative advantage in.
Although exchange rate fluctuation may result in a gain (positive) or a loss (adverse). It is often considered undesirable because it introduces an element of

uncertainty. Because of the risk involved, it can be said that foreign exchange management imposes can extra burden on a company's finance manager. Meanwhile the following should be considered:

a) Balance of Trade
b) Invisible Balance
c) Balance of Payment on current account.

Balance of Trade

Visible goods are goods that have physical existence such as cars, machinery which are traded and exchanged in international trade. When a country produces such goods and sells them abroad they are referred to as visible export. When she buys such goods abroad for home consumption it is known as visible imports. The difference in the value of visible exports and visible imports is known as the balance of trade and it may be favourable or unfavourable.

Invisible Balance

Countries also buy and sell services such as banking services, shipping services etc. When a country sells or renders such services to another country such transactions is called invisible exports, when the opposite is the case, i.e. services are provided for the country by other countries, they are called invisible imports and the difference between invisible imports and invisible items which may either be favourable or unfavourable for any particular year.

The Balance of Payment on Current Account

This is the record of all transactions between one country and the rest of the world, for all visible goods and invisible services in the course of the year. When the total payments made for both visible goods and invisible services in the course of one year exceed the total receipt from visible and invisible services. The balance of payments on current account is said to be unfavourable. A country in this position is said to experience a deficit on the account. In a reversed case, the balance of payment is favourable.

16.3 FACTORS AFFECTING FLUCTUATIONS IN EXCHANGE RATES

1) The supply and demand for the foreign currency
2) The supply and demand for the local currency
3) Global inflation rates and its effect on the domestic rate of inflation
4) Local economic conditions including local production of goods for export and local interest rates
5) The political environment in Nigeria and in the foreign country
6) Volume of trade
7) Speculation: Speculators influence movements in exchange rates by buying and selling in the expectation of making positive returns.
8) Interest rate
9) International confidence in the naira reflecting international confidence in the domestic economic management policies.

16.4 METHODS OF HEDGING AGAINST FOREIGN CURRENCY RISK

1) **Forward Countries**: This is a contract to buy or sell a specified quantity of foreign currency at an agreed future date or within a specified future time period. The contract could be fixed if the future date is fixed. It could be floating, if the future date falls within a range.

2) **Foreign Currency Invoicing**: One way of avoiding exchange risk is for an exporter to invoice a foreign customer in domestic currency. In this way only the exporter will be able to avoid exchange risk, the burden of the risk will now be passed on to the importer.

3) **Matching**: If a Nigerian Company expects to receive some earnings in foreign currency and at the same time expects to incur certain expenses in the same foreign currency, it may plan to offset its payments against receipts in the currency. In this way, movements in exchange rates between the naira and the currency in question would be irrelevant to the extent that matching can take place as there will be no need to purchase or sell foreign currency.

4) **Borrowing in a Foreign Currency**: An exporter who invoices foreign customers in a foreign currency can hedge against the exchange risk by:

i) borrowing an amount in the foreign currency now
ii) converting the foreign currency into domestic currency at the sport rate

iii) repaying the loan with interest out of the eventual foreign currency receipts

5) **Protection Clauses**: An export or import context might be given a protection clause, whereby sales prices in the foreign currency or the adjusted exchange rate moves outside a defined range.

6) **Netting**: This is a technique which involves the head office and its foreign subsidiary netting off the intra-organizational debts due at the end of each period. Only the balance exposed to currency risk needs to be hedged.

7) **Pricing Policy**: A company can anticipate adverse exchange rate movements by building an extra profit margin into the selling price to act as a cushion in the event that exchange rates do move adversely. Protection clause is another aspect of pricing policy.

8) **Leading and Lagging**: Accelerating (leading) and delaying (lagging) international payments by modifying credit terms normally on credit

16.5 FOREIGN EXCHANGE MARKET PARTICIPANTS

1) **Arbitrageurs**

The seek to earn risks-free profits by taking advantage of differences in exchange rates arising countries. They buy currencies that are under priced at one centre and simultaneously sell the same set of currencies at the centres where they are overpriced, thereby making a risk free arbitrage profit.

2) **Speculators**

The reason for their action is profit making. They trade in foreign currencies by profiting from the exchange rate fluctuations. They take risks in the hope of making profits by buying a particular currency when the price is low and selling the same currency when the price is high.

3) **Hedgers**

These are mainly multinational companies. They operate in several countries and their assets and liabilities are designated in foreign currencies. The foreign exchange rate fluctuation can cause diminution in the home currency value of their assets and liabilities.

16.6 Exchange Rate

Exchange rate is the equivalent of the foreign currency that is obtainable from a unit of home currency. It is the rate at which one currency exchanges for another currency.

DIRECT AND INDIRECT QUOTES

Direct Quote

Since the advent of SAP in 1986, Nigeria adopted direct quote of exchange.
Exchange is quoted directly when the number of units of home currency to deal in one unit of foreign currency is given. E.g. $1 = N128.

Indirect Quote
It is indirect when the number of units of foreign currency to deal in one unit of home currency is given. E.g. N1 = $0.0078.
Indirect quote is the reciprocal of direct quote and vice versa.

Types of Exchange Rate

1) **Fixed Exchange Rate**: with a fixed exchange rate the government of a country maintains its currency at a particular exchange rate against a specified foreign currency. When the level can no longer be maintained due to market pressure devaluation takes place.
2) **Floating Exchange Rate**: With this system, the market determines the exchange rate of that currency with other currencies and these rates will constantly fluctuate.
3) **Spot Rate**: This is the rate at which foreign exchange can be bought or sold with payment set for the same day. It the rate ruling at the conversion date.
4) **Forward Rate**: It is the currency rate quoted now for delivery at some future specified date.

16.7 THEORIES OF FOREIGN EXCHANGES DETERMINATION

1) Purchasing Power Parity Theorem

This theorem predicts that the exchange value of foreign currency depends on the relative purchasing power of each currency in its own country and that spot exchange rates will vary over time according to relative price changes. It follows therefore that if the rate of inflation of country.

A is greater than the rate of inflation in country
B, the rate of exchange of currency of country

A will fall against the currency of Country B. The exact relative purchasing power purity relationship is expressed as follows.

$$\frac{S1 - So}{So} = \frac{Pn - Pf}{1 + Pf}$$

where So = Current (direct quote) spot rate
Si = Expected future (direct quote) spot rate at time 1
Pn = Inflation rate of home country
Pf = Inflation rate of foreign country

The above formula can be simplified

$$\frac{Si}{So} = \frac{1 + Pn}{1 + Pf}$$

Illustration 16.1

It is expected the inflation rates in Nigeria and US are 6% and 3% respectively. The present spot rate of 1 US $ is N45.36. What will be the expected spot rate in twelve months time.

$$\frac{S1}{So} = \frac{1 + Pn}{1 + Pf}$$

$$\frac{S1}{45.36} = \frac{1 + 0.06}{1 + 0.03}$$

$$S1 \times 1.03 = 45.36 \times 1.06$$

$$S1 = \frac{48.0816}{1.03} = N46.68$$

Fisher Effect

The term fisher effect is used in looking at the relationship between interest rates and expected rates of inflation. The rate of interest can be seen as made up of two parts. The real required rate of return plus a premium for inflation. The real and nominal interest rates are connected by Fisher Effect as follows:

$$(1 + R)(1 + 1) = (1 + M)$$

when R = Real interest rate
I = Expected rate of inflation
M = Market (nominal) interest rate

Then,

$$(1 + R) = \frac{(1 + M)}{(1 + I)}$$

The difference is interest rates between two countries is equal, in equilibrium, to the expected difference in inflation rate between these countries. This hypothesis is called fisher effect. If real interest rate are equal in all countries, then

$$\frac{1 + i_n}{1 + i_f} = \frac{1 + Pn}{1 + Pf}$$

where i_n = nominal interest rate of home country
i_f = Nominal interest rate of foreign country
Pn = Rate of inflation of home country
Pf = Rate of inflation of foreign country

INTERNATIONAL FISHER EFFECT

This is also called "Open Fisher Theory". If assets that countries with higher rates of inflation will have higher nominal interest rates to provide adequate return to investors to combat inflation. The international fisher effect relationship is expressed as:

$$\frac{S1 - So}{So} = \frac{i_n - i_f}{1 + i_f}$$

where, S1 = Expected future spot rate at time period 1
So = Current spot rate
In = Nominal interest rate of home country
If = Nominal interest rate of foreign country

The formula can be simplified as follows:

$$\frac{S1}{So} = \frac{i_n - i_f}{1 + i_f}$$

$$\frac{S1}{45.36} = \frac{1 + 0.08}{1 + 0.05}$$

S1 = 48.99/1.05 = 46.66
S1 = N46.6

2) Interest Rate Parity Theorem

This theorem states that the differential between the forward exchange rate and the spot exchange rate is equal to the differential between the foreign and domestic interest rates. Its condition is that the forward premium of discount for a currency quoted in terms of another currency is approximately equal to the difference in interest rates prevailing between the two countries.

$$\text{So,} \quad \frac{F - So}{So} = \frac{i_n - i_f}{1 + i_f}$$

where, F = Direct quote for forward rate
So = Direct quote spot rate
in = Interest rate of home country
if = Interest rate of foreign country

simply,

$$\frac{F}{So} = \frac{i_n - i_n}{1 + i_t}$$

Illustration 16.3

The current bank interest rate of U.S. and Nigeria are 4.5% and 8.5% respectively. The present spot market rate of exchange in 1 US $ is N45.36. What would be the twelve month forward rate?

$$\frac{F}{So} = \frac{i_n - i_n}{1 + i_t}$$

$$\frac{F}{45.36} \quad \frac{1 + 0.085}{1 + 0.045}$$

$$F\,(1.045) = 45.36 \times 1.085$$

$$F = 49.2156/1.045 = N47.096$$

16.8 CURRENCY FORECASTING

a) **Market Based Forecast**: The currency forecast is obtained by extracting the prediction embodied in interest and forward rate.

b) **Model Based Forecast:**

i. Fundamental Analysis: It relies painstakingly on the examination of macro-economic variables and policies that are likely to influence a currency prospect. The variables examined include relative inflation, interest rates, national income growth and changes in money supply.

ii. Technical Analysis: It focuses exclusively on past price and volume movements while totally ignoring economic and political factors.

16.9 EXCHANGE RISK

This is the variability of a firm's value that is due to uncertain exchange rate.

Currency Exposure to Risk

1) **Accounting or Translation Exposure**: Risk of adverse effects on a firm's financial statements that may arise from changes in exchange rates.
It is the change in the value of a firm's foreign currency denominated account due to a change in the exchange rate.

2) **Economic Exposure**: Risk that arises from changes in real exchange rate. It is the extent to which the value of a firm will change due to exchange rate movement.

3) **Transaction Exposure:** Risk to a firm with known future cashflows in a foreign currency that arises from possible changes in the exchange rate. It is the extent to which a given exchange rate will change the value of foreign currency dominated transactions already entered into.

16.10 FOREIGN EXCHANGES MANAGEMENT TECHNIQUES

1. **Currency Options**: This gives the holder the right but not the obligation to sell (put) or buy (call) the contract currency at a set price and at a given date.

2. **Currency Future**: This is a contract for future delivery of a specific quantity of a given currency with the exchange rate fixed at the time the contract is entered into.

3. **Currency Forward Contract**: This is similar to future contracts except that they are not traded on organized market. They are non-standardized private deals.

4. **Interest Rate Swaps**: This is an agreement between two parties to exchange interest rate payments for a specific maturity on an agreed principal. The most common interest rate swap involves exchanging fixed interest payments for floating interest payments.

5) **Currency Swap**: This is a simultaneous borrowing and lending operation whereby two parties exchange specific amount of two currencies at the outset at the spot rate. The parties undertake to reverse the exchange rate after a fixed term at a fixed exchange rate.

6) **Debt Swap**: This is a set of transactions (also called debt-equity swap) in which a firm buys a country's dollar debt and swap this debt with Central Bank for local currency that can be used to acquire a local enterprise.

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