# CA FINAL

# MAY - 2019

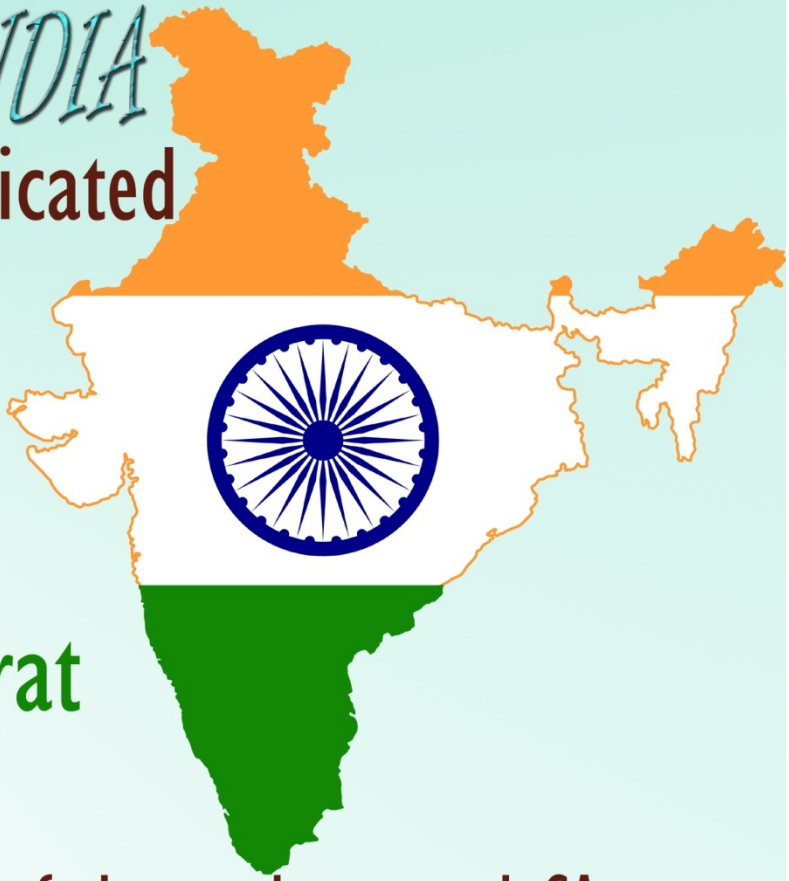
Old syllabus

# STRATEGIC FINANCIAL MANAGEMENT

**CA MD IMRAN**

# I LOVE MY INDIA

This book is Dedicated to INDIA



Jai Hind

Jai Bharat

Congratulation to all of those who passed CA exam. Best of your success in the exam, life and your very brightful and successful future to you dear aspirant. The day you determined to become Chartered Accontant you are a CA. Let's confirm to the world by your result.

Yes there is 100% pass result for you because you are 100% certain let's do it.

य एष सुप्तेषु जागर्ति कामं कामं पुरूषो निर्मिमाण : ।

तदेव शुक्रं तद् ब्रह्म तदेवामृतमुच्यते ।

तस्मिंल्लोकाः श्रिताः सर्वे तदु नात्येति कश्चन । एतद् वै तत् ।।

# THE CONSTITUTION OF INDIA

## PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC] and to secure all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the [unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949 do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

**I am very thankful to my best friend and senior for their contribution**

CA AYESHA ZULFIKAR AGADI
CA ABHISHEK AGARWAL
CA ABIMANY
CA ADIL OBAID
CA. AJAY TIWARI
CA AJIT
CA AKARSH
CA.AKASH JAIN
CA AKHTAR
CA ALOK SHARAN PRASAD
CA ANISH BHAGAT
CA. ANUP AGRAWAL
CA. ANURAG SINGHAL
CA.ARVIND KUMAR
CA ASHISH JAIN
CA ASIF
CA. AWADHESH KUMAR
CA. P C MISHRA
CA B N MISHRA
CA SANAT
CA BAJRANG
CA BALAJI
CA BHAWESH KUMAR
CA BIPIN MISRA
CA BRAHAMDEO PARASHAD
CA. BREESKET SINGH
CA CS CMA SHAYAM KEDIA
CA CS CMA SITAKANTA PRUSTY
CA DEEPAK PATEL
CA DEEWAN SIR
CA DHIRAJ KUMAR
CA. DILIP KUMAR
CA DINESH KUMAR JAIN
CA YASIR
CA FARHAN RAHMAN
CA FAIROOS
CA FIROZ AHMAD
CA GAURAV MURARKA
CA GHANSHYAM AGARWAL
CA GIRISH GUJRAT NAHAR KAMAL
CA GIRISH NAHAR
CA.GITESH PODDAR
CA. R.P. GOENKA
CA J T RAGHU
CA. JAI SHANKAR
CA ROCKY KUMAR DANIEL
CA AMIT KESHRI
CA JAY PRAKASH SHARMA
CA KARAN THAKAR
CA KASHIF
CA KASHINATH GORAI
CA MD MUMTAZ
CA MEHUL
CA MOHSIN SHAIKH
CA MUJAFFAR IQBAL
CA MUSTAKEEM
CA NAVEEN AGARWAL
CA NEERAJ
CA NIRANJAN KUMAR SINGH
CA P AGRAWAL
CA PALLAVI JAIN
CA PANKAJ AGARAWAL
CA PANKAJ KUMAR
CA PAWAN AGARWAL
CA PRASHANT KUMAR REDDY
CA PRAVEEN SHARMA
CA PUNAM
CA RADHIKA KABRA
CA RAGHAVENDRA ADIGA
CA RAJAN
CA.RAJEEV KUMAR
CA RAJIV
CA RAJNISH SIR
CA RAMANDEEP SIR
CA.RAVI AGARWAL
CA RAVI SHEKHAR
CA RISHAV MODI
CA RITESH
CA RITESH TIBREWAL
CA MD RIZWAN
CA ROHIT SIMDEGA
CA MD TABREZ SIDDIQUI
CA.S KUMAR
CA S SHIVAM
CA SABIR
CA. SACHIN AGRAWAL
CA.SACHIN MITTAL
CA SADAT
CA SADIQUE SEKH
CA.SANAT KUMAR
CA SAYEED ARSHAD
CA SHADAB
CA SHAKIL AHMAD
CA SHANKAR BHAIA
CA. SHANTANU SENGUPTA
CA SHEKHAR SUMAN
CA. SHRAWAN KUMAR
CA SHRIKANT DUBEY
CA SHUBHAM JAIN
CA SIDHART JAIN
CA SIRFARAJ AHMAD
CA SITA RAM KUMAWAT



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CA KAUSHAL
CA KISHOR KUMAR
CA KISHORE
CA KRISHNA PRASAD
CA. MADHAV GUPTA
CA M N THAKUR
CA MAJHER MAJID
CA. MANISH AGARWAL
CA MANISH JAIN
CA MANISH KUMAR AGARWAL
CA MANOJ SINGH KUSHWAH
CA VIKASH KUMAR
CA VINOD KUMAR GUPTA
CA. VIRENDRA KUMAR
CA VISHAL KHANNA
CA VISHAL
CA.YOGESH SHARMA
CA. AMOL KUMAR LACHHIRAMKA
CA.ANIL KR JHA
ALL CHARTERED ACCOUNTANT
QUAIFIED AND FUTURE
CHARTERED ACCOUNTANT (FCA)

CA SK SHOUDHARY
CA SOURABH SIR
CA. NIRMAL K SINGH
CA SUBHAM
CA SUGANDHA SRIWASTAVA
CA SUJIT
CA SUMAN SHAW OIL
CA SURAJ KUMAR SAHOO
CA SURENDRA DHAKED
CA SWAPNIL ROY
CA. TARUN JAIN
CA TIRUMAL RAW
CA TIWARI JAYENDRA KUMAR
CA TRIPTI WAGADRE
CA TUTION MALHOTRA
CA VAIBHAV SAHAY
CA VIDEA SAGAR
CA VIKASH KHEDIA

My others book for CA FINAL.

1. FINANCIAL REPORTING OLD SYLLABUS
2. FINANCIAL REPORTING NEW SYLLABUS
3. STRATEGIC FINANCIAL MANAGEMENT OLD SYLLABUS.
4. STRATEGIC FINANCIAL MANAGEMENT NEW SYLLABUS.
5. ADVANCED AUDITING AND PROFESSIONAL ETHICS OLD SYLLABUS.
6. ADVANCED AUDITING AND PFOEESSIONAL ETHICS NEW SYLLABUS.
7. CORPORATE AND ECONOMIC LAWS NEW SYLLABUS.
8. CORPORATE AND ALLIED LAWS OLD SYLLABUS.
9. DIRECT TAX SUMMARY.
10. GOODS AND SERVICE TAX SUMMARY

# Chapter- 0 - SFM BASIC FUNDAMENTAL

Object of financial management
Cost of capital
Component of interest
Concept of discounting
Inflation in capital budgeting
Frequency of compounding
Concept of continuous compounding (Exponential)
Various type of yield (How to move from period to sub-period)
Dirty power
Annuity and its application
Perpetuity and its application
Future value
Application of normal distribution
Chapter – 1

# Portfolio Management

Chapter Index
- Risk and return of the stock & portfolio of assets
- Capital Asset Pricing Model
- Sharpe Index Model - Systematic and Unsystematic Risk
- Beta management
- Portfolio Theory
(a) Reducing the Risk of a Portfolio
(b) Enhancing the Risk of a Portfolio
(c) Hedging the Portfolio
(d) Modern Portfolio Theory
- Some More Aspects of "Risk and Return
(a) EFFICIENT MARKET HYPOTHESIS
(b) Alpha
(c) Characteristic Line
(d) Security Market Line (SML)
(e) Capital Market Line (CML)
(f) Market Model
(g) Matrix Approach in Investment Decisions
- General Problems
- INTERNATIONAL INVESTING
- ARBITRAGE PRICING THEORY (APT)
- SHARPE INDEX MODEL (Including Optimal Portfolio)

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(b) Arbitrage Opportunities
(c) Leading and Lagging
(d) Foreign Exchange Risk Exposure
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(h) International Working Capital Requirement
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- ❖ Returns
- ❖ Indifference Point
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- Follow on Investment / Expansion Option (Risk Neutral Method)
- Follow on Investment / Expansion Option (BS Model))
- Investment Timing Option (NPV Method)
- Investment Timing Option (BS Model))

| CHAPTER - 0 | SFM basic fundamental |
|---|---|

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## ❖ Object of financial management

Objective of financial management is to maximise shareholder wealth, it is measure by market capital of the company. Market capital is represented by number of share multiplied with share price.

**Market capital = Number of share x Market share price**

Shareholder is the owner of the company they appoint management the company, manager should manages the company in the best interest of shareholder. Management acquire fund at optimum cost and utilise it with the minimum risk to earn maximum return and distribute dividend to shareholder or retained earnings for further investment to generate maximum possible return.

## ❖ Cost of capital

THE cost of capital of a firm is the minimum rate of return which the firm must earn on its investments in order to satisfy the expectations of investors who provide funds to the firm. It is the weighted average of the cost of various sources of finance used by it. The method of computing the cost of capital is to compute the cost of each type of capital and then find the weighted average of all types of costs of capital. In other words, two steps are involved in determination of cost of capital of a firm: (i) computation of cost of different sources of capital, and (ii) determining overall cost of capital of the firm by weighted average or total cost divided by total fund.

Kc- kc would be weighted average of effective cost of debt and equity

Kc = weight of debt x post-tax cost of debt + weight of equity x cost of equity.

**Kc= wd x post-tax kd + we x ke**

**Cost of debt is to be calculated as follows.**

**Irredeemable debt:**

$$\text{Cost of debt} = \frac{\text{Annual interest (1 - Tax rate)}}{\text{Net proceeds of debt}} \times 100$$

**For debt redeemable after certain period**

$$\text{YTM} = \frac{I + \frac{F-P}{n}}{\frac{F+P}{2}}$$

F= face value/ redemption value, P= Price, n= Number of year, I- Interest

**For Debts redeemable in instalments.**



.

$$= \text{Lower rate} + \frac{\text{Lower rate NPV}}{(\text{Lower rate NPV} - \text{Higher rate NPV})} \text{ x (difference in rates)}$$

COST OF EQUITY SHARE CAPITAL

There are three methods regarding estimating the cost of equity capital:

(i) Dividend price ratio,

$$Price = \frac{Dividend}{Ke}$$

$$Ke = \frac{Dividend}{Price}$$

Ke = Cost of equity capital

(ii) Dividend price ratio plus growth, and

$$Price = \frac{Dividend\ (1+g)}{Ke - g}$$

$$Ke = \frac{Dividend\ (1+g)}{Price} + g$$

D1 = Dividend per share at the end of first year (after the date on which price per share is given)
g = Growth rate of dividend
P = Current market price per share
Ke = Cost of equity capital

(iii) Earning price ratio.
Price is how many time of Earning per share.
Price = Earnings per share x P/E ratio
P/E ratio = 1/ke, Ke = 1/PE ratio.

## ❖ Component of interest (Required rate of return)

Rf( Risk free real rate )= it is compensation for sacrifice of current consumption

Inflation Premium = It is compensation for loss of purchasing power.

Risk Premium = it is compensation for bearing risk.

All rate should be taken in to factor while calculation in below.

Risk free nominal rate = Rf( Risk free real rate ) x Inflation Premium

Risk adjusted rate = Rf( Risk free real rate ) x Risk Premium

Risk adjusted nominal rate = Rf( Risk free real rate ) x Inflation Premium x Risk Premium

When we invest in an inflation protected security we don't demand inflation premium i.e., rate would be Rf real. When we invest in a corporate security, there is default risk involved therefore we demand risk premium.

All interest rate are combining in multiplication fashion except CAPM, RADR & Spread.

## ❖ Concept of discounting

Present value of Rupees is in present term whereas future value of rupees is in future term. In future value of rupees required rate of return is included. To sacrifice the current consumption for certain period we would require compensation for sacrificing current consumption it is known as required rate of return.

The value of assets is the present value of future cash flows discounted at the appropriate required rate of return.

In financial management we would take decision based on future cash flow whereas investment will be at present so all the future cash flow discount are required rate to bring in present term.

Intrinsic value = PV of the future cash flow discounted at Re.

While discounting future cash flow would be discounted with the rate applicable for that year, if rate is different of each year, then successive cash flow would be discounted first with rate applicable for previous year then finally rate applicable for such year. For example 3rd year cash flow would be discounted first with the rate applicable for 1st year then 2nd year then finally with the discount rate of 3rd year.

## ❖ Inflation in capital budgeting

There should be consistency between Nature of cash flow and discount rate. Nominal cash flow discount with nominal rate and real cash flow discount with real rate, etc. if cash flow is ex inflation then incorporate inflation in future cash flow in consecutive term. That to incorporate inflation in cash of third year, inflation affect 1, 2 and 3rd year should be incorporated.

While incorporating inflation in cash flow successive cash flaw with accumulate inflation cumulatively. For example 3rd year cash will include inflation of for 1st year then 2nd year then finally with the inflation rate of 3rd year.

## ❖ Frequency of compounding

Effective annual yield compounded annually

Rate = $(1+ \text{rate})^n - 1$

Money market yield compounded n time in a year.

Holding Period yield

Bond equivalent yield compounded half yearly.

## ❖ Concept of continuous compounding (Exponential)

Rate change in real time that is compounded every moment. Without taking factor of exponential rate follow below step.

Step 1 x .000244017206

Step 2 + 1

Step 3 x= 12 times

- **Dirty power $x^{1/n}$**

Make a factor then follow below steps

Step 1 √ 12 times

Step 2 - 1

Step 3 Divide by power

Step 4 + 1

Step 5 x= 12 times

Annuity and its application

Annuity is the sum of discounting factor. It is used to derive present of future cash flow if all the cash flow is equal. It is also used to derive equal future instalment of present value cash flow either by dividing with annuity factor or multiplied with capital recovery factor.

Capital recovery factor = 1/ annuity factor,

Perpetuity and its application

It is used in case of no growth wherein a certain cash flow is expected to continue for uncertain future period.

IV= A/i

Future value

It is reverse of present value.

Application of normal distribution

- Ln

Without taking factor of exponential rate follow below step.

| | |
|---|---|
| Step 1 | $\sqrt{\ }$ =12 times |
| Step 2 | - 1 |
| Step 3 | ÷ .000244017206 |

| 1 | Portfolio management |
|---|---|

## Portfolio Management

Chapter Index

- Risk and return of the stock & portfolio of assets
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# *Introduction*

- **Portfolio** means combination of various underlying assets like bonds, shares, commodities, etc.

- **Portfolio Management** refers to the process of selection of a bundle of securities with an objective of maximization of return & minimization of risk.

**Steps in Portfolio Management Process**

Planning

Execution

Feedback

## ❖ Risk and return of the stock & portfolio of assets

A portfolio is said to be optimum when it provides highest possible return at lowest possible risk.

| | | Return | Risk (SD) |
|---|---|---|---|
| Stock | Past Data | ΣX/n | $\sigma = \sqrt{\frac{\Sigma(X - \ddot{X})^2}{n}}$ |
| | Post Data | ΣPX | $\sigma = \sqrt{\Sigma P(X - \ddot{X})^2}$ |
| Portfolio Markowitz Theory | | Weighted average = WX.RX+WY.RY | $\sigma = \sqrt{wx^2.\sigma x^2 + wy^2.\sigma y^2 + 2.wx.wy.cov(x,y)}$ |
| ***Standard-deviation of a 3-asset Portfolio*** $Cov(x,y) = r.\sigma x.\sigma y$ | | $\sigma = \sqrt{wx^2.\sigma x^2 + wy^2.\sigma y^2 + wz^2.\sigma z^2 + 2.wx.wy.cov(x,y) + 2.wx.wz.cov(x,z) + 2.wy.wz.cov(y,z)}$ | |
| ***Standard Deviation of Portfolio consisting of Risk-free security & Risky Security*** | | $\sigma = \sqrt{wx^2.\sigma x^2 + wy^2.\sigma y^2 + 2.wx.wy.cov(x,y)}$ $\sigma = \sqrt{wx^2.\sigma x^2 + 0 + 0)}$ $\sigma = \sigma x \,.Wx$ | |

Return= $\frac{Dividend + Change\ in\ Price}{Initial\ Price} x\ 100$

**Modified Internal Rate of Return**

| | Year | | | |
|---|---|---|---|---|
| | 0 | 1 | 2 | 3 |
| Cash Flow (₹ Million) | -15.625 | 4.479 | 6.53 | 7.09 |
| Year 1 Cash Inflow reinvested for 2 years (1.188 x 4.479) | | | | 5.32 |
| Year 2 Cash Inflow reinvested for 1 years (1.090 x 6.53) | | | | 7.12 |
| | | | | 19.53 |

$$MIRR = \sqrt[n]{\frac{Terminal\ Cash\ Flow}{Initial\ Outlay}} - 1 = \sqrt[3]{\frac{19.53}{15.625}} - 1 = 0.0772 \text{ say } 7.72\%$$

## COEFFICIENT OF VARIATION-

It is a Risk per unit of return. Lowest is best.

= (SD/mean) x 100.

**Coefficient of correlation (.r)- it refers to strength of linear relationship between two variables. Lower the coefficient of correlation greater the benefit of diversification.**

$$r=\frac{Covariance(x,y)}{SDx.SDy}$$

The correlation co-efficient has no units. It is a pure measure of co-movement of the two stock's return and is bounded by -1 and +1.
If r = 1, no benefit of diversification
If r =-1, immense benefit of diversification to the extent of risk free portfolio can be constructed.
If r lies between -1 and +1 , minimum variance portfolio can be constructed.
**Risk Free portfolio**- dusreka SD divided by donoka SD

Risk free portfolio = $\frac{\sigma y}{\sigma x+\sigma y}$

**Minimum Variance portfolio**- dusreka variance minus covariance divided by donoka variance minus 2 covariance.

Minimum variance portfolio = $\frac{\sigma y2-cov(x,y)}{\sigma x2+\sigma y2-2cov(x,y)}$

## Co-efficient of Determination

Co-efficient of Determination = (Co-efficient of co-relation) $^2$

**= $r^2$**

Co-efficient of determination ($r^2$) gives the percentage of variation in the security's return i.e. explained by the variation of the market index return.

**Example:**



.

If $r^2$ = 18%

--- In the X Company's stock return, 18% of the variation is explained by the variation of the index and 82% is not explained by the index.

--- According to Sharpe, the variance explained by the index is the systematic risk. The unexplained variance or the residual variance is the Unsystematic Risk.

**Use of Co-efficient of Determination in Calculating Systematic Risk & Unsystematic Risk**

**1. Explained by Index [Systematic Risk]**

= Variance of Security Return × Co-efficient of Determination of Security

i.e. $\sigma 1^2 \times r^2$

**2. Not Explained by Index [Unsystematic Risk]**

= Variance of Security Return × (1 - Co-efficient of Determination of Security )

i.e. $\sigma 1^2 \times (1 - r^2)$

## Covariance

-it is a measure of joint deviation of x around Ẍ and y around Ỹ

Cov(x,y)= $\frac{\sum(x-\ddot{X}).(y-\tilde{Y})}{n}$ or for future data= $\sum p(x - \ddot{X}).(y - \tilde{Y})$

*Co-variance of an Asset with itself is its Variance*

**Co-variance Matrix** In Co-variance matrix, we present the co-variance among various securities with each other. **Return Covariance**

| | A | B | C |
|---|---|---|---|
| A | xxx | xxx | xxx |
| B | xxx | xxx | xxx |
| C | xxx | xxx | xxx |

## ❖ Capital Asset Pricing Model

Re= RF + (RM-RF)*Beta

Re = Required rate of return
RF = Risk free rate of return
RM = Market return

Beta $(\beta)$= $\frac{Change\ in\ stock\ return}{Chang\ \ in\ market\ return}$

it is sensitivity of stock return with respect to market

Beta $\beta = \frac{Cov(x,y)}{\sigma x2}$

Or $\beta = \frac{r.\sigma y}{\sigma x}$

$$\beta = \frac{Cov(r,m)}{\sigma_m^2}$$

Y means stock & X means market.

New Formula for Co-Variance between 2 Stocks (Cov A,B) = $\beta$ A × $\beta$ B × $\sigma^2$ m

## ❖ Beta management –

it is sensitivity of stock return with respect to market return. It represent if market is change by 1% stock return is expected to change by x% in the same direction. Such x multiplier is beta. Beta is managed to enjoy higher return and suffer lower loss. If market is expected to rise we enjoy higher return by increasing beta and if market is expected to go in bearish we avoid by reducing beta.

Additional investment (x) required at specified beta.

$$\frac{value\ of\ the\ portfolio * Beta\ of\ the\ portfolio}{value\ of\ the\ portfolio * x} = Specified\ target\ beta$$

Proportion of risk free security to be acquired for target beta.

Let the Proportion of risk free security to be acquired for target beta is = p

Target beta = 0 x p + $\beta$p(1-p)

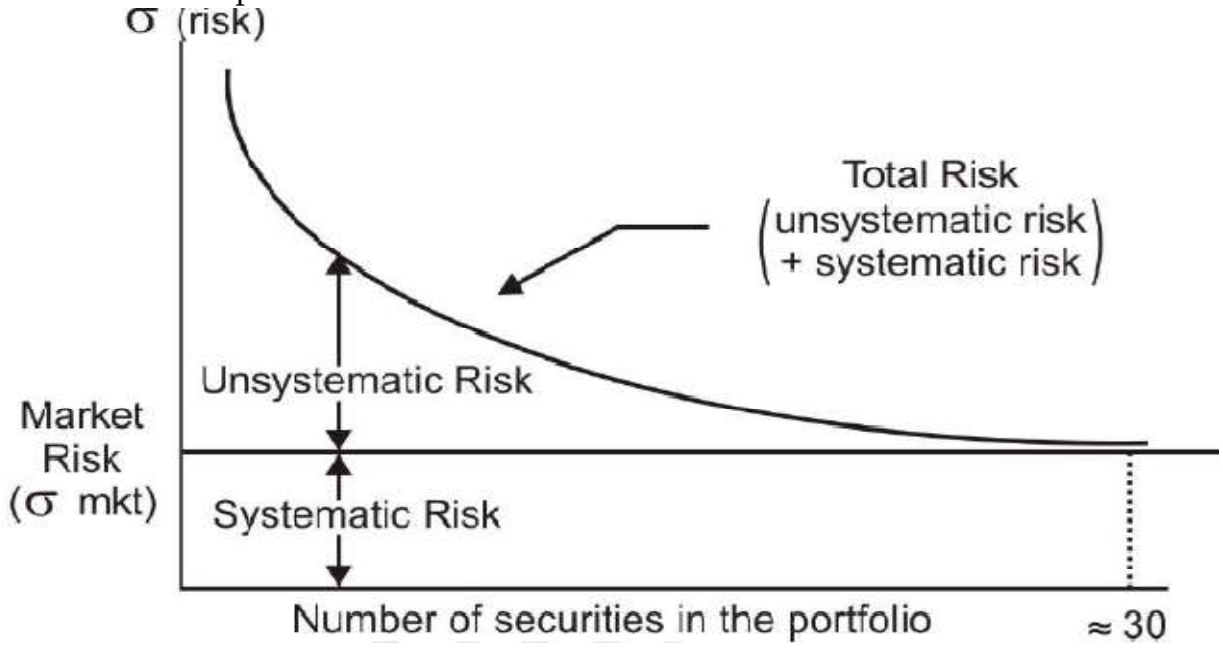
Also we reduce beta by selling stock with higher beta and buying stock with lower beta. We increase beta by selling stock with lower beta and buying stock with higher beta.

## ❖ *Sharpe Index Model or Calculation of Systematic Risk (SR) & Unsystematic Risk (USR)*

### Systematic and Unsystematic Risk

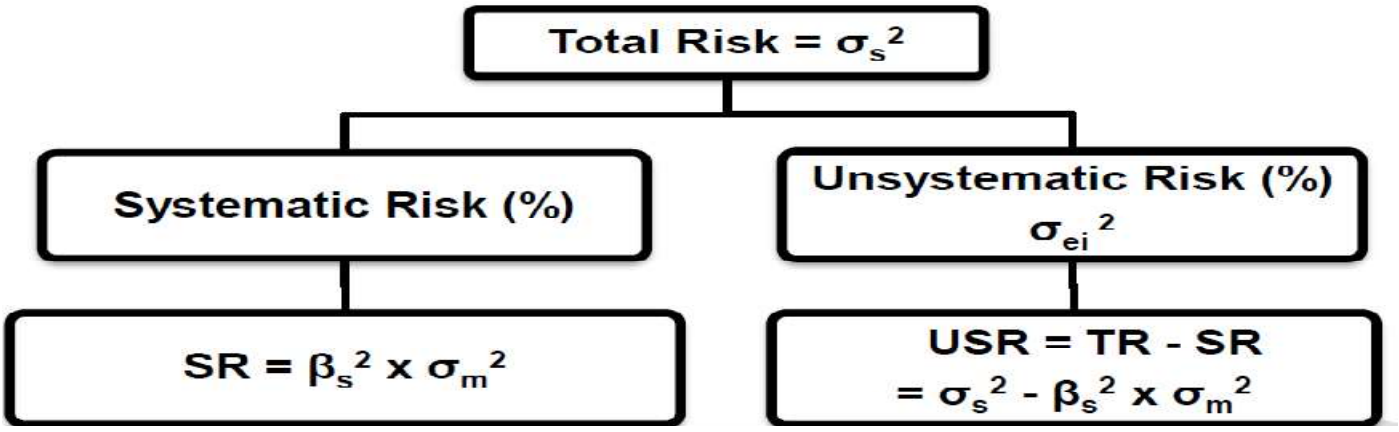
TOTAL RISK OF AN INVESTMENT

Total risk of an investment, which is variance (or standard deviation) of its return, can be divided into two parts:




**Total risk = Systematic risk + unsystematic risk**

$\sigma y2 = \beta^{2} \cdot \sigma m^2 + \sigma e^2$




$\sigma e^2$= USR/ Standard Error/ Random Error/ Error Term/ Residual Variance.

Systematic risk can be measured with the help of Beta (Beta indicates the riskiness of an investment, it relation to market portfolio.)

Systematic Risk of an investment = Beta of that investment x Market Standard Deviation

Unsystematic Risk of an investment = Total risk (SD of that investment)-Systematic Risk( calculated as above)

ALTERNATIVE APPROACH:

(i) Systematic Risk of an Investment = Beta$^2$ x Market Variance

(ii) Unsystematic Risk of an investment = Total risk (Variance of the investment)-Systematic Risk(calculated above)

## ❖ Portfolio Theory

**Constant proportion portfolio insurance**

Floor to be maintained. Equity will be raised according to latest share price.

Investment in equity= Multiplier (Total assets- floor)

Investment in bond= Total assets – equity investment

(a) Reducing the Risk of a Portfolio -

(b) Enhancing the Risk of a Portfolio

(c) Hedging the Portfolio

(d) Modern Portfolio Theory

- Some More Aspects Of "Risk And Return

(a) EFFICIENT MARKET HYPOTHESIS

Run Test
Under this method, the sampling technique of testing the significance is applied. We find the values of three variables (i) r i.e., no. of runs (ii) n1 (iii) n2 . A run is defined as the repeated occurrence of the same category of return/price. n1 refers to total number of + changes and n2 refers total number of negative changes.
Step 1 – determine (i) r i.e., no. of runs (ii) n1 (iii) n2

Step 2 Calculate mean and SD
Mean (μ)=$\frac{2n1\ n2}{n1+\ n2}+\ 1$

SD ($\sigma$) = $\sqrt{\frac{(\mu-1)(\mu-2)}{n1+n2-1}}$

Step 3- calculate upper and lower limit if r lies in between such limit then market exhibit week form efficiency

Limit= $\mu \pm t\sigma$

(b) Alpha

## (c) Characteristic Line

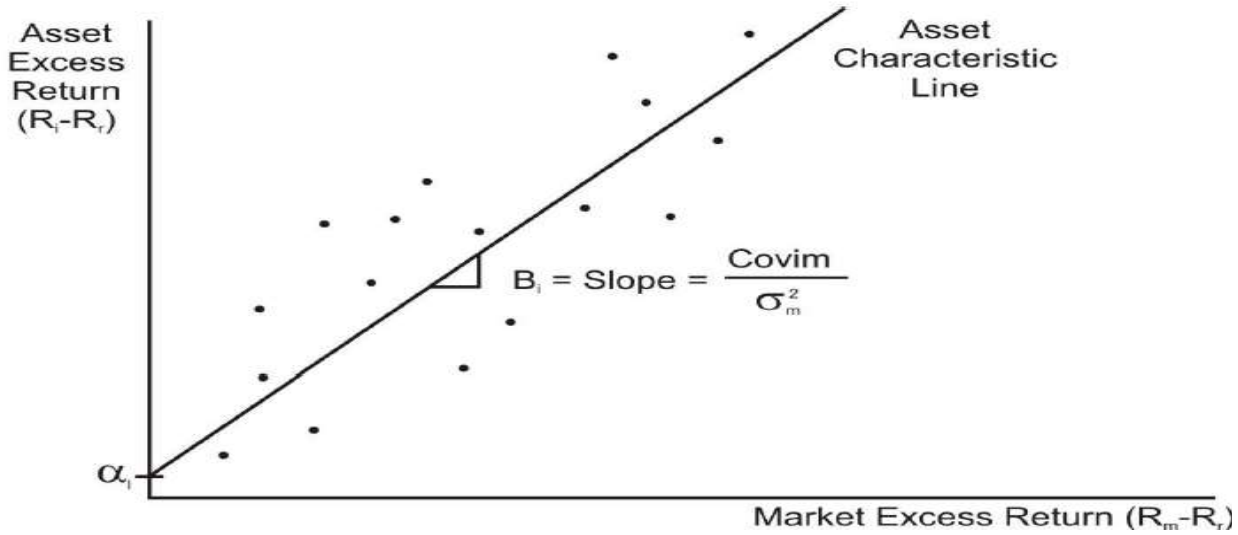
Characteristic Line represents the relationship between Asset excess return and Market Excess return.
**Equation of Characteristic Line:**

$$Y = \alpha + \beta x$$

Where Y = Average return of Security
x = Average Return of Market

α = Intercept i.e. expected return of an security when the return from the market portfolio is ZERO, which can be calculated as **Y – β× X = α**
b = Beta of Security
**Note:**

The slope of a Characteristic Line is Beta $\beta = \frac{Cov(x,y)}{\sigma x2}$




(d) Security Market Line (SML)

SML reflects the relationship between expected return and systematic risk (β)

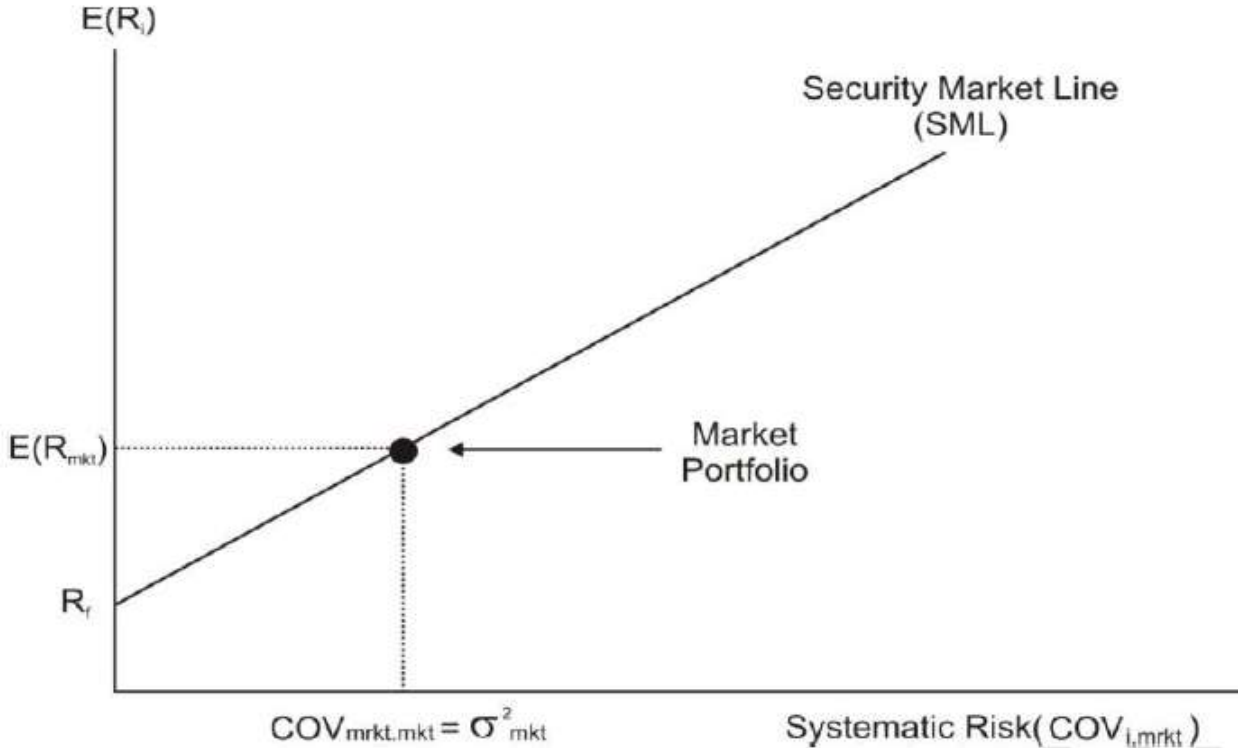
**Equation:**
**E (R i) = RFR + COVi,/σ²market[E (R Market) – RFR]**
Re= RF + (RM-RF)*Beta

Beta
--- If Beta = 0

CAPM Return = R f + β (R m – R f)
= R f
--- If Beta = 1

E(R) = R f + β (R m – R f)
= R f + R m – R f
= R m
**Graphical representation of CAPM is SML.**

According to CAPM, all securities and portfolios, diversified or not, will plot on the SML in equilibrium




(e) Capital Market Line (CML)

## *Capital Market Line (CML)*

The line of possible portfolio risk and Return combinations given the risk-free rate and the risk and return of a portfolio of risky assets is referred to as the Capital Allocation Line.

Under the assumption of homogenous expectations (Maximum Return & Minimum Risk), the optimal CAL for investors is termed the Capital Market Line (CML).

CML reflect the relationship between the expected return & total risk (σ).

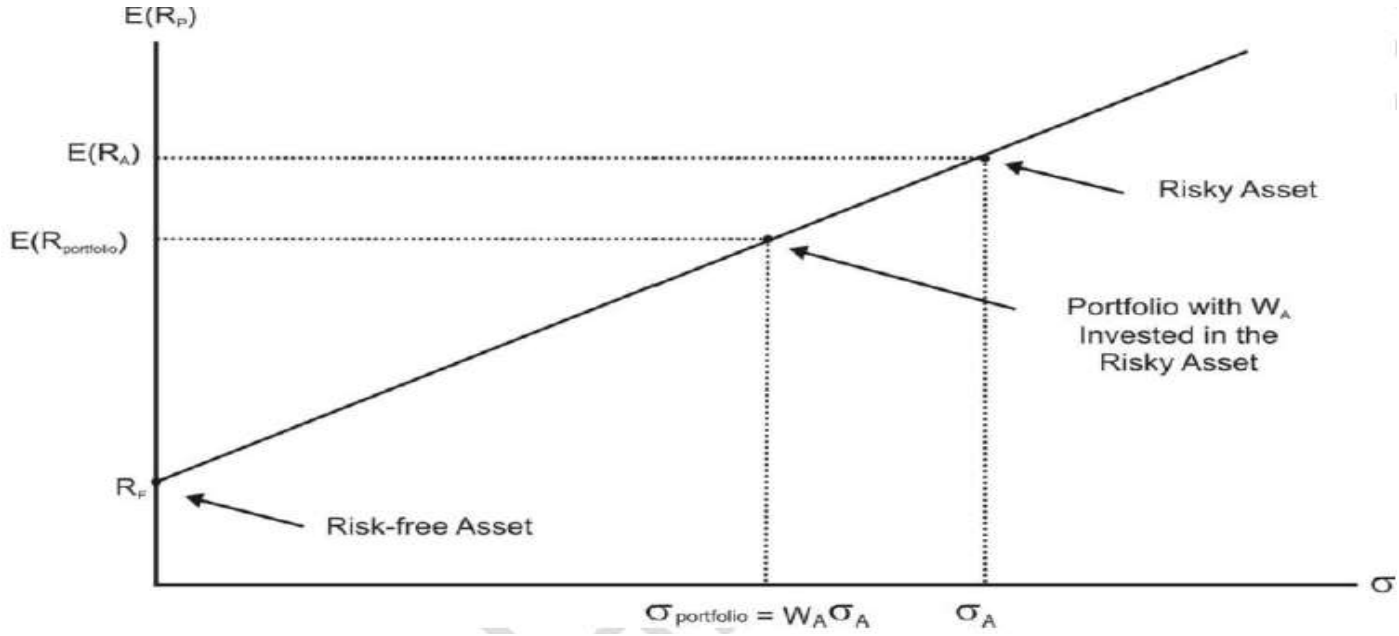
**Equation of this line:-**

**E(R p) = RF + σp/σm[E (RM) – RF]**

Where [E (RM) – RF] is Market Risk Premium



.




(f) Market Model

(g) Matrix Approach In Investment Decisions

- General Problems

- INTERNATIONAL INVESTING

## ❖ ARBITRAGE PRICING THEORY (APT)

It is a multifactor model as against CAPM which is single factor model. the expected return from a security is a linear function of various factors affecting the returns from the securities in the market; these factors may be interest rate, inflation, currency rates, GDP growth, oil prices etc., each factor is represented by a factor specific beta coefficient.
As per APT: Expected return

= RF + [Beta1 x Factor Risk Premium1]+[Beta2 x Factor Risk Premium2]+……...+[Beta$^{n}$x Factor Risk Premium $^{n}$]

### ❖ *Cut-Off Point or* SHARPE INDEX MODEL (Including Optimal Portfolio)

1. **Calculate excess return to beta ratio and rank accordingly**

$$\frac{\boldsymbol{E(R) - Rf}}{\boldsymbol{\beta}}$$

2. Draw table arrange all the stock in descending order and the choose all the stock from the table up to which c* is highest.

$$Ci = \frac{\sigma m^2 \sum \frac{(E(R)-Rf)\beta}{\sigma e^2}}{1+\sigma m^2 \sum \frac{\beta^2}{\sigma e^2}}$$

Variance of market * kuch/ 1+ variance of market * kuch



.

Kuch niche wala= $\frac{\boldsymbol{\beta^2}}{\sigma e^2}$ **kuch upar wala** = $\frac{\boldsymbol{excess\ return* \beta}}{\sigma e^2}$

3. Find weight to be given to chosen stocks

$$\boldsymbol{Zi} = \frac{\boldsymbol{\beta^2}}{\sigma e^2}\left[\frac{(\boldsymbol{E(R)} - \boldsymbol{Rf})}{\boldsymbol{\beta}} - \boldsymbol{c}*\right]$$

**Excess return to beta ratio minus c* x**$\frac{\boldsymbol{\beta^2}}{\sigma e^2}$

Special point

1. X means market & Y means stock.
2. Portfolio beta weighted average if beta of individual stock given and their value (weight) is given.

# CHAPTER -2 Bond valuation

Chapter Index

- Yield – current yield, YTM
- Value of Bond
- Bond pricing in between coupon date
- Duration
- Yield curve
- Forward Rates
- Convexity
- Convertible Bonds
- Immunizing the stream of liabilities
- Interest Immunization

## *Introduction (Fixed Income Security)*

Bonds are the type of long term obligation which pay periodic interest & repay the principal amount on maturity.

- **Yield**

**Current yield:**

(Annual interest based on coupon rate / current market price of the Bond) x 100

## Yield to maturity :

It is the annualized rate of return on the investment that the investor expects (on the date of investment) to earn from the date of the investment to the date of maturity. It is also referred as the required rate of return. Theoretically, it is equal to current market interest rate.

For plain vanilla bond.

$$\text{YTM}= \frac{I+\frac{F-P}{n}}{\frac{F+P}{2}}$$

YTM means effective interest rate on current market price. YTM derive the actual market price. Re/ required rate of return or yield on similar bond represent what should be the price, which a person expect. There is inverse relationship between yield of the bond and its price / value. Higher the rate lowers the value & lower the rate higher the value.

| | | | |
|---|---|---|---|
| YTM > Re | **Bond is trading cheap** | **Investor should go long** | **Currently bond is under priced** |
| YTM < Re | **Bond is trading reach** | **Investor should go short** | **Currently bond is overprice** |

**Term structure of interest**

For ZCB

Outflow = inflow

$$\text{IVo} = \frac{FACE\ VALUE}{(1+r)^n}$$

$$\text{r}= \left(\frac{FACE\ VALUE}{INTRINSIC\ VALUE}\right)^{1/n} - 1$$

- **Value of Bond**

It is the present value of all future cash inflows arising on account of the bond to the investor. The present value is being calculated using the bond's yield-to-maturity as the discount rate. It is also referred as required rate expected rate / yield / return to maturity / opportunity cost.

**Value of bond = Present value of coupon + Present value of redemption**

## IV of BOND = Coupon xPVAF (r%,n) + Redemption x PVIF (r%,n)

It is discounted at market return of yield on similar bond. Intrinsic value represents what should be the market price today.
For semi-annual bond, use half of coupon and discounted rate and discount for the double period as in year.

| | | | |
|---|---|---|---|
| MV>IV | Bond is trading reach | Investor should go short | Currently bond is overprice |
| MV<IV | Bond is trading cheap | Investor should go long | Currently bond is under priced |

- Bond pricing in between coupon date
  1. Calculate clean price as on immediate next last date in interest period. That is intrinsic value.
  2. Calculated dirty price as on above date. That above intrinsic value + periodic interest
  3. Calculate dirty price as on valuation date. PV of Step 2.
  4. Calculate clean price as on valuation date. Step 3 price – accrued interest.

- Duration& Volatility

Duration is the immunising period where the Reinvestment and the price effect cancel out each other such that the investor is immunized from interest rate changes & realized yield is equal to promised YTM. Duration is the weighted average time to receive the present value of bond. The weights are the present values of the payments, using the bond's yield-to-maturity the discount rate.

MACAULAY DURATION = $\frac{\sum WX}{\sum W}$
W= Present value of CF discounted at YTM.
X= Year- 1,2,3,……

VOLATILIT

$$Modified\ Duration = \frac{\text{Macaulay Duration}}{Periodic\ YTM\ factor}$$

INTERPRETATION- for 1% change in yield, bond price is expected to change by x% in the opposite direction ignoring the convexity. It measures the % change in bond price for every 1% change in YTM.
Ex. If P0 = 834, find change in market price if increase in required yield by 100 basis point. Volatility is 3.98
Ans- change decrease in market price= 1 x 3.98 = 3.98% , that is 834 * 3.98% = 33.19

New price = 834-33.19 = 800.81

If interest rate shock is given the calculate effective duration

$$Effective\ Duration = \frac{P2 - P1}{2 * P0 * \Delta Y}$$

P2= price with negative interest rate shock, Price with positive interest rate shock, P0= Initial price / current price, $\Delta Y$ = shock in basis point in % decimal term.

- **Yield curve**

  There is inverse relationship between bond price and yield. When yield rises bond price falls & when yield falls bond prices rises.

- **Forward Rates**

This concept is based on Expectation theory.

*Forward rate is the interest rate that we expect or fixed today for borrowing or investment or take place later on that will prevail in the market after certain period.*

***Forward rate = bigger factor / smaller factor -1***

Forward rate for first year is the rate of interest that expect, in the beginning of the 1st year, to earn on our investment made in the beginning of the 1st year till the end of 1st year. It is also referred as spot rate for 1st year.

Forward rate for second year is the interest rate that we expect, today, to prevail in the market in 2nd year. In another words, we can say that it is rate of return that we expect (today) to earn on our investment made in the beginning of 2nd year till the end of 2nd year.

$F_{12}= \left(\frac{(interest\ factor\ of\ year\ 2)^2}{(interest\ facftor\ of\ year\ 1)}\right) - 1$

Forward rate for 3rd year is the interest rate that we expect, today, to prevail in the market in 3rd year. In another words, we can say that it is rate of return that we expect (today) to earn on our investment made in the beginning of 3rd year till the end of 3rd year.

$F_{23}= \left(\frac{(interest\ factor\ of\ year\ 3)^3}{(interest\ facftor\ of\ year\ 2)^2}\right) - 1$

Forward rate for 4th year is the interest rate that we expect, today, to prevail in the market in 4th year. In another words, we can say that it is rate of return that we expect (today) to earn on our investment made in the beginning of 4th year till the end of 4th year.

$F_{34}= \left(\frac{(interest\ factor\ of\ year\ 3)^4}{(interest\ facftor\ of\ year\ 2)^3}\right) - 1$

- **Convexity**

Modified duration is a measure of rate of change in the bond price on change in yield to maturity. Convexity is the rate of change of duration with relation to yield.

$$\text{Convexity} = \frac{\sum WX(X+1)}{\sum W\ (1+YTM)^2}$$

- **Convertible Bonds**

These are the bonds which have / can to be converted into specified number of equity shares of the company issuing these bonds within a specified period.

(i) The number of shares that each bond can be converted to is known as the **conversion ratio.**

(ii) **Conversion price** is the exercise price at which the investor converts his bond into equity shares.

$$\text{Conversion price} = \frac{\textbf{par value of the bond}}{\textbf{conversion ratio}}$$

(iii) **Conversion parity price /** No Gain No Loss of Share/ Market Conversion Price

$$\text{Conversion price} = \frac{\textbf{currentMarket value of Convertible bond}}{\textbf{conversion ratio}}$$

(iv) **Straight value of a Bond** : This term is used with reference to option convertible bonds. The straight bond value is **what the convertible bond would sell for if it could not be converted into equity shares.** It is the price of an equivalent non-convertible bond. It is the PV of future coupon & redemption discounted at YTM on similar NCDs.

**Straight value of BOND = Coupon x PVAF (r%,n) + Redemption x PVIF (r%,n)**

(v) **Downside risk** :Downside Risk reflects the extent of decline in market value of convertible bonds at which conversion option become worthless (share price goes much below the conversion price . The market price of the convertible bond will be equal to Straight value of bond. This will result in loss for the investor. This loss is referred as downside risk.

$$\textbf{Downside risk} = \frac{\textbf{Market value} - \textbf{straight value}}{\textbf{straight value of bond or } \text{Market value of Non-converti} \quad \text{bond}} * \textbf{100}$$

(vi) **Stock value of bond** = **current market price of share x conversion ratio**. It is also referred as **conversion value** of the bond.

(vii) **Conversion premium** - The extent by which the market value of a convertible security exceeds the conversion value. Suppose a convertible bond is being traded in the market at Rs. 265. It can be converted into 10 equity shares having market price of Rs.25. The conversion premium is 265 – 250 = 15. If calculated in terms of % , the is divided by

$$\text{Conversion premium} = \frac{\text{conversion premium}}{\text{conversion value.}}$$

(viii) **Conversion Premium per share**

$$\text{Conversion premium}\textbf{per share} = \frac{\text{conversion premium}}{\text{Conversion Ratio}}$$

(ix) **Floor Value**: Floor Value is the maximum of :

a) Market Value of Convertible Bond. Or
b) Market Value of Non-Convertible Bond.

**Note**: Market Value of Convertible Bond (Assume 5 Years)
$= \text{Interest}/(1+\text{YTM})1 + \text{Interest}/(1+\text{YTM})2 + \ldots\ldots\ldots\ldots + \text{Interest}/(1+\text{YTM})5 + \text{Conversion Value } (\text{CV}5)/(1+\text{YTM})5$
CV5 = MPS at the end of Year 5 × No. of Shares.

(x) **Premium Pay Back Period or Break Even Period of Convertible Bond**
It is a time period, when bond would be converted into equity share so that the loss on conversion would be set-off by income from interest.

$$\textbf{Break Even Period} = \frac{\text{Loss due to Conversion}}{\text{Extra Income from Bond}}$$

**OR**

$$= \frac{\text{Market Price of Bond} - \text{Conversion Value}}{\text{Interest on Bond} - \text{Dividend on Share}}$$

Q. The data given below relates to a convertible bond :
Face value : Rs.250
Coupon rate : 12%
No. of shares per bond :20
Market price of share : Rs.12
Straight value of bond : Rs.235
Market price of convertible bond : Rs.265
Calculate :
(i) Stock value of bond.
(ii) The percentage of downside risk. (iii) The conversion premium
(iv) The conversion parity price of the stock. (Nov. 2008 SFM)

Answer
(i) Stock value of bond = current market price of share x conversion ratio
= 12 x 20 = 240
(ii) % of downward risk =
Market price of convertible bond – straight value of convertible bond
Straight value of bond
= (265-235) /235 = 0.1277 = 12.77%
(iii) Conversion premium = current market price of convertible bond – conversion value=265–240 = 25
(iv) Conversion parity price= current market price of convertible debenture / conversion ratio.
= 265 / 20 = 13.25

- <u>Immunizing the stream of liabilities</u>

The principle of immunization require that
Duration of Assets = Duration of Liabilities

Wx * year of x + Wy * year of y = Duration of liabilities as calculated

1. First calculate duration of liabilities.
2. Determine the proportion of investment.
3. PV of such proportion to be invested today to pay require amount after x year..

# • Bond refunding decision

***Bond Refunding:*** If, when bonds mature, the issuer does not have the cash on hand to repay bondholders; it can issue new bonds and use the proceeds either to redeem the older bonds or to exercise a call option. This process is called refunding.

| Initial cash flow | | Recurring cash flow | | |
|---|---|---|---|---|
| Refund of the old bond | ( ) | | Old | New |
| Tax shield on premium of redemption of share | | 1.Post tax interest | | |
| Issue of new bond | | 2.Tax shield on amortisation | | |
| Floatation cost of new bond | ( ) | Net (1-2) | | |
| Tax shield on unamortized portion of old bond | | PVAF of saving discounted at kd | | |
| Overlapping interest | | | | |
| | xxxx | | | xxxx |

- Interest Immunization



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# CHAPTER - 3 | Equity valuation

- Absolute valuation
  - Dividend discount module
  - Free cash flow approach
- Relative valuation
- Residual valuation
- Chop shop approach

# CHAPTER -3 | Equity valuation

- **Absolute valuation**

- **Dividend discount module-** used where dividend track record is available or value is from minority prospective.

**$IV_0$ = PV of all the future dividend discounted at equity capitalisation rate / Required rate of return.**

Required rate of return (Re) = RF + (RM-RF)*Beta

**Beta for listed company**

Beta $\beta = \frac{Cov(x,y)}{\sigma x2}$

Or $\beta = \frac{r.\sigma y}{\sigma x}$

**Beta for unlisted company**

**Choose beta of listed company and undergone the process of Leveraging and deleveraging**

**Leverage beta (βL) =βu x** $\left(\mathbf{1} + \frac{\boldsymbol{Debt}\ (\mathbf{1}-\boldsymbol{t}\%)}{\boldsymbol{equity}}\right)$

Unleveraged beta (βu) = $\frac{\boldsymbol{\beta L}}{\left(1+\frac{\boldsymbol{Debt}\ (\mathbf{1}-\boldsymbol{t}\%)}{\boldsymbol{equity}}\right)}$

Forecast of future dividend

1. For no growth firm
   Price = E/Re, Re= E/P, Re= 1/ PE ratio, P= A/I, $IV_0$= EPS/ Re
2. For constant growth
   $IV_0 = \frac{D1}{\text{Re}-\text{g}}$
   Growth (g) = b x r
   b,= retention ratio
   r, = return on capital employed.
   Growth rate can be computed by two approach.
   - Simple average growth rate = $\frac{\left(\frac{Closing-\ Opening}{Opening}\ x\ 100\right)}{n}$
   - Compounded average growth rate = $\left(\frac{closing}{Opening}\right)^{1/n} - 1$
3. For multiple growth
   By preparing table- in to step 1st for explicit growth period and other for normal growth period or no growth period.

Some concept

| | | | |
|---|---|---|---|
| $P_0$>IV<br>E(R)<Re | Bond is trading reach | Investor should go short | Currently bond is overprice |
| $P_0$< IV OR<br>E(R) >Re | Bond is trading cheap | Investor should go long | Currently bond is under priced |

## - Valuation of share / firm / equity

Free cash flow approach – used where dividend track record is not available or valuation is done from control prospective.

| | | | |
|---|---|---|---|
| Step 1- Free cash flow for firm (FCFF) | Net operating profit after tax (NOPAT) | Sales | |
| | | Less: operating cost | |
| | | EBDIT | |
| | | Less : Depreciation | |
| | | EBIT | |
| | | Less: Tax on EBIT | |
| | | NOPAT | xxxx |
| | Net investment | Capital spending | |
| | | Less: Depreciation | |
| | | Add: Change in Working Capital | |
| | | Net investment | xxxx |
| | FCFF = Net operating profit after tax (NOPAT) - Net investment | | |
| Step 2 – PV of FCFF | Should be discounted at appropriate discount rate<br>1. For explicit growth period<br>Discount factor of respective year should be used to discount.<br>2. For normal growth period.<br>Value of firm = FCFF1/ kc-g<br>3. For no growth period<br>Value of firm = $\frac{\text{NOPAT}}{kc}$<br>Kc- kc would be weighted average of effective cost of debt and equity<br>**Kc= wd x post tax kd + we x ke**<br>Ke= = RF + (RM-RF)*Beta | | |
| Value of equity | PV of FCFF | | |
| | Less: Market value of Debt | | |
| | Add : Market value of non- trade investment | | |
| | Value of equity | | |
| | Share price = value of equity / No. of share | | |

For FCFF

1. Do not deduct interest and do not consider interest tax shield.

2. Income from non-trade investment does not form part of FCFF and its market value is to be added while deriving value of equity.

## FREE CASH FLOW (EQUITY) MODEL

Step-1 if weight of debt given

FCFE = PAT –Equity investment

Equity investment means equity portion of investment that is in total investment excluding investment made by debt.

Equity investment = Net investment (1 – weight of debt)

if weight of debt not given

FCFE = PAT + Equity investment – Net borrowing

Step- 2 Value of equity = Present value of FCFE discounted at appropriate discounting rate.

- ## ALCAR Approach

for no growth firm to find out the value of new strategy.

Value of strategy = Post strategy value – Pre strategies value.

Step1- Pre strategies value

Value of firm = $\frac{\text{NOPAT}}{kc}$

Step 2 Post strategies value

Stage 1- explicit growth period

| Particular | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| a. NOPAT | | | | |
| b. Capital expenditure | | | | |
| c. Net investment (change in Capital employed) | | | | |
| d. FCFF (a-c) | | | | |
| e. PV @ Kc | | | | |

Stage 2- No growth period

Value of firm = $\frac{\text{NOPAT}}{kc}$

Or

For normal growth period.

Value of firm = FCFF1/ kc-g

- **Relative valuation**

**Value of firms on the basis of how similar firms are value by use of price multiple**

- Residual valuation

  **EVA= NOPAT – Capital charges**

  Capital charges = kc x capital employed

  **MVA = PV of all future EVA discounted at Kc.**

  **EV(enterprises value) = Capital employed + MVA**

- Chop shop approach – **value of sum is sum of value of all average value of each individual segment.**

Special point

1. Given dividend may be is of current year or last year, generally it is not given and on taking differently answer would be different, so choose very carefully some useful hint is given as follows:

| | |
|---|---|
| Current year dividend (D1) | Expected dividend, company pays dividend, company retains dividend means remaining pays, DPS at the end of year 1.<br>after the date on which price per share is given<br>calculated dividend per share from current year profit. |
| Last year dividend (D0) | Company had DPS/EPS, last year dividend, as on today, dividend paid, current dividend. |

2. 182 treasury bill presently trading at 97.6%. this type of information is used to calculate Rf.

$$Rf = \frac{100 - 97.6}{97.6} * 100 * \frac{365}{182}$$

3. Sometime Rm= dividend yield + growth rate.
4. Market risk premium = Rm- Rf
5. Bonus issued, dividend per share decrease in proportion to number of share increased.
6. Old growth rate 7%, growth rate increase by 3%, New growth rate= 7+3 = 10
7. If there is retention ratio there would be growth rate. G = b x r
8. Company retain some%, means remaining pays as dividend.
9. Dividend yield = dividend / share price x 100
10. Return = dividend yield + capital gain yield.
11. Market value of debt= coupon / Market interest rate.
12. Annualised investment rate

$$\frac{f - p}{p} * 100 * 12/n$$

13. Annualised discount rate

$$\frac{p - f}{f} * 100 * 12/n$$

14. Debt equity ratio is different from weight of debt and weight of equity.
    Debt equity ratio = Debt / Equity
    Weight of Debt = Debt/ Debt + Equity
    Weight of equity = Equity/ Debt + Equity.
15. Working capital.
    Initially there is investment of working capital. For every year consider only change in working capital. And finally on termination there would be recovery of working capital. Change if working capital – positive implies there is investment and negative implies recovery.
16. No growth firm- Status Qua – capital spending offset by depreciation and there is no change in working capital. Means net investment is NIL. Value of Firm = NOPAT/Re.

# CHAPTER - 4 Foreign exchange risk management

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- Foreign Exchange Introduction / Quotation & arithmetic
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Foreign Exchange Introduction / Quotation & arithmetic

## ❖ Introduction

In today's world, the business firms are engaged in international trade and finance activities. The firms import / export goods and services, they invest / borrow in international capital markets and they operate joint – ventures in different countries. Each country having different currencies, some counties currencies is more valuable and some are less valuable. A currency of countries is valid only within such countries. So to make payment and receipt from other countries, the firms have to purchase / sell foreign exchange, i.e. currencies of other countries.

There are following some of the countries and their currencies.

| Countries | Currencies symbol | Currencies name | Value in Rupees term ( direct quote for India) | Value in Rupees term ( indirect quote for India) |
|---|---|---|---|---|
| INDIA | ₹ | Rupees | 1 | |
| USA | $ | Dollar | 64 | 0.01538462 |
| EUROE | € | Euro | 75.38 | 0.01441338 |
| UK | £ | Pound | 82.03 | 0.01234111 |
| Japan | ¥ | Yen | 0.5805 | 1.69348010 |
| SWISS FRANCE | SFR | SFR | 65 | 0.01538462 |
| SPANE | ₱ | Spanish peseta | | |
| AUSTRALIA | AUD | Australian dollar | 49 | 0.02040816 |
| CANADA | CAD | Canadian dollar | 48 | 0.02083333 |
| SINGAPUR | SGD | Singapore dollar | 47 | 0.02127660 |

## ❖ Direct quote and indirect quote

Direct quote - Number of unit of home currencies for per unit of foreign currencies.
Direct quote = 1 / indirect quote
Indirect quote – Number of unit of foreign currencies for per unit of home currencies.
Indirect quote = 1/ direct quote

## Golden rule for foreign exchange chapter

General rate quotation ---------- ₹ /$ (means rate of $ in ₹ term)

Bank provides bid / ask rate---------- ₹ /$ -------- 65/67 (means bank agree to bid (Purchase) $ at ₹ 65 and ready to sale $ at ₹ 67. For customer it is reverse for customer it is sale/buy rate means when customer will buy a $ has to pay ₹ 67 and when customer will sale a $ he will get ₹ 65. However if bank buy in interbank market then bid / ask rate of one bank is sale / buy rate for other bank.

To come over complexity of foreign exchange chapter following rule should be followed

₹ /$ -------- A/B

1. Always think for B. B has to buy or sale accordingly look bid/ ask rate.
2. Look currency given under question. If currency of B then multiply and if currency of A given in question then divide by selected bid or ask rate.

For interest rate…….₹ /$ -------- A/B

- If interest rate in B term and change in rate of currency B then multiply, and if change in rate of currency A then divide.
- If interest rate given in A term and changes in rate of currency A then multiply and if change in rate of currency B then divide.

❖ Inverse rate and two way arbitrage

Inverse rate are also known as implied rate or synthetic rate.

Synthetic or implied (A/B) bid = 1/ (B/A) ask

Synthetic or implied (A/B) ask = 1/ (B/A) bid

Example

Bank A quoting

₹ /$ ---------- 65/67

Bank B quoting

$/₹ ---------- 0.0120/0.0130

Carry on arbitrage.

Solution

Implied $/₹ at bank A - 0.0149/ 0.0154

So bank B is under prices arbitrage involves buying at bank B and Selling at bank A.

Let the notional principle is ₹10,000.

Arbitrage profit = (0.0149-0.0130) x 10000 = 19

## ❖ Cross rate

| Exchange rate | In bid ask form |
|---|---|
| x/~~y~~ = a<br>~~y~~/z = b<br>x/z = a * b | x/~~y~~ = A/B<br>~~y~~/z = C/D<br>x/z = A*C / B*D<br>BID*BID / ASK* ASK |
| x/~~y~~ = a<br>z/~~y~~ = b<br>x/z = a/b | x/~~y~~ = A/B<br>z/~~y~~ = C/D<br>x/z = A/D / B/C<br>cross and divide |



.

| | |
|---|---|
| ₹/y = a<br>₹/z = b<br>y/z = b/a | ₹/y = A/B<br>₹/z = C/D<br>y/z = C/B / D/A<br>cross and divide but begin with denominator. |

Arbitrage means rotate money in different currency to earn profit.

## ❖ Spot rate and forward rate

- **Spot rate** is the exchange rate applicable for buying or selling foreign currency today.
- **Forward rate** is a rate which is fixed today but which is applicable for buying or selling foreign currency at some future time.

## ❖ Forward premium or discount on currency (A) /(B)

- Forward premium or discount on currency (A)

$$\frac{s-f}{f} * 100 * 12/n$$

- Forward premium or discount on currency (B)

$$\frac{f-s}{s} * 100 * 12/n$$

## ❖ Swap point

Swap point given to arrive at forward rate by adding or subtracting in given spot rate.

| | |
|---|---|
| If the swap point are low/ high → | Add |
| If the swap point are high/ low → | Subtract |
| However if swap point given as premium then add irrespective of high or low.<br>If swap point given as discount then subtract irrespective of low or high. | |

If swap point given of two different month then swap point of intermediate can be calculated proportionately according to number of days.

## ❖ Risk in Foreign Exchange

(a) Forward Exchange Contracts

Forward exchange contracts are used to hedge against the adverse movement in exchange rate. Forward exchange contract is a contract wherein out of two parties (in India one party compulsorily being a bank) one agrees to deliver a certain amount of foreign exchange at an agreed rate at a fixed future date to the other party.

- **Exporter** Sale – foreign currencies receivable – afraid of foreign currencies falling – should sell foreign currencies forward to hedge against adverse movement.

- **Importer** Purchases – foreign currencies payable – afraid of foreign currencies rising – should buy foreign currencies forward to hedge against adverse movement.

(b) Futures Contracts – derivative

(c) Options - derivative

(d) Currency Swaps



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(e) Option forward contract

## ❖ Exchange rate determination

### (a) Interest Rate Parity Theory

IRP is relationship between exchange rates & interest rates, other factor remaining constant. As per IRP countries having lower interest rate should be at forward premium & countries having higher interest rate should be at forward discount.

As per IRP Equation

Let rate is quoted as ₹ /$

$$\frac{F\ (₹\ /\$)}{S(₹\ /\$)} = \frac{1 + i\ ₹}{1 + i\ \$}$$

*i.e, ratio of forward to spot is equal to ratio of interest rate factor.*

### Rational behind IRP- Covered interest arbitrage (CIA)

1. Determine the under-priced interest rate. Say $
2. Borrow $ at such under-priced interest rate and compute amount payable on maturity $.
3. Convert the amount receipt $ (not maturity amount) on borrowing into another currency₹ spot.
4. Invest the amount receipt ₹on conversion and compute the amount receivable on maturity₹.
5. Sell amount receivable ₹ forward to get back $.

The difference between amount receivable (step – 5) and amount payable on maturity (Step -2) would be arbitrage profit.

### - Forward cover v/s money market cover

| | FORWARD COVER | MONEY MARKET COVER |
|---|---|---|
| Foreign currency receivable<br>* logic- by borrowing amount receivable at future time realised immediately and debtor would make payment directly to bank<br>In simple create reverse position if receivable create reverse position (payable) by borrowing. | - **Exporter** Sale – foreign currencies receivable – afraid of foreign currencies falling – should sell foreign currencies forward to hedge against adverse movement. | Borrow* PV of foreign currency – Sell it spot to buy home currencies – invest home currencies<br>(Borrow - Sell – Invest) |



.

| | | |
|---|---|---|
| Foreign currency payable<br>* Logic- By investing amount payable at future time made arrange for payment now and creditor would be paid directly by bank.<br>In simple create reverse position if payable create reverse position (receivable) by investing. | - **Importer** Purchases – foreign currencies payable – afraid of foreign currencies rising – should buy foreign currencies forward to hedge against adverse movement. | Invest* PV of foreign currency – Buy spot foreign currency which is to be invested – borrow home currency forward to buy foreign currency<br>(Invest - Buy – Borrow) |

## - Appraisal of international project

| Approach | Step |
|---|---|
| Domestic currency approach | 1. Calculate expected spot rate application of IRP.<br>2. Convert foreign currency cash flow into home currencies using above expected rate.<br>3. Compute NPV in ₹ by using ₹ discount rate (Re). |
| Foreign currency approach | 1. Find out risk- adjusted discount rate $\left(Rf\ of\ FC * \frac{Re\ of\ HC}{Rf\ of\ HC}\right)$<br>2. Calculate NPV in foreign currency.<br>3. Covert the foreign currency NPV using the ₹ Spot rate. |

## - Selecting currencies of borrowing / investment

| | |
|---|---|
| Borrow in currencies | Where home currency outflow is minimum. |
| Invest in currencies | Where home currency inflow is maximum. |

# (b) Purchasing Power Parity Theory

Exchange rates are affected by inflation. Higher rate of inflation in one country (as compared to the other country) results in discount of currency of that country and vice-versa.

$$\frac{F\ (₹/\$)}{S(₹/\$)} = \frac{1 + i\ ₹}{1 + i\ \$}$$

***i.e the ratio of forward to spot is equal to ratio of inflation rate factor.***

(c) International Fisher Effect

According to Prof. Fisher, the expected inflation rate for a country has an important effect on money-interest rate (also referred as nominal-interest rate) in the country. In other words, nominal rate of interest is affected by inflation rate.

The Fisherian Principal of interest rates is :

(1+real interest rate) / (1+inflation rate) = (1+nominal interest rate)

$$\frac{1+r\,₹}{1+r\,\$} = \frac{1+i\,₹}{1+i\,\$}$$

$$\frac{1+r\,₹}{1+i\,\$} = \frac{1+r\,₹}{1+i\,\$}$$

i.e REAL INTEREST RATE IN COUNTRY A (₹) = REAL INTERET RATE IN COUNTRY B ($)

## ❖ Some Related Topics

### (a) Nostro Account

Nostro is a Latin word which means ours. ( In this sense, Nostro Account means Our account with you).Nostro Account is a current account that a bank holds with a bank in a foreign country . Such accounts are operated in the currency of that foreign country. It is maintained as pass- book actual inflow of foreign currency is credited to this account and actual outflow of the foreign currency is debited to this account.

| Nostro account of xyz Bank | | Exchange position statement | | |
|---|---|---|---|---|
| Dr. | Cr. | | Bought / long | Sold/ short |
| Outflows | Inflows | | Purchase of FC | Sale of FC |
| Remitted by TT | | | Forward purchase cancelled | Forward purchase Made |
| | | | Draft made | Draft cancelled |
| | | | Purchase bill | Remittance |

(b) Arbitrage Opportunities

(c) Leading and Lagging

### (d) Foreign Exchange Risk Exposure

- Transaction Exposure

Transaction exposure is concerned with gain/loss arising out of foreign exchange rate fluctuations on account of outstanding payables and receivables in foreign currency. In such a case in question spot rate and forward rate given and also purchase sale data given then find out profit on both the date using spot rate and forward rate respectively resulting difference is known as foreign exposure. To hedge against these types of exposure, some foreign exchange risk measures, for example forwards, may be used.

- Operating Exposure / economic exposure

Change in operating profit due to change in selling price as resulting from change in demand. Demand changes as per price elasticity. If price elasticity is 2 then if price changes by 1% then

demand shall be change by 2%. Determine profit at both the demand new and old resulting difference is economic exposure.

- Accounting exposure / Translation Exposure

Firms have foreign operations like foreign branch, foreign associate, foreign Joint -Venture, foreign subsidiary etc have to convert the financial statements of these operations ( in local currency ) for incorporating/consolidating them in the financial statements of these firms. For this purpose, the firms follow AS-11 (Revised 2003). The net result of this process results in gain/loss and thereby affects the value of the firm.

(h) International Working Capital Requirement

(i) General Problems on FERM

## ❖ Cancellation, extension & early delivery of a forward contract

| | |
|---|---|
| **Cancellation** | **Old forward contract is cancelled by entering into a reverse contract. So, a buying / Selling forward contract is cancelled by entering into a selling buying contract as on same date of contract. Profit / loss on this transaction are transferred to the customer account.** |
| **Extension** | **First old contract is cancelled as above. Along with entering into a fresh forward contract for the revised maturity.** |
| **Early delivery** | The steps of early delivery can be divided into 3 parts:<br>(I) (a) Take delivery on spot basis and (b) make provisional payment on the original forward contract rate basis. The net effect of these two steps is that there will be either debit or credit balance in the customer's account. This will be settled at the time of maturity of the original contract (i.e. at the time of final settlement) along with interest. If there is credit balance in the customer's account the bank will pay interest at the rate of fixed deposit interest rate; if there is debit balance the bank will charge the customer interest at the rate of its Prime Lending Rate (PLR).<br>(II) A fresh contract for the cancellation of the original contract:<br>The bank enters into an opposite forward contract with the customer; under the original contract the bank was to purchase the foreign currency from the customer, the bank will sell that currency, on forward basis, to the customer. The new contract will have same maturity date as that of old contract (which is to be cancelled).<br>(III) On maturity :<br>The bank will execute both the forward contracts (original contract as well as the contract entered on the date of early delivery). Under the original contract the bank will purchase the foreign currency and under the new contract (entered on the date of early delivery) the bank will sell the foreign currency. The customer's account will be settled with interest.<br>Q. bi |



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Special point of practical question

1. If rate as 180 day deposit rate 180 days borrowing rate give means it is for 180 days not per annum, to make per annum multiply it by 2, or to use for 180 days use as it is without making it half.
2. an attempt is made to simplify complexity of foreign exchange rate quotation as follows:

| | |
|---|---|
| Generally ₹ /$ -------- A/B | Means price of B in A term. |
| Exception | |
| Currency Pair ₹ /$ -------- A/B | That is price of A in B term. |
| In letter ----- AUD/USD----- A/B | It may be price of A in B term. But try to recognise actual rate and fact with the logic of current effective market rate. |
| ₹ /$ 0.0120/0.0130 | That is price of A in B term. Because $ is costlier than ₹. |

3. Certain amount to be borrowed and applicable upfront processing fees is 2% then what amount should be borrowed.

$$\left(\frac{\boldsymbol{Certain\ amount}}{\mathbf{1} - \boldsymbol{upfront\ processing\ Fees}\%}\right)$$

4. If we have to borrow in foreign currencies then first determine foreign currency to be borrowed by converting amount to be borrowed in foreign currency using spot rate, then we got borrowed amount, when borrowed amount is in foreign currencies to bring in home country that borrowed amount first we have to sale spot. Then finally later on we have repay loan then we have to buy foreign currency to pay, determine amount payable converting borrowed amount inclusive of interest using forward rate.
   That is
   i. 1st convert required amount spot
   ii. 2nd Borrow
   iii. 3rd cover total payment inclusive of interest forward.
5. Loss in cancellation is added in case of purchase and deduct in case of sale. In case of profit Added in case of sale and deduct in case of purchase to calculate effective cost.
6. Rate as ₹ /$ , it is expected that exchange rate will decline by 5%. Means $ will decline by5%.
7. Bullet repayment means interest each year and full principle at end.
8. In interbank market bid/Ask rate quoted by one bank for other is same as one bank to customer. So bid ask rate for offering bank is sale buy rate for seeking bank.

| CHAPTER - 5 | Derivative- financial risk management |
|---|---|

INTRODUCTION OF DERIVATIVE

- ❖ OTC Derivatives

  - Cap, Floor and Collar

  - **FOREWARD RATE AGREEMENT**
  - Introduction
  - Valuation of swaps
  - Arbitrage
  - Pay off from swaps
  - Interest Swaps
  - Swaptions

- ❖ Futures
  - margin
  - valuation of future
  - stock index future
  - beta management using stock index future
  - stock future arbitrage
  - hedging through currency future
  - ***Hedge Ratio***

- ❖ Options
  - Introduction
  - Call Option
  - Put Option
  - Profit or Loss/ Pay off of call Option & Put Option
  - Concept of Moneyness of an Option
  - Put Call Parity Theory (PCPT)
  - Binomial Model (Delta Hedging / Perfectly Hedged technique / Risk free portfolio approach) for Call Writer
  - Risk Neutral Approach for Call & Put Option(Binomial Model)
  - Black & Scholes Model

- ❖

(a) Understanding the Options

(b) Straddles and Strangles
(c) Strip and Strap
(d) Butterfly With Reference to Options
(e) Condor
(f) Bull and Bear Spreads
(g) Calendar spreads
(h) General Problems on Options
(i) Option Valuation
(i) Price Difference Approach
(ii) Expected Gains Approach
(iii) Binomial Model
(iv) Risk Neutral Method
Two Stage Binomial Model
(v) Black- Scholes Model
(g) Put – Call Parity Theory (PCPT)
(h) The Greeks
(i) Delta
(ii) Gamma
(iii) Vegs
(iv) Theta
(v) RHO
Stock Market Derivatives in India:
2
Arbitrage Opportunities
Commodities Derivatives

# INTRODUCTION OF DERIVATIVE

Derivative is a financial instrument which derives its value from underlying assets. It is designed to carry out betting. Underlying assets could be share, currencies, stock index future, physical commodity, etc.

We broadly classified in two categories:-

| OVER THE COUNTER | EXCHANGE TRADED |
|---|---|
| Forward contract | Future |
| Financial swaps | Option |
| Forward rate agreement | |

| If Actually | Derivative concept | | | | | |
|---|---|---|---|---|---|---|
| Under-priced | Upside betting | Long position | Boolish | Buying | Borrowing | Call buy / Put sell |
| Over priced | Down side betting | Short position | Bearish | Selling | Investing | Put buy / Call sell |

## ❖ OTC Derivatives

- Cap, Floor and Collar

- FOREWARD RATE AGREEMENT

### - Introduction

FRA is FORWARD CONTRACT on INTEREST RATE. The winner will get and sufferer will pay the PV difference on the date on which the lending or borrowing is to be done.

- **Valuation / Pricing of swaps** – pricing of FRA is set in such a way that there is no scope of arbitrage opportunity.

Pricing of FRA = $\frac{Highe\ \ period\ factor}{Smaller\ period\ factor} - 1 * \frac{12}{gap\ period}$

Arbitrage – if the actual FRA rate is higher / lower than the rate should be , there will be clear cut arbitrage opportunity by simultaneous borrowing and investment The winner will get and sufferer will pay the PV difference on the date on which the lending or borrowing is to be done. To earn arbitrage profit if the actual rate is overpriced then invests& if the actual rate is under-priced then borrow.

### - Pay off from swaps

The winner will get and sufferer will pay the PV difference on the date on which the lending or borrowing is to be done.

Pay off = $\frac{(Actual\ rate - contract\ rate) * amount * \frac{Mon}{12}}{Annuity\ factor\ for\ gap\ period}$

### • Interest Swaps

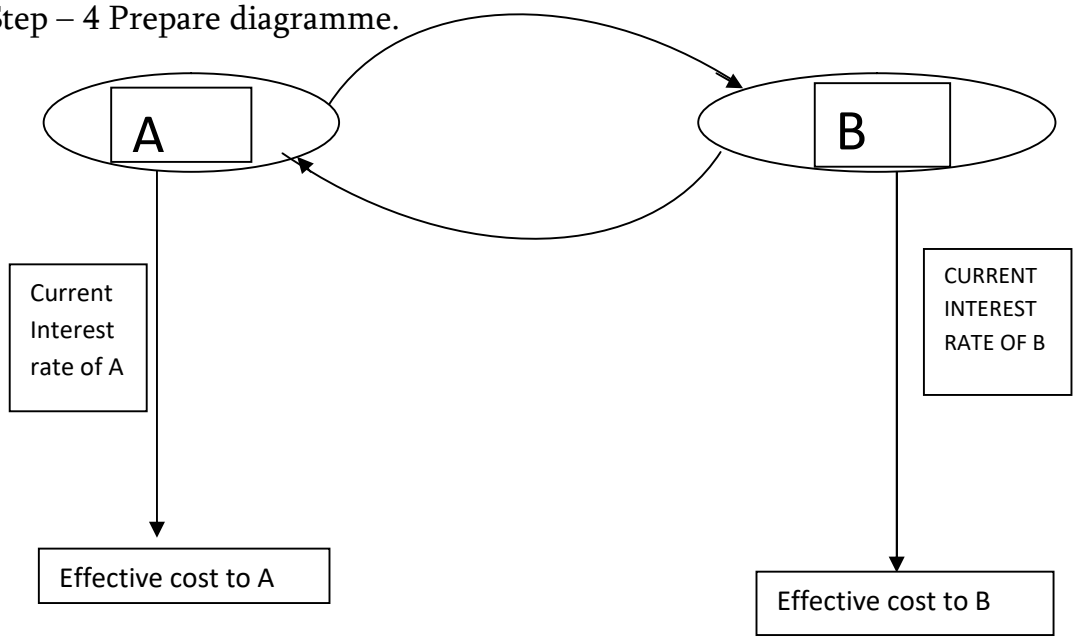
In interest swap, two parties initially already undertaken or going to undertake interest obligation but they agree pay each other's interest obligation for their mutual benefit. Following step should be followed:

Step -1 Make them do what they do not want to do. That is they borrow in different permutations of their choices.

Step – 2 Swap it.

Step -3 Calculate effective costs.

Step – 4 Prepare diagramme.




- ## Pricing and valuation of swaps

Value of floating rate swaps is at par. Value of fixed rate swaps calculated.

Value of fixed rate swaps = PV of coupon and redemption discounted at current market rate.

**Value of Fixed leg swaps = Coupon x PVAF (r%,n) + Redemption x PVIF (r%,n)**

Value of swaps = Value of floating rate swap - Value of fixed rate swaps

- ## Periodic swaps price

$$= \frac{1 - las \ \ discounting \ factor}{Summation \ of \ discounting \ factor}$$

## Swaptions

## ❖ Futures

Future are the derivative instrument which involve at standardised contract to BUY/ SELL a certain amount of the underlying asset at an agreed upon price called future price.

- **Margin**

Margin is a performance guarantee i.e. security provided by the client to the exchange. It is money deposited by both the long and the short. There is no loan involved and consequently, no interest charges.

The exchange requires traders to post margin and settle their account on a daily basis.

**1. Initial Margin**

It is the money that must be deposited in a futures account before any trading takes place and paid by both long and short position. It is set for each type of underlying asset.

Initial Margin per contract is relatively low and equals about one day's maximum price fluctuation on the total value of the contract.

**Initial Margin = Daily Absolute Change + 3 Standard Deviation**

**2. Maintenance Margin**

It is the amount of margin that must be maintained in a futures account. i.e. It is a limit below which our closing balance should not fall. If the initial margin balance in the account falls below the maintenance margin due to the change in the contract price, **additional fund must be deposited to bring the margin balance back-up to the initial margin requirement**.

It is 75% of Initial margin.

**3. Variation Margin**

It is the amount which the trader has to bring when the margin reduced below the maintenance margin so as to balance margin arrived at equal to initial margin.

**Note:**

Any amount, over & above initial margin amount can be withdrawn.

## - Valuation of future

Future is priced as pre cost of carry model which is based to preventive of arbitrage principle.

As per this model

Theoretical $F = S + NCC$

Where

S= spot price

**NCC = Interest saved + storage cost saved - convenience yield forgone – monetary benefit forgone.**

Future value type

**F = S + Interest cost saved + Storage cost saved – Future value of economic benefit forgone – Future value of conveyance yield forgone.**

Present value type

**PV of F = S + PV of storage cost – PV of monetary benefit forgone – PV of Conveyance yield forgone**

**If this is not holding good there will be clear arbitrage opportunity. Arbitrage profit would be amount of mispricing.**

**In case of Normal Compounding**

Fair Future Price = [Spot Price + PV of S.C ] ( 1+r) n

**In case of Continuous Compounding**

Fair Future Price = [Spot Price + PV of S.C ] × $e^{rt}$

Where PV of S.C = Present Value of Storage Cost

**Note: Fair Future Price when Storage Cost is given in percentage(%).**

**FFP = Spot Price × $e^{(r+s)\times t}$**

Where S = Storage cost expressed in percentage.

**In case of Continuous Compounding**

Fair Future Price = Spot Price × $e^{(r-c)\times t}$

## - STOCK FUTURE ARBITRAGE

If cost of carry model does not hold good cash future arbitrage is possible. That is if actual future price is not equal to theoretical future price then arbitrage opportunity, depending on the theoretical F and actual F it can be of two types

| Cash & carry arbitrage | Reverse cash and carry arbitrage |
|---|---|
| If actual F > Theoretical F<br>Since F is overpriced so sale F | If actual F < Theoretical F<br>Since F is under-priced so buy it. |
| F-, S+ , & borrow<br>Selling Future (F-), Buying Stock (S+), by borrowing | F+, S-, & Invest<br>Buy future (F+), Sell Stock (S-), and invest |
| It will result in interest expenses and dividend income. | It will result in interest on investment and dividend income forgone. |
| Take lot size 100 is not given however nifty future lot size is 50.<br>Ultimately amount of arbitrage profit would be amount of mispricing. | |

| Case | Value | Future Market | Cash Market | Borrow/ Invest |
|---|---|---|---|---|
| TFP < AFP | Over-Valued | Sell or Short Position | Buy | Borrow |
| TFP > AFP | Under-Valued | Buy or Long Position | Sell | Investment |

## - STOCK INDEX FUTURE
## BETA MANAGEMENT USING STOCK INDEX FUTURE

- -- Hedging is the process of taking an opposite position in order to reduce loss caused by Price fluctuation. The objective of Hedging is to reduce Loss. Complete Hedging means profit/ Loss will be Zero.

Number of Future contract (N) = $\frac{Vp\ (\beta\ targe \quad \beta\ of\ portfolio)}{Future\ price * Lot\ size * Beta\ of\ heding\ tool}$
(to be bought or sold to attain target beta)

Beta of hedging tool assume 1 if it is not specifically given.

If target beta not give
Number of Future contract (N) = $\frac{Vp * \beta\ of\ portfolio}{Future\ price * Lot\ size * Beta\ of\ heding\ tool}$

| Beta management using stock trading | | |
|---|---|---|
| Market | β | Action |
| Boolish / Boom | Increase β | Sell the stock future with low beta or<br>Buy the stock future with high beta |
| Bearish / Down | Decrease β | Sell the stock future with high beta or<br>Buy the stock future with low beta |

Addition investment requirement to reach at specified beta
Let addition investment be x then

$$\frac{value\ of\ the\ portfolio * Beta\ of\ the\ portfolio}{value\ of\ the\ portfolio * x} = Specified\ target\ beta$$

## - HEDGING THROUGH CURRENCY FUTURE

| Exposure | Actually | To hedge | |
|---|---|---|---|
| F C Receivable | Afraid of FC falling | Sell FC/ Buy HC | Ultimately find out the HC inflow on maturity |
| F C Payable | Afraid of FC rising | Buy FC / Sell HC | Ultimately find out the HC outflow on maturity |
| Step 1- Buy / Sale future<br>Step 2- Calculate Number of contract = Exposure / Lot size<br>Step 3 – Calculate pay off from future on squaring off. | | | |

If future is of foreign currencies then pay off in home currencies
If future in of home currencies then pay off will be in foreign currencies.
Step 4 – Sale / buy future spot along with pay off.
Step 5 – Consider interest cost on blocked margin.
Step 6 – Net pay off would be Step 4 + Step 3 – Step 5

## - *Hedge Ratio*

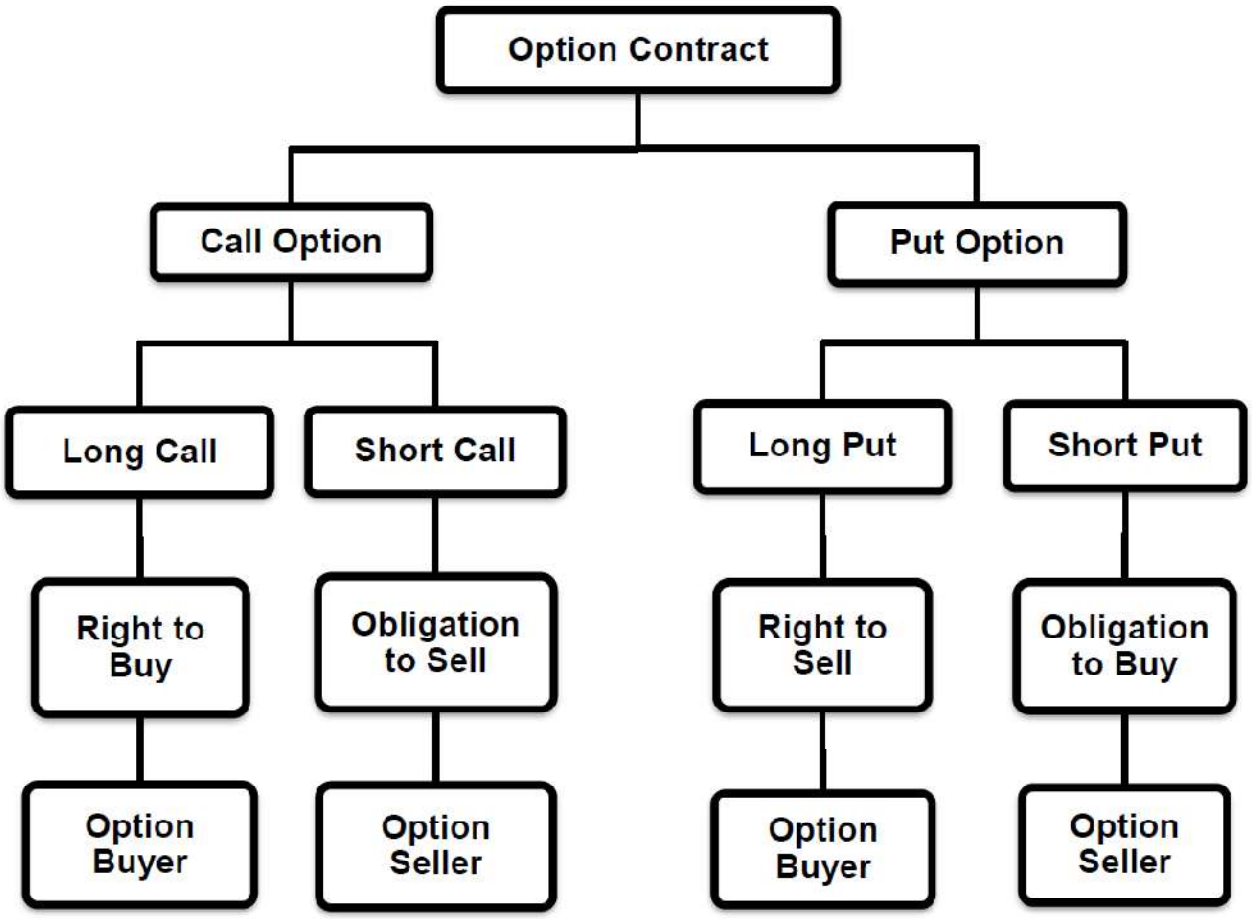
The Optional Hedge Ratio to minimize the variance of Hedger's position is given by:-
Hedge Ratio = Corr. (r) $\frac{\sigma S}{\sigma F}$
σS = S.D of Δ S
σF = S.D of Δ F
r = Correlation between Δ S and Δ F
Δ S = Change in Spot Price
Δ F = Change in Future Price

❖ Options

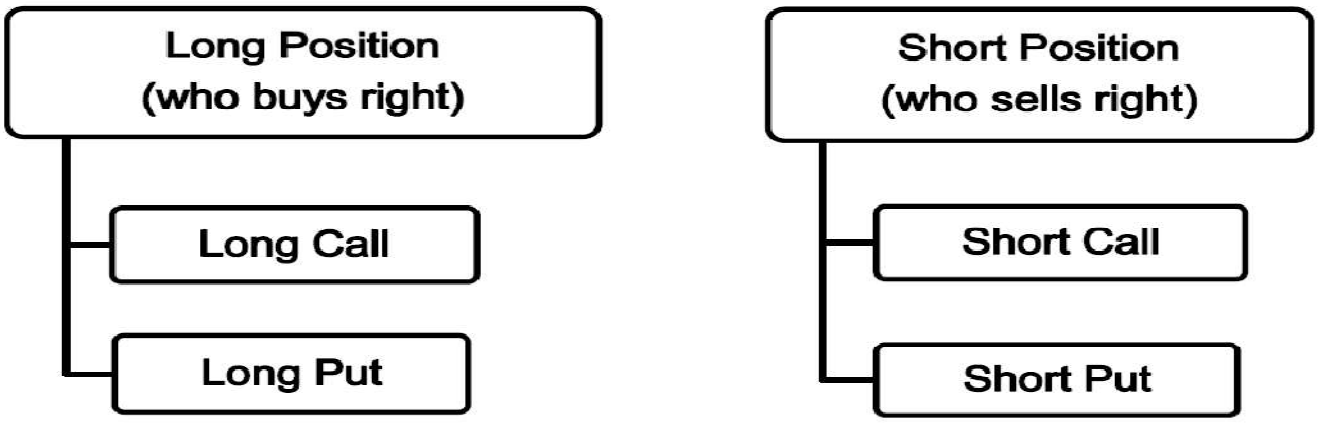
## - Introduction

**Option Contract:**

An option contract give its owner ***the right, but not the legal obligation***, to conduct a transaction involving an underlying asset at a pre-determined future date ( the exercise date) and at a pre-determined price (the exercise price or strike price).




Meaning of long position and short position




--- There are four possible options position

1. **Long call**: The buyer of a call option -- has the ***right to buy*** an underlying asset.
2. **Short call**: The writer (seller) of a call option --has the ***obligation to sell*** the underlying asset.
3. **Long put**: The buyer of a put option -- has the ***right to sell*** the underlying asset.



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**4. Short put**: The writer (seller) of a put option -- has the ***obligation to buy*** the underlying asset.
**Note:**

If question is silent always assume Long Position.

## - Exercise Price/ Strike Price:

The fixed price at which buyer of the option can exercise his option to buy/ sell an underlying asset. It always remains constant throughout the life of contract period.

## - Option Premium:

- To acquire these rights, owner of options must buy them by paying a price called the Option premium to the seller of the option.
- Option Premium is paid by buyer and received by Seller.
- Option Premium is non-refundable, non-adjustable deposit.

**Note:**
- The option holder will only exercise their right to act if it is profitable to do so.
- The owner of the Option is the one who decides whether to exercise the Option or not.

### - *Call Option*

**When Call Option Contract are exercised:**

- When CMP > Strike Price  Call Buyer Exercise the Option.
- When CMP < Strike Price  Call Buyer will not Exercise the Option.

**Note:**
- Maximum loss to the call buyer will be equal to option premium paid.
- Maximum profit for the call Writer/ Seller will be only option premium received
- Maximum profit for call buyer will be unlimited.
- Maximum loss for call seller will be unlimited.
- Break-even point for the buyer and seller is the price at which profit and loss will be zero.

**Break-even Market Price = Exercise Price + Option Premium**

- The call holder will exercise the option whenever the stock's price exceeds the strike price at the expiration date.
- The sum of the profits between the Buyer and Seller of the call option is always Zero. Thus, Option trading is ZERO-SUM GAME. The long profits equal to the short losses.
- Position of a Call Seller will be just opposite of the position of Call Buyer.

- In this chapter, we first see whether the Buyer of Option opt or not & then accordingly we will calculate Profit & Loss

- ***Put Option***

**When Put Option Contract are exercised:**

- When CMP > Strike Price  Put Buyer will not Exercise the Option.

- When CMP < Strike Price  Put Buyer will Exercise the Option.

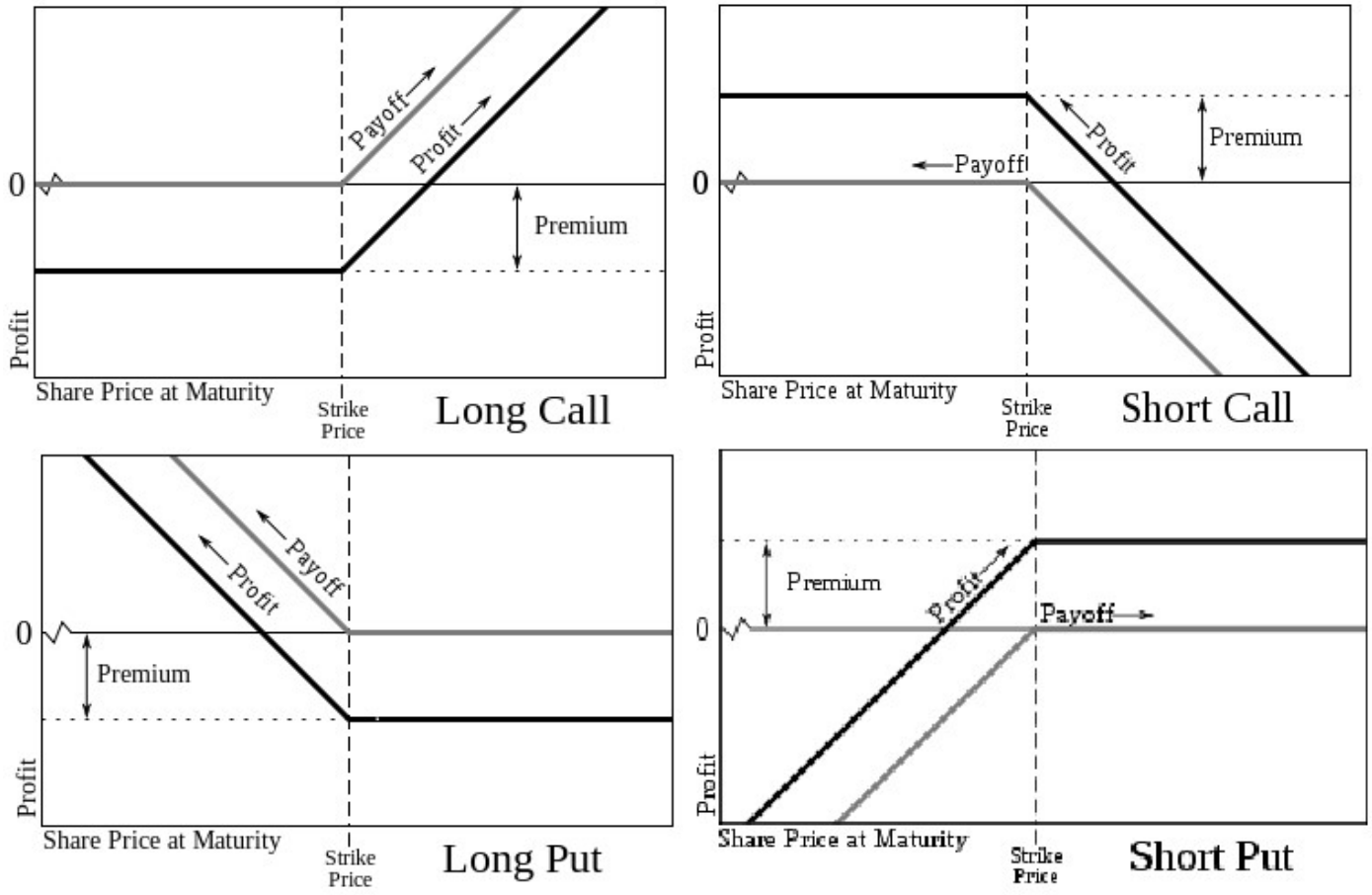
**Note:**

- If Actual Market Price falls to Zero, NP = X - S - OP i.e. X - 0 - OP

Maximum Profit = X - OP

- Put Buyer will only exercise the option when actual market price is less the exercise price.
- Profit of Put Buyer = Loss of Put Seller & vice-versa. Trading Put Option is a Zero-Sum Game.

## Pay off diagram




- *Profit or Loss/ Pay off of call Option & Put Option*

While calculating profit or loss, always consider option Premium,

| Call Buyers (Long Call) | |
|---|---|
| **If S – X > 0**<br>Exercise the option<br>Net Profit = S – X – OP | **If S – X < 0**<br>Not Exercise<br>Loss = Amount of Premium |
| **Put Buyers (Long Put)** | |
| **If X – S >0**<br>Exercise the option<br>Net Profit = X – S –OP | **If X – S < 0**<br>Not Exercise<br>Loss = Amount of Premium |

## Break-even Market Price for call & Put option

Break – even Market Price is the price at which Profit & loss is Zero.

| For Call Buyer &Call Seller | For Put Buyer &Put Seller |
|---|---|
| Net Profit = S – X – OP | Net Profit = X – S – OP |
| If NP = 0<br>**S = X + OP** | If NP = 0<br>**S = X – OP** |
| Where S = Stock Price<br>X = Exercise Price<br>OP = Option Premium | |

- ***Concept of Moneyness of an Option***

Moneyness refers to whether an option is ***In-the money or Out- of the money***.

**Case I**

- If immediate exercise of the option would generate ***a positive pay-off***, it is in the money

**Case II**

- If immediate exercise would result in loss (***negative pay-off***), it is out of the money.

**Case III**

- When current Asset Price = Exercise Price, exercise will generate ***neither profit nor loss*** and the option is at the money.

| | Call Option | | Put Option |
|---|---|---|---|
| **Case 1** | S – X > 0 | **In-the-Money** | X - S > 0 |
| **Case 2** | S – X < 0 | **Out-of- the-Money** | X - S < 0 |
| **Case 3** | S = X | **At-the-Money** | X = S |

**Note:**



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Do not consider option premium while Calculating Moneyness of the Option.

Combination strategy

| Combination strategy | | | |
|---|---|---|---|
| **Name** | **Strategy** | **Name** | **Strategy** |
| Long straddle | P+ C+ at same E | Short straddle | P- C- at same E |
| Long strip | 2P+,C+ at same E | Short strip | 2P-,C- at same E |
| Long strap | P+, 2C+ at same E | Short strap | P-, 2C- at same E |
| Long strangle | P+ at lower E<br>C+ at higher E | Short strangle | P- at lower E<br>C- at higher E |

Some other strategy

| **Name** | **Strategy** | |
|---|---|---|
| Bull Spread | + Lower E | -Higher E |
| Bear Spread | -lower E | + higher E |
| Volatile butterfly | Body Buy | Long butterfly |
| Non-volatile butterfly | Body Sell | Short butterfly |

## - *Put Call Parity Theory (PCPT)*

Put Call Parity is based on Pay-offs of two portfolio combination, a fiduciary call and a protective put.

**Fiduciary Call**

A Fiduciary Call is a combination of a pure-discount, riskless bond that pays X at maturity and a Call.

**Protective Put**

A Protective Put is a share of stock together with a put option on the stock.

Protective put = Fiduciary call

$P_0 + S_0 = C_0 + PV \text{ of } EX$

**Case I**

If LHS = RHS, no arbitrage is possible.

**Case II**

If LHS ≠ RHS, arbitrage is possible.

A. If **LHS < RHS**, Call is Over-Valued & Put is Under-Valued

| **Option Market** | | **Cash Market** | **Net Amount** |
|---|---|---|---|
| **Short Call**<br>i.e. Obligation to sell & receive Option Premium | **Long Put**<br>i.e. Right to sell & pay Option Premium | **Buy**<br>i.e. Buy one share | **Borrow** |

B. If **LHS > RHS**, Call is Under-Valued & Put is Over-Valued

| Option Market | | Cash Market | Net Amount |
|---|---|---|---|
| Long Call<br>i.e. Right to Buy & pay Option Premium | Short Put<br>i.e. Obligation to Buy & receive Option Premium | Sell<br>i.e. Sell one share | Invest |

- ***Binomial Model (Delta Hedging / Perfectly Hedged technique / Risk free portfolio approach) for Call Writer***

This model assumes that the underlying asset can have only two values at the time of maturity of an option. One will be higher than the strike price and the other will be lower than the strike price

-Under this concept, we will calculate option premium for call option.
-It is assumed that expected price on expiry may be greater than Current Market Price or less than Current Market Price.
Following are the steps
**Step 1**: Compute the Option Value on Expiry Date at high price and at low price
**Value of Call as on expiry = Max [(S – X),0]**
**Step 2**: Buy 'Delta' No. of shares 'Δ' at Current Market Price as on Today. Delta 'Δ ' also known as Hedge Ratio.

$$\textbf{Hedge Ratio or 'Δ'} = \frac{\textbf{Change in Option Premium}}{\textit{Change in the price of underlying assets}}$$

Or

$$\frac{\textit{Value of call on expiry at High Price} - \textit{Value of call on expiry at Low Price}}{\textbf{High Price} - \textbf{Low Price}}$$

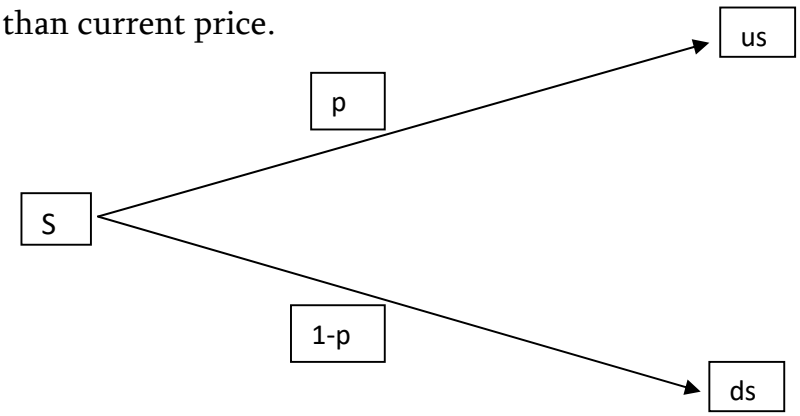
**Step 3**: Borrow the net Amount required for the above steps

$$\mathbf{B} = [\Delta \times \text{HP} - \text{value of } C\text{all}\,] / \,1+r$$

**Step 5:** Calculate Value of call as on today
**Borrowed Amount = Amount required to purchase of share – Option Premium Received**
**B = Δ × CMP – OP**
**Or**
**(Option Premium = Δ × CMP – Borrowed Amount)**

- ***Risk Neutral Approach for Call & Put Option(Binomial Model)***

-Under this approach, we will calculate Fair Option Premium of Call & Put as on Today.
-The basic assumption of this model is that share price on expiry may be higher or may be lower than current price.




u,= us/s
d,= ds/s
R= effective interest rate for sub period.

**Step 1: Calculate Value of Call or Put as on expiry at high price & low price**
Value of Call as on expiry = Max [( S – X),0]
Value of Put as on expiry = Max [(X – S), 0]

**Step 2: Calculate Probability of High Price & Low Price**

$$\text{Probability of High Price} = \frac{R-d}{u-d}$$

**Step 3: Calculate expected Value/ Premium as on expiry by using Probability**

$$\boldsymbol{C0 = \frac{p.cu + (1-p)cd}{R}} \qquad \boldsymbol{P0 = \frac{p.pu + (1-p)pd}{R}}$$

**Step 4: Calculate Premium as on Today**

**By Using normal Compounding**
= Expected Premium as on expiry / (1+r)t
**By Using Continuous Compounding**
= Premium as on expiry × $e^{-rt}$

## - *Black & Scholes Model*

The BSM Model uses five variables to value a call option:
1. The price of the Underlying Stock (S)
2. The exercise price of the option (X)
3. The time remaining to the expiration of the option (t)

4. The riskless rate of return (r)
5. The volatility of the underlying stock price (σ)

**For Call:**

Value of a Call Option/ Premium on Call = $\mathbf{S}\times \mathrm{N}(\mathbf{d1}) - \frac{\mathrm{Ex}}{e^{\mathrm{rt}}}\times \mathbf{N}(\mathbf{d2})$

Where N(d1) and N(d2) are statistical term which takes into account standard deviation, logarithm (ln) and other relevant factors (It denotes Probability).
N(d1) and N(d2) can be calculated by Using d1 and d2

**Calculation of d1 and d2**

$$\mathrm{d1} = \frac{\ln[\mathrm{S/Ex}] + [\mathrm{r} + \sigma^2/2]\times \mathrm{t}}{\sigma \times \sqrt{\mathrm{t}}}$$

where
S = Current Market Price
X = Exercise Price
r = risk-free interest rate
t = time until option expiration
σ = Standard Deviation of Continuously Compounded annual return

$$\mathrm{d2} = \mathrm{d1} - \sigma\sqrt{\mathrm{t}}$$

**Note:**
Value or Premium of Put can either be calculated by using PCPT or BSM. However if value of Call is given or calculated, then in such case PCPT is preferred.

**Example**
Q.No.35: Spot Price $1000, Exercise P = $950, r = 0.10 p.a. c.c.,S.D. = 0.50 annual, t = 3 months. Find the value of European call option.
Answer

$$\mathrm{d1} = \frac{\ln\left[\frac{1000}{950}\right] + \left[.1 + \frac{.5^2}{2}\right].25}{.5\times \sqrt{.25}}$$

$$= .4300$$

$$\mathrm{d2} = .4300 - .5 \times \sqrt{.25}$$

$$= .1800$$

d1 = .4300-------- N(d1)= .6664
d2 = .1800 -------- N(d2) = .5714

Value of ECO = 1000 x 0.6664 – 950 x e-0.10 x .25 x 0.5714 = $136.98

Special point

1. Future contract lot size rounded off to the nearest.

# CHAPTER- 6 Dividend policy

CHAPTER INDEX

- Irrelevance Theory – M M Approach
- Relevance Theory

(a) Traditional View

(b) Walter's Model

(c) Gordon Model

- Residual Theory of Dividend
- Linter Model of Dividend
- Buy Back

# _ Irrelevance Theory

## (a) Modigliani and miller (MM) Model

Miller and Modigliani have opined that the price of equity shares of a firm depends solely on its earnings power and is not influenced by the manner in which its earnings are split between dividends and retained earnings.

$$Po = \frac{D1 + P1}{1 + ke}$$

where Ke = cost of equity capital. With reference to Dividend policy, it is also referred as capitalization rate/rate of capitalization/discount rate.

$$nPo = \frac{nD1 + nP1}{1 + ke}$$

$$nPo = \frac{nD1 + nP1 + mP1 - mP1}{1 + ke}$$

$$nPo = \frac{nD1 + (n + m)P1 - (I - E + nD1)}{1 + ke}$$

$$nPo = \frac{(n + m)P1 - I + E}{1 + ke}$$

Since dividend is absent in final equation, MM conclude that dividend does not affect the market price of share. The Theory (MM theory of dividend irrelevance) is not considered to be realistic because of its unrealistic assumptions.

## New Number of share (m) to be issued to finance the investment at P1

mP1= I – (E-nD1)

or

| New Number of share (m) | |
|---|---|
| Investment | |
| Less : Retained earning<br>( Earning – dividend ) | |
| New fund requirement (A) | |
| Price 1 (B) | |
| Number of share (A/B) | |

# _ Relevance Theory

## (a) Traditional View

As per this view, share-markets place considerably more weight on dividends, than on retained earnings. Graham & Dodd observed "The stock market is overwhelmingly in favour of liberal dividends." Shareholders often prefer cash now as dividends rather than a wait for benefits in an uncertain future. Hence as per this view, value of share is positively correlated with size of dividend. The advocates of the theory opine that a bird in hand is better than two in the bushes. Higher the dividends higher the share price and lower the dividend lower



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the share price. According to this model dividend has 4 times effect on share price as compare to retained earnings

Price = $Multiplier * \left(Dividend + \frac{Earning}{3}\right)$.

P = $M * \left(D + \frac{E}{3}\right)$.

## (b) Walter's Model

Walter emphasized two factors which influence the market price on a share. The first is dividend pay-out ratio and the second is the relationship between internal return on retained earnings (r) and cost of equity capital (Ke ).

Price = $\frac{D+(E-D)\frac{r}{ke}}{ke}$

E = Earnings per share,

D = Dividend per share

P = Market price per share

r,= Return on investment, return on project.

ke = Required rate of return, cost of capital, cost of equity, equity capitalisation rate or over all capitalisation rate.

| *Category of firm* | *r v/s Ke* | *Correlation between dividend size and market price of the share* | *Optimum P/o ratio* |
|---|---|---|---|
| (i) Growth firms, | r >Ke | Negative | Nil |
| (ii) Normal or constant firms. | r = Ke | No correlation | Every P/o is optimum Optimum dividend pay-out ratio is irrelevant |
| (iii) Declining firms, and | r <Ke | Positive | 100% |

## (c) Gordon Model

According to Gordon, market price of share is equal to present value of all future dividends. His main contention is that rate of growth of dividend is a function of retained earnings and rate of return on retained earnings. (g = b.r, where g = rate of growth, b = proportion of retained earnings, r = rate of return of retained earnings.

$IV_0 = \frac{D1}{Re-g}$

Growth (g) = b x r

b,= retention ratio

r, = return on capital employed.

Or Gordon's Formula

$$P0 = \frac{E\ (1-b)}{Re-g}$$

$P_0$ = Present value of Market price per share
E = Earnings per share
K = Cost of Capital
b = Retention Ratio (%)
r = IRR
br = Growth Rate

The limitation of this model is that it can be applied only if Ke is more than br.

- **Residual Theory of Dividend**

As per this theory that part of EAT for equity shareholders which can be invested profitably, should be retained and invested in the business. The remaining part i.e. the residual amount should be used for paying the dividend.

- **Linter Model of Dividend**

Linter opined that a company should try to follow such a dividend policy which results in minimum possible fluctuations in dividend per share year after year.

Dt-Dt-1 = c(r*EPSt-Dt-1)

| |
|---|
| According to Linter: Dn = c.r.EPSn + (1-c).Dn-1 Where, |
| Dn = dividend per share for year n; |
| c = adjustment rate1; |
| r= target payout ratio;<br>EPSn = EPS of year n<br>Dn-1 = dividend per share of year n-1 |

- Buy Back

On Buy back share is bought back from shareholder due to which number of share decrease and EPS increase.

## Leverage buy back

$$\text{New EPS} = \frac{PAT - Post\ tax\ cost\ of\ debt}{Total\ number\ of\ share - Buy\ backed\ No.of\ share}$$

## BUY BACK PRICE

Total market capitalisation = equated revised number of share x New share price

$$\text{Total Market capitalisation} = \left(Total\ number\ of\ share - \frac{Amount\ to\ be\ bough\ \ back}{P1}\right) P1$$

P1 is the new share price

# CHAPTER - 7 Mutual funds

Chapter Index

- NAV
- Returns
- Indifference Point
- Performance appraisal of fund manager
- Plan under Mutual fund.

## ❖ NAV

A MUTUAL fund is an organization (in India this organization must be in the form of a trust) that pools the savings of a number of investors called as unit holders who share a common goal. The money thus collected is invested by the professional fund managers in different types of securities depending upon the objectives of the scheme. The return/ loss on investment are shared by the unit holders in proportion to the number of units owned by them.

NAV: The net assets value of any MF scheme is the current value of its all assets net of its liabilities

| | |
|---|---|
| (1) Market value of traded listed securities<br>(2) Estimated value of<br>(i) Non-traded listed securities<br>(ii) Unlisted securities | XXXX |
| Liquid Assets / Cash balance at year end | XXXX |
| Other Receivable / Assets /Accrued dividend/interest | XXXX |
| Less: Other Payable / Liabilities /Accrued expenses | XXXX |
| NET ASSETS VALUE | XXXX |
| Number of unit | XXXX |
| Net Assets Value per unit (NAV/Number of unit) | XXXX |

## ❖ Returns

Holding Period Return= $\frac{Dividend+Capit \quad gain\ distributio \quad Change\ in\ Price}{Initial\ Price} x\ 100$

Convert HPY to Bond Equivalent yield (BEY) / Money Market Yield (MMY)

## ❖ Indifference Point

Return of investor = (Return of MF – Recurring Expenses) (1- initial expenses)
Or

$$\frac{Return\ on\ investment\ (Re)}{1 - initial\ expenses} = Return\ of\ MF - Recurring\ Expenses$$

$$Recurring\ Expenses + \frac{Return\ on\ investment\ (Re)}{1 - initial\ expenses} = Return\ of\ MF$$

$$Return\ of\ MF = \frac{Return\ on\ investment\ (Re)}{1 - initial\ expenses} + RExp$$

## ❖ Performance appraisal of fund manager

| Basis | Formula | Significance |
|---|---|---|



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| | | |
|---|---|---|
| SHARPE RATIO | $\frac{\text{Likely Return(Rp)} - \text{RF}}{SD(\sigma)}$ Excess return to SD | This ratio measures the risk premium earned per unit of total risk. (Higher, Better). This is also known as reward to variability ratio. |
| TREYNOR RATIO | $\frac{\text{Likely Return(Rp)} - \text{RF}}{Beta(\beta)}$ Excess return to beta | This ratio measures the risk premium earned per unit of systematic risk. (Higher, Better).The ratio is also known as reward to volatility ratio. |
| JENSON'S ALPHA | Likely Return (Rp) – [RF + Beta(RM-RF)] | The ratio measures the excess return earned over the expected return. If Jenson's Alpha is positive, the performance is satisfactory, otherwise it is not. |
| APPRAISAL RATIO | | |

## ❖ Plan under Mutual fund.

| Plan | Particular |
|---|---|
| Pay out Plan | |
| Dividend Re-investment plan | In Dividend Re- investment plan dividend received will be reinvested at NAV, and subsequent dividend will be received at revised number of cumulative number of unit.<br>Finally return would be calculated as the difference between value of redemption unit and initial investment. |
| Bonus plan | |
| Growth plan | $\left(\frac{(Closing\ NAV - Opening\ NAV) Opening\ number\ of\ unit}{Opening\ NAV\ or\ P\ Price}\right)$ x 100 |

Special point

1. To find annualised return from cumulative return
   IRR Method
   Outflow = $\left(\frac{inflow}{(1+r)^n}\right)$
2. Expenses ratio= $\left(\frac{Expenses\ incurred\ per\ unit}{Average\ NAV}\right)$

   Average NAV = $\left(\frac{Opening\ NAV+Closing\ NAV}{2}\right)$
3. Equity share quoted at 175%, Mean 175% of Nominal value/ Face value, not a book value. Do not apply such % on cost or market value.
4. M2 = Adjusted Rp –Rm
   Adjusted Rp = Rf + SRp x ϭm

| CHAPTER - 8 | Valuation of business and Merger & acquisition |
|---|---|

Chapter Index

- ❖ Valuation of Business

(i) Adjusted Book Value Method
(ii) Value of Shares & Debt Method
(iii) Comparison Method
(iv) Discounted Cash Flow Method

- ❖ Merger and acquisition

Financial evaluation of a merger proposal

Case-1 CASH DEAL AND SYNERGY IN VALUE

Case – 3 CASH DEAL AND SYNERGY IN EARNING

Case-2 STOCK DEAL AND SYNERGY IN VALUE

Case -4 STOCK DEAL AND SYNERGY IN EARNINGS

(i) Maximum Exchange Ratio
(ii) Minimum Exchange Ratio
(iii) basis of exchange ratio
(iv) Spin-off
(v) Financial Restructuring
(a) Merger
(b) Demerger
(c) Acquisition and Takeover
(d) Reverse Bid
(e) Buyouts
(f) Dual Listing
(g) Co-insurance Effect
(h) Takeover Defenses
(i) Due Diligence

## ❖ Valuation of Business

## ❖ Maximum amount that Acquiring can pay to target company.

| | | |
|---|---|---|
| Present value of synergy as resulting from merger (PV of Value $_{AB}$-Value $_{A}$)<br>Add: Any additional resulting synergy as a result of merger | A | xxxx |
| Add:<br>Net Realisation from sale of fixed assets other than of regular use<br>Scrap value of unused assets<br>Realisable value of stock<br>Realisable value of inventories<br>Less:<br>Liabilities to be paid | (B) | XXX<br>XXX<br>XXX<br>xxx<br>XXX<br>XXX |
| Value of business | (A+B) | Xxxx |

## ❖ Difference in valuation had been there no merger:

| | |
|---|---|
| Maximum amount that Acquiring can pay to target company | XXX |
| Less : Stand alone value of target company | XXX |
| Difference in valuation had been there no merger | XXXX |

(i) Adjusted Book Value Method
(ii) Value of Shares & Debt Method
(iii) Comparison Method
(iv) Discounted Cash Flow Method

## ❖ Merger and acquisition

## ■ Financial evaluation of a merger proposal

The financial evaluation of a merger proposal involves computing NPV of the merger for each firm

| Case-1 CASH DEAL AND SYNERGY IN VALUE | Case – 3 CASH DEAL AND SYNERGY IN EARNING |
|---|---|
| $V_{AB} = V_A + V_B$ + Synergy – cash | PAT $_{AB}$ = PAT $_A$ + PAT $_B$ + Synergy |
| NPV to A = $V_{AB} – V_A$ | Assuming P/E ratio remaining the same. |
| NPV to B = Cash – $V_B$ | |
| Maximum amount that A can pay = $V_B$ + Synergy | VAB = (P/E ratio X PAT $_{AB}$) – Cash |
| Minimum Price that B wants = $V_B$ | NPV $_A$ = $V_{AB} – V_A$<br>NPV $_B$ = Cash – $V_A$ |



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| True cost of acquisition to A = NPV to B | |
|---|---|
| **Case-2 STOCK DEAL AND SYNERGY IN VALUE**<br>$V_{AB} = V_A + V_B$ + Synergy<br><br>$PAB = \frac{V_{AB}}{NA + r.NB}$<br>NPV to any firm = (Post merger price – pre merger price) x no. of share<br>NPV to A = $(P_{AB} - P_A)N_A$<br>NPV to B = ( r. $P_{AB} - P_B$) $N_B$ | **Case -4 STOCK DEAL AND SYNERGY IN EARNINGS**<br>$PAT_{AB} = PAT_A + PAT_B$ + Synergy<br><br>$V_{AB}$ = (P/E ratio X $PAT_{AB}$)<br>$P_{AB} = \frac{V_{AB}}{NA \quad r.NB}$<br>NPV to any firm = (Post merger price – pre merger price) x no. of share<br>NPV to A = $(P_{AB} - P_A)N_A$<br>NPV to B = ( r. $P_{AB} - P_B$) $N_B$ |

Classification of Merger / Acquisition based on various factors

## - Valuation Method

(i) Maximum Exchange Ratio
r= $P^*_B / P_{AB}$

*, after synergy

(ii) Minimum Exchange Ratio
r= $P_B / P_{AB}$

## - BASIS FOR EXCHANGE RATIO –

favourable factor = Target co./ Acquiring Co.
Adverse factor = Acquiring Co./ Target Co.

| Basis | FORMOULA |
|---|---|
| EPS | $\frac{EPS\ of\ target}{EPS\ of\ Acquiring\ co.}$ |
| Market Price | $\frac{MP\ of\ target}{MP\ of\ Acquiring\ co.}$ |
| Book Value | $\frac{BV\ of\ target}{BV\ of\ Acquiring\ co.}$ |
| Intrinsic Value | $\frac{IV\ of\ target}{IV\ of\ Acquiring\ co.}$ |



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| | |
|---|---|
| NPA (Non-Performing Assets) | $\frac{NPA\ of\ Acquiring\ co.}{NPA\ of\ target}$ |

(iv) Spin-off
(v) Financial Restructuring

# Special point

1. If leveraged buyout by borrowing fund @ 15% Target Company by paying cash then how much cash should be offer to maintain same earning per share.

$$\frac{(Earning\ of\ A + Earning\ of\ B) - 15x\ X\ (1 - tax\ rate\%)}{Number\ of\ share\ of\ A} = EPS\ of\ A$$

2. Book Value per share
   $= \left(\frac{Net\ Worth\ or\ (share\ capital + Reserv\quad Surplus) or\ (Assets - Liabilities)}{Number\ of\ share}\right)$
3. Market capitalisation represents market value of share for total number of shareholder.
   Whereas free float market capitalisation represent market value of share hold by only external shareholder, that is excluding promoter shareholding.
   However in free float market capitalisation, earnings are for all the shareholders so to derive EPS, divide earnings by total number of share.

4. $P_{AB}$ is necessarily calculated in case of stock deals.
5. EPS is calculated as follows:

| | |
|---|---|
| EBDIT | XXX |
| Less : Depreciation | XXX |
| EBIT | XXX |
| Less: Interest | XXX |
| EBT | XXX |
| Less: Tax on EBT | XXX |
| PAT | XXX |
| Less: Preference dividend | XXX |
| Earnings available for equity shareholder. (A) | XXX |
| Number of share ----------(B) | XXX |
| EPS ( Earning per share)----------(A)/(B) | XXX |

6. In case of both deal cash and share deal simultaneously value of target is calculated as follows:-
   Cash + ($P_{AB}$ x Number of share allotted) – target capital
7. If we want to issue share so as to maintain same earning per share, exchange ratio would be as follows:-
   r, = $\frac{EPS\ of\ target}{EPS\ of\ Acquiring\ co.}$
8. If valuation made using DDM
   NPV to Acquiring Co. = (Ownership position x $V_{AB}$ ) - $V_A$
9. In Special type of Sum wherein we have to show the effect of merger on liabilities, keep remember in a limited liabilities firm equity cannot have a negative pay off, if assets is insufficient to pay debt then debt will not be paid in full, it can only be paid to the extent of equity, however when on combining equity is enough then debt would be paid in full.



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# CHAPTER - 9 Lease decisions

Chapter Index





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# Introduction

It is an agreement between two parties wherein owner transfer the right to use of an assets in lieu of fixed lease rent and revert back assets at the end of lease term.

# Lease evaluation from lessor point of view

| | | |
|---|---|---|
| Less | Equipment cost | (xxxx) |
| Add | P V of post-tax lease rent | Xxxx |
| Add | P V of post-tax salvage value | Xxxx |
| Add | P V of depreciation tax shield | Xxxx |
| Less | P V of post-tax other expenses | (xxxx) |
| | Net Present value of Lease | XXXX |

# Lease evaluation from lessee point of view

## - Cost approach

| Cost of Lease | | Cost of Borrow and buying | |
|---|---|---|---|
| P V of post- tax lease rent | | P V of instalment | |
| | | Less: P V of Interest tax shield | |
| | | Less: P V of Depreciation tax shield | |
| | | Less: P V of Salvage value | |
| Net Advantage of Lease | Cost of Lease - Cost of Borrow and buying | | |

## - NPV Approach

| NPV- Lease | | NPV-Borrow and buying | |
|---|---|---|---|
| P V of EBDIT (1-t) - P V of post- tax lease rent | | P V of EBDIT (1-t) | |
| | | Less: P V of instalment | |
| | | Add: P V of Interest tax shield | |
| | | Add: P V of Depreciation tax shield | |
| | | Add: P V of Salvage value | |
| Net Advantage of Lease | NPV Lease – NPV Borrow and buying | | |

# B.S.W. Method

Williamson Method(B.S.W. Method) Under this method, we find operating result and financial result. Tax is totally ignored for calculating financial result.

| NET ADVANTAGE OF LEASING (NAL) | | |
|---|---|---|
| NAL | | Financial Advantage of Leasing (FAL) + Operating Advantage of Leasing (OAL) |
| FAL | Pre taxed | Equipment cost saved – P V of Lease Rent |
| OAL | Kc | P V of tax shield on LR – P V of (ITS + DTS + SV) Forgone |



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Three Methods of Lease V/S Purchase Evaluation

## Calculation of Lease Rent – 4 Situations

| |
|---|
| I. Calculation of lease rent which matches with purchase/loan option : Assume lease rental to be x. Equate " present value of purchase/loan option" with "present value of lease option (based on lease rent x )". Find the value of x. This is referred as break-even lease rental. |
| II. Calculating equal lease rent to provide pre tax return to lessor: Lease rent = Apply IRR method ( ignore the tax of Lessor) |
| III. Calculating unequal lease rent to provide pre tax return to lessor: Apply IRR method. |
| IV. Calculating lease rent to provide post tax return to the lessor. Apply IRR method. |

Lease V/S Hire Purchase
Monthly Lease Instalments
Calculation of Cost of the Machine

## Cross – Border Lease

Cross-border leasing is a lease arrangement where lessor and lessee are based in different countries. It is a means of international financing the equipment's requiring huge funds like aircrafts, transport equipment's, marine equipment's, and telecommunication equipment's etc which have predictable revenue streams. (Such leases are also referred as Big Ticket Leases). In developing countries, the local resources may not be available for such financing. The financing is in the form of debt i.e. the lessor gets the return at fixed rate. It is a safer way of debt financing as it is easier for a lessor to repossess the leased equipment following a default by the lessee because the lessor is the owner and not mere secured lender.


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Special point

1. Discount rate

| Use- rate | Circumstances |
|---|---|
| Given discount rate | If discount rate specifically given to discount cash flow use such rate. |
| Post tax cost of capital | Use it if it is given. |
| Post tax cost of debt | Use it in case of Lease V.s Borrow &Buy decision. If question doesn't provide any discount rate. |
| Post tax cost of debt | In case of Lease decision VS Borrow & buy |
| 1ST PREF = kd (1-t)<br>2nd PREF= Kc | If question is silence. |

2. If salvage value given and question direct to depreciate full over the life of assets then full is capital gain, So, tax would be levied on full and post-tax salvage value should be considered.
3. Short cut for depreciation and depreciation tax shield.
   One apply depreciation rate on depreciable value thereafter apply on depreciation ,1-depreciation rate.
4. In case of advance lease rent, calculate lease rent and tax on lease rent separately because although lease rent is paid in advance but tax on lease rent will be levied at year end only.
   Lease rent = $X + X * PVAF(r\%,n)$
   $Tax\ on\ lease\ rent = X * PVAF(r\%,n)$
5. To calculate instalment of loan never do interest post tax, use original borrowing rate to calculate equated annual instalment.

# CHAPTER. 10 Capital budgeting

(Capital Expenditure decisions)

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(B) Discounted Cash Flow Analysis
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(b) Profitability index,
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## ❖ Introduction

Capital budgeting is a process of undertaking capital expenditure decision. CAPITAL expenditure decisions are concerned with decisions regarding investment of funds in fixed and current assets for getting returns for a number of years. Such decisions are extremely important because of following reasons:

(i) Substantial sums of money are involved.

(ii) It may be difficult to reverse the decision.

(iii) Such decisions have considerable impact on the future of a firm. Sometimes, the success or failure of the firm may depend upon a single investment decision. Method Based on Accounting Profit

## Methods Based on Cash flows

(A)Pay Back Period (PBP) Method

(B) (A) PAY BACK PERIOD (PBP) METHOD / APPROACH

- Payback period is the period within which the project will pay back its cost.
- Smaller the payback period, better the project.
- The main advantage of the method is its simplicity.
- The main disadvantage is that it does not consider post payback period profitability.
- Payback period can be calculated on the basis of simple cash flow or discounted cash flow.
- PBP method is quite suitable when rate of becoming obsolete is quite high.
- Generally it is calculated on the basis of undiscounted as follows. If there requirement of the question, we may calculate it on the basis of discounted as follows.

Example

| | I Proposal | II Proposal |
|---|---|---|
| Investment | Rs.1,00,000 | Rs.1,00,000 |
| Cash inflow | | |
| I year | 30,000 | 20,000 |
| II year | 30,000 | |
| III year | 30,000 | |
| IV year | 30,000 | 40,000 |
| 5 | | |
| V year | — | 30,000 |
| | 1,20,000 | 1,50,000 |
| Payback period | 3.33 years | 3.50 years |

If we go by PBP, we prefer the first proposal because of smaller PBP. While taking this decision, we have not considered the fact in first proposal post-pay back profit is only Rs.20,000 while it is Rs.50,000 in II proposal.

(B) Discounted Cash Flow Analysis

## Free cash flow

| Project cash flow | Total approach – FCFF | |
|---|---|---|
| Initial cash flow | Capital expenditure | xxxxx |



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<table>
<tr><td></td><td>Working Capital expenditure</td><td></td></tr>
<tr><td><u>Operating cash flow</u></td><td>
<table>
<tr><td>Selling price</td><td></td></tr>
<tr><td>Less : Variable /Operating Cost /</td><td></td></tr>
<tr><td>Contribution Per unit (A)</td><td></td></tr>
<tr><td>Quantity (B)</td><td></td></tr>
<tr><td>Contribution (A) x (B)</td><td></td></tr>
<tr><td>Less: Cash fixed cost</td><td></td></tr>
<tr><td>EBDIT</td><td></td></tr>
<tr><td>Less : Depreciation</td><td></td></tr>
<tr><td>EBIT</td><td></td></tr>
<tr><td>Less: Tax on EBIT</td><td></td></tr>
<tr><td>NOPAT</td><td></td></tr>
<tr><td>Add: Depreciation</td><td></td></tr>
<tr><td>Operating cash flow</td><td></td></tr>
</table>
Increase or decrease in working capital<br>Additional capital investment<br>Interest treatment<br>Depreciation treatment</td><td>xxxx</td></tr>
<tr><td><u>Terminal cash flow</u></td><td>Net salvage value of fixed assets<br>Recapture or working capital</td><td><u>xxxx</u></td></tr>
<tr><td></td><td></td><td><u>xxxx</u></td></tr>
</table>

1. If cash flow is being calculated only for equity then all interest should be deducted from EBIT, and Use Ke for discount.
2. In case of long term approach that is equity and long term loan, short term interest like interest on over draft should be deducted from EBIT, and for discounting use Kc.
3. If PAT is given in the sum then **operating cash flow** will be calculated as following

   **Long term point of view = PAT + Depreciation + Post tax long term loan interest.**

   **Total point of view = PAT +Depreciation + Post tax all interest.**

   Because in accounting PAT is usually arrived as

| | |
|---|---|
| EBDIT | |
| Less : Depreciation | |
| EBIT | |
| Less: Interest | |
| EBT | |
| Less: Tax on EBT | |
| PAT | |

4. Depreciation is relevant here only because of depreciation tax shield otherwise due to depreciation there is no any cash inflow or outflow it is just

| | |
|---|---|
| amortisation of initial expenditure. Following are the treatment of depreciation<br>- Deduct depreciation at pre tax stage and add back at post – tax stage.<br>- Do not deduct depreciation at pre- tax stage, just add depreciation tax shield in PAT.<br>- Ignore depreciation in calculation if tax is not applicable.<br>5. OCF = (EBDIT- Depreciation – interest on S.T.Loan)(1-Tax rate) + Depreciation | |
| **Step 2 – PV of FCFF** | Should be discounted at appropriate discount rate<br>- For explicit growth period<br>Discount factor of respective year should be used to discount.<br>- For normal growth period.<br>Value of firm = FCFF1/ kc-g<br>- For no growth period<br>Value of firm = $\frac{NOPAT}{kc}$<br>**Kc-** kc would be weighted average of effective cost of debt and equity<br>**Kc= wd x post tax kd + we x ke**<br>**Ke=** = RF + (RM-RF)*Beta |

## (a) Net present value,

**NPV** = PV of inflow – PV of outflow.

If NPV is positive the project may be taken up. If NPV is zero, project may be taken up only if non-financial benefits are there. If NPV is negative project may not be taken up.

## (b) Profitability index,

$$\text{Profitability index (PI)} = \frac{\text{Present value of inflow}}{\text{PV of outflow}}$$

If PI is more than one, the project may be taken. If PI is one project may be taken up only on the basis of non-financial considerations. If PI is less than one the project may not be taken up. It is also called benefit cost ratio or desirability Factor. In case of project of different year of life PI is best technique.

Suppose the PI of a five-year project is 1.50. It means that on an investment of rupee one, the present value of the return1 that we will get over 5 years is Rs.0.50.

## (c) Internal rate of return.

IRR is the rate of return on funds employed; it is calculated on the basis of discounted cash flow approach. It is inclusive of cost of capital. For example, cost of capital is 10%

and IRR is 15%, it means the total return on the funds employed is 15%; out of which 10% is to meet the cost of capital and the balance it is extra profit over and above cost of capital.IRR is that discounting rate at which NPV of a project is Zero. Hence,

- If NPV = 0 or PI = 1, than IRR is equal to discounting.
- If NPV is greater than zero or if PI is greater than one, IRR is greater than discounting rate.
- If NPV i s less than zero or PI i s less than one, than IRR i s less than discounting rate.

Two steps for calculation of IRR :
(A) Discount all cash flows at two such rates that one gives you positive NPV and other gives you negative NPV.
(B) Apply formula:

$$\text{IRR} = \text{Lower rate} + \frac{\text{Lower rate NPV}}{\text{Lower rate NPV} - \text{Higher rate NPV}} \times \text{Diff. in rates}$$

If the two rates referred above are not given in the question, following steps are required:

- Calculate fake payback period (undiscounted) on the basis of average cash flows.
- Locate the figure of fake payback period in annuity table against the number of years equal to life of the project. Find the rate of discount.
- Discount the cash flows at the rate found above, if NPV is positive, the other rate should be higher than this rate. If NPV is negative, the other rate should be lower than this rate.

## ❖ Capital Rationing

Capital rationing occurs whenever there is a ceiling on the amount of funds that can be invested during a specific period of time, i.e., it is a situation in which a firm has several attractive investment opportunities but does not have enough funds to invest in all of them. In other words, capital rationing involves the allocation of a fixed amount of capital among competing and economically desirable projects.

**Non-Divisible Projects and Capital Rationing**

In this case, we define all feasible combinations of the project and choose the combination that has highest NPV. Here project independency may be given.

**Divisible Projects and Capital Rationing**

In this case, we calculate net profitability index. Net profitability index is obtained by dividing the NPV with investments out of limited funds.

## ❖ Inflation

Inflation is a fall in the purchasing power of money. This is equivalent to a rise in the general (on an average basis) level of prices of goods and services in the economy. Inflation affects two aspects of capital budgeting: (i) Projected cash flows, and (ii) discounting rate.
There are two approaches regarding capital budgeting under inflationary conditions:

**(i) Real cash flows and real cost of capital:** Under this approach cash flows are taken on constant purchasing power basis, i.e., we estimate the cash flows that would be there if there is no change in price level. Similarly, cost of capital is also taken on the assumption of no change in price level. The projects are evaluated on the basis of real cash flows and real cost of capital.

**(ii) Nominal cash flows and nominal cost of capital:** Under this approach, cash flows are taken considering (incorporating) changes in price levels. Similarly cost of capital is taken as that it would be in case of estimated inflation.

Two types of problems : (a) All the cash flows as well as discounting rate is affected by a single rate of inflation (this rate is referred as general inflation rate). (This situation is unlikely to happen in practical life).

(b) Different items may be affected by differing price change rates. For example, material prices may increase by 5 per cent, wage rates by 9 per cent and overall price rise (affecting the cost of capital) may be 10 per cent.

In the first situation, either of the two approaches can be applied. In the second situation, only second approach (nominal cash flows and nominal cost of capital) can be applied.

## ❖ Capital Recovery Factor (CRF)

Capital recovery factor = 1 / Annuity i.e. 1 / Sum of PVFs

CRF is used to convert zero period CF into equivalent annual CF, i.e., if we multiply zero period CF with CRF, we get equivalent annual CF.

There are four uses of capital recovery factors:

(i) Converting zero period cash flow into equal amounts of cash flows.

(ii) Calculating equivalent annual amount of depreciation and interest. When we multiply zero period net cost of fixed asset with capital recovery factor, we get equivalent annual amount of depreciation and interest. (This amount of depreciation and interest is not considered in cash flow techniques, this amount is not allowed for
income tax purpose). This amount is considered for decision making in techniques other than cash flow techniques.

(iii) cost comparison of projects with unequal lives

(iv) cost comparison of projects with unequal lives and unequal outputs per period.

Foreign Exchange and Capital Budgeting:

## ❖ Risk and Uncertainty

Capital expenditure decisions are taken on the basis of estimates of future cash flows. Actual results may or may not correspond to the estimates. This fact incorporates risk and uncertainty in capital expenditure decisions. The term risk is used to denote the possibility of variability of actual results (as compared with estimates) if the probability of this possibility is known. The term uncertainty is used, if the probability of this possibility is not known. Both risk and uncertainty refer to an uncertain decision-making situation. There are four important methods of decision-making about capital expenditure in the uncertain situations:

(i) Probability Distribution,

(ii) Decision Tree

(iii) Risk Adjusted Discount Rate
(iv) Certainty Equivalent Approach.
(v) Sensitivity Analysis

## - Probability Distribution, (Hiller's model)

If the cash flows are independent over time, i.e., cash flow of one year is independent of cash flow of the other year, that is cash of current year doesn't changes due to changes in the cash flow of previous year. Probability distribution approach is considered for estimating the risk. Under this project there are four steps:

(i) Expected N.P.V. of project,
(ii) Variance for various periods,
(iii) Standard deviation for project as a whole

$$= \sqrt{\frac{\sigma 1^2}{(1+rf)^2} + \frac{\sigma 2^2}{(1+rf)^4} + \frac{\sigma 3^2}{(1+rf)^6} + \cdots \ldots \ldots \ldots \ldots \ldots \ldots \ldots + \frac{\sigma^n}{(1+rf)^n}}$$

Discount variance for double period and take under root.

(iv) Determining probability of positive / Negative NPV using normal distribution

$$Z = \frac{X - \text{mean}}{SD}$$

## - Probability Distribution, (HERTZ model)

Use it when cash flow of a year depends on previous that cash flow is dependent. There is one to one correlation between the cash flow of different year.

Under this project there are four steps:

(i) Expected N.P.V. of project,
(ii) Standard deviations for various periods,
(iii) Standard deviation for project as a whole

$$= \frac{\sigma 1}{(1+rf)} + \frac{\sigma 2}{(1+rf)^2} + \frac{\sigma 3}{(1+rf)^3} + \cdots \ldots \ldots \ldots \ldots \ldots \ldots \ldots + \frac{\sigma}{(1+rf)^n}$$

Discount SD for single period and do not take under root.

(iv) Determining probability of positive NPV using normal distribution

$$Z = \frac{X - \text{mean}}{SD}$$

## - Decision Tree

A decision tree is a diagram that exhibits the outcomes of an act under various events. Acts are those strategies about which we have to take decision. Acts are also referred as Actions, Courses of actions, strategies or alternatives. Events are uncertain situations,

their result (i.e. whether these will happen or not) will be known in future. Events have probabilities.

Decision tree is an excellent tool for choosing between several courses of actions. It is a map of reasoning process. The technique is particularly helpful in situations of complex multistage decision problems. It is used to identify the best strategy.

This diagram is read from left to right. In this diagram:

□→ Square precedes Acts. (Squares represent decisions we can make)

○→circle precedes events. (Circles show various uncertain outcomes)

In Capital Budgeting, this approach is used for decision making if the cash flows of a period are dependent upon cash flows of the other period. We find various possible NPV estimates by making a decision tree. (The term NPV estimate means event – based NPV i.e. NPV that would be there if a particular event takes place). We calculate mean and S.D. of these NPV estimates.

## - Risk Adjusted Discount Rate

This method of risk analysis adjusts the cost of capital upward as projects become riskier. Greater the risk, higher the adjusted discount rate, and therefore lower the project's risk-adjusted NPV. The difference between the risk-adjusted discount rate and risk-free discount rate is an index of the required risk premium. The critical problem, of course, is to decide by how much the risk-free discount rate should be increased to take care of risk. One way is that the finance manager decides it arbitrarily after giving the consideration to the probability of variation of actual results with the budgeted one.

The other way, a better one, to decide the risk premium is to apply CAPM.

Re= RF + (RM-RF)*Risk Index

Re = Required rate of return

RF = Risk free rate of return

RM = Market return

**Other method of RADR**

**RADR= Kc + Differential Risk Premium**

Once this rate is determined, the normal procedure of capital expenditure decision is followed.

## - Certainty Equivalent Approach.

Under this approach, we multiply the cash flow estimates with certainty — equivalent coefficient (CEC) before discounting them by risk-free discount rate. CEC depends upon management's attitude towards risk.

If risk-free discount rate not given then calculate as follows:

$$Rf = \frac{1+Kc}{1+Risk\ Premium}$$

## - Sensitivity Analysis

The five important determinants of NPV, besides some others, are:

(i) Selling price

(ii) sales quantity
(iii) cash cost
(iv) cost of capital, and
(v) Amount of investment.

Sensitivity analysis is a tool to measure the risk surrounding a capital expenditure project. The analysis measures how responsive/sensitive the project's NPV is to change in the variables that determine NPV.

This analysis is carried on the projects reporting positive Net Present Values. It requires the calculation of % change, in value of each determinant of the NPV that may reduce the NPV to zero. These percentages are put in ascending order. The item corresponding to minimum change is considered to be most sensitive / risky.

The concept of the sensitivity suggests that management should pay maximum attention to this item as small adverse change in this item may result in big unfavourable results. Sensitivity analysis therefore provides an indication of why a project might fail.

Two model of sensitivity analysis

**NPV Approach** = [ {(Selling Price – Variable Cost) Quantity – Fixed Cost} PVAF (r%,n)] – Initial Investment

Shock each factor one by one keeping other factor constant, in unfavourable direction and resulted NPV compare with original NPV. Determine the percentage change in NPV as a result of change in such factor for all the factor.

MOS (Margin of Safety) Approach

= [ {(Selling Price – Variable Cost) Quantity – Fixed Cost} PVAF (r%,n)] – Initial Investment

By setting NPV =0, Compute revise figure of each factor one by one, and compare with the original figure of such factor.

Accounting Rate of Return
CPM, PERT and Simulation Model

## Special decision situation

### - Mutual Exclusive Projects

Mutually exclusive projects exist where the acceptance of one project excludes the acceptance of another project. Sometimes, the task of choosing one of these projects becomes difficult for finance manager because NPV and IRR may give contradictory rankings. The conditions under which contradictory ranking can occur are: (i) Size disparity, (ii) Time disparity and (iii) Life disparity.

Compute the ANNUAL CAPITAL CHARGE for each of the plants separately

| Cost Approach | NPV approach |
|---|---|
| ACC= $\frac{PV\ of\ all\ the\ cost\ net\ of\ salvage\ value}{PVAF\ (Kc,n)}$ | Annual NPV = $\frac{Net\ Present\ Value}{PVAF\ (Kc,n)}$ |

| | |
|---|---|
| Choose the plant with the LOWER ACC | Choose the plant with the higher ACC (Annual NPV) |

IRR Complications
Terminal Value Method

## - Adjusted Present Value (APV)

It evaluates a proposal strictly from the point of view of existing equity share holders. It incorporates the financial aspect of the project while taking investment decision.

| | |
|---|---|
| **Base case NPV**<br>NPV of the project assuming that it is all equity financed discounted at Re and use Unleveraged beta to calculate Re. Re means require rate of return that cost of equity Ke. | |
| Less : Issue cost | |
| Add: PV of interest tax shield discounted at Pre-tax cost of debt / or Rf | |
| Add: PV of value of concession | |
| Adjusted Present Value (APV) | XXXXXX |

## - Economic life of a plant

The physical life of a plant refers to the number of years that a plant can be used, while economic life refers to the number of years, the plant should be used, Mathematically, economic life corresponds to the life (year) for which minimum equivalent annual cost.. Its calculation table is shown as below.

| Year | Cost | PV of All cost | Cumulative PV of all cost | Cost of Machine if replaced | Salvage Value | PV of salvage value | P V of all the cost net of salvage value | PVAF | ACC |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8= 4+5-7 | 9 | 10= 8/9 |

## - Replacement project

If life of new machine is equal to life of existing machine use incremental principle.

| | |
|---|---|
| Initial investment | Cost of new machine – post tax salvage value of old machine. |
| Operating cash flow | (Post tax EBIT from New Machine – Post tax EBIT from old Machine) + Incremental depreciation. |
| Terminal cash flow | Post tax SV of New machine – Post tax salvage value of old machine (if not replaced) |

Different point of view in capital budgeting


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# Real option

A real option is the right, but not the obligation, to undertake some business decision, after the project has been implemented; generally the option to make/ withdraw/withhold a capital investment. "Options to modify the projects are known as Real options". We will accept option it is beneficial / profitable otherwise not.

## ❖ Abandonment (NPV Method)

Step – 1

NPV without abandonment option as usual.

Step – 2

Evaluating each scenario independently, Accepting the scenario where option (put) is exercised.

Step -3 = NPV of project = Step 1 + Step 2

Follow on Investment / Expansion Option (NPV Method)

Follow on Investment / Expansion Option (Risk Neutral Method)

## ❖ Follow on Investment / Expansion Option (BS Model))

Step – 1

NPV without follow on investment option as usual.

Step – 2

Apply BSM to calculate NPV of follow on investment

Step -3 = NPV of project = Step 1 + Step 2

Investment Timing Option (NPV Method)

Step – 1

NPV without timing option as usual.

Step – 2

Evaluating each scenario independently, Accepting the scenario where option (put) is exercised.

Step -3 = NPV of project = Step 1 + Step 2

Investment Timing Option (BS Model))

| | |
|---|---|
| 11 | Miscellaneous – Factoring, money market instruments, VCC/VCF |

FACTORING
MONEY MARKET INSTRUMENTS
VENTURE CAPITAL COMPANY / VENTURE CAPITAL FUND

## ❖ FACTORING

It is an arrangement where in function of credit department is being outsourced to some external agency. It is a trade financing vehicle. Factors buy a company's trade receivables (arising on account of genuine transactions) at a discount, thereby their **immediately conversion into cash**. Factoring is an ongoing arrangement between the client and factor, where invoices raised on account of sales of goods and services are regularly assigned to the factor for financing, collection and sales ledger administration.

Most factoring is done on **non-recourse basis** (no tension of bad debts), which means that the factor assumes the risk of bad debts other type of factoring is **recourse** wherein risk of bad debt is a tension of client.

Factoring is just a complete financial package that combines working capital financing, credit risk protection, and sales ledger maintenance and debt collection services. Factors usually insist on handling all the most or sales to avoid the risk of dealing with only risky\ receivables.

Factors advance with holding some % of reserve, generally up to 80 per cent of receivables amount immediately and the balance paid on maturity after deducting factor commission and interest upfront. Factoring involves high costs(factoring commission and interest on funds advanced) but it is quite worthwhile because factors bear the risk of bad debts.

**In financial evaluation of factoring** we evaluate whether job of collection receivable should be carry on itself it should be outsourced to factor, the decision is being taken after cost benefit analysis.

| **Financial evaluation of factoring** | |
|---|---|
| **Saving from factoring** | |
| - Administration cost | |
| - Bad Debt (non-recourse basis) | |
| - Cost of fund | |
| - Saving on discount expenses | |
| - Increase in contribution ( if sales goes up due to factoring.) | |
| A | XXXXX |
| | |
| **Cost due to factoring** | |
| - Factor commission | |
| - Interest change by factor on Advance for receivable given by factor | |
| - Cost of fund on portion of receivable not advanced by factor. | |
| - Cost of delayed fund advanced by factor. | |
| - Bad debt (if recourse basis) | |
| B | XXXXX |
| (A-B) Profit /(loss) due to factoring | |

If saving is in excess of cost charge by factor then we will accept factoring otherwise not.

Special point

1. Inventory day = $\frac{\text{average inventory}}{\text{COGS}} * 365$



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2. Debtor day = $\frac{\text{Average debtor}}{\text{Credit sales}} * 365$, debtors days applied on credit sales result debtor.
3. Interest cost on credit sales outstanding during the year.
4. If question silence bad debt on average debtor because such average debtor held for the whole period without doing proportionate for number of debtor days.
5. Withholding certain % of reserve means advance after deducting such reserve, commission and interest.
6.

MONEY MARKET INSTRUMENTS
VENTURE CAPITAL COMPANY / VENTURE CAPITAL FUND