# Time Value of Money

## Simple Interest

**Formula:** $SI = P(i)(n)$

SI= Simple Interest
P= Principal amount
I= Interest rate per time period (in decimals)
n= number of time periods

## Present Value

**Formula:** $PV = FV \times \frac{1}{(1+i)^n} = FV \times PVF$

Where,
FV= Future Value, PV= Present Value
i= interest rate per annum
n= time, PVF= present value factor

## Compound Interest

**Formula:** $A = P\left(1+\frac{r}{n}\right)^{nt} - A$

Where,
$A$ = future value
$P$ = principal amount (initial investment)
$r$ = annual interest rate
$n$ = number of times the interest is compounded per year
$t$ = number of years

## Future Value

**Formula:** $FV = PV \times (1+i)^n = PV \times FVF$

Where,
FVF= Future Value Factor

## Effective Interest Rate

**Formula:** $E = \left(1+\frac{i}{n}\right)^{n} - 1$

Where,
E= effective annual interest rate
i= the nominal interest rate
n= number of time the interest is compounded per year

## Perpetuity

**Formula:**

$$\text{Value of perpetuity} = \frac{A}{r}$$

Where
A=Amount of periodic payment,
r= yield, discount rate, interest rate

## Annuity

**Formula:**

**VI.1** Future value of annuity

$$= \text{Annuity} \times FVAF = \text{Annuity} \times \frac{FVF - 1}{i} = \text{Annuity} \times \frac{(1+i)^n - 1}{i}$$

**VI.2 Present value of annuity**

$$= \text{Annuity} \times PVAF = \text{Annuity} \times \frac{1 - PVF}{i} = \text{Annuity} \times \frac{1 - \frac{1}{(1+i)^n}}{i}$$

Where, FVAF = Future value annuity factor, PVAF= Present value annuity factor

# Ratio Analysis

## 1. Liquidity

1. **Current Ratio** $= \frac{\text{Current Assets}}{\text{Current Liabilities}}$
(also known as Working Capital Ratio)

2. **Quick Ratio** $= \frac{\text{Quick Assets}}{\text{Quick Liabilities}}$
(also known as Acid test ratio) Quick Assets =Current Assets –Inventories–Prepaid Expenses, Quick Liabilities = Current Liabilities-Bank OD

3. **Cash Ratio** $= \frac{\text{Cash} + \text{Marketable Securities}}{\text{Current Liabilities}}$
(also known as absolute liquidity ratio)

4. **Basic Defense Interval [BDI]** $= \frac{\text{Cash} + \text{Receivables} + \text{Marketable Securities}}{\frac{\text{Operating Cash Expenses} + \text{Int.} + \text{Tax}}{365}}$

5. **Adequacy of resources** $= \frac{\text{Cash} + \text{marketable Securities} + \text{Receivables}}{\text{Monthly Expenses}}$
Determines the number of months you could operate without further funds received (burn rate)

## 2. Capital Structure Ratios

1. **Equity Ratio** $= \frac{\text{Shareholders Equity}}{\text{Total Capital Employed}}$
2. **Debt Ratio** $= \frac{\text{Total Debt}}{\text{Capital Employed}}$
3. **Debt to Equity Ratio** $= \frac{\text{Total Liabilities}}{\text{Shareholder's Equity}}$

Or Total liabilities= Long term Debt

4. **Capital Gearing Ratio** $= \frac{\text{Pref. Share Capital} + \text{Debentures} + \text{Long term debt}}{\text{Equity Share Capital} + \text{Reserves \& Surplus} - \text{Losses}}$

Capital gearing ratio is also calculated to show the proportion of fixed interest (dividend) bearing capital to funds belonging to equity shareholders.

## 3. Coverage Ratios

1. **Debt Service Coverage Ratio**
$DSCR = \frac{\text{Earnings available for debt service}}{\text{Interest} + \text{Installment}}$

2. **Interest Service Coverage Ratio**
$ISCR = \frac{\text{EAT} + \text{Interest}}{\text{Interest}}$

3. **Prefernce Dividend Coverage Ratio**
$PDCR = \frac{\text{EAT}}{\text{Prefence Dividend Liability}}$

## 4. Profitability Ratios

### Market Information

**4.1 (a) Price Earning Ratio (PE Ratio)**
$\text{PE Ratio} = \frac{\text{Market Price per share}}{\text{Earning Per Share}}$

**4.1 (b) Yield**
$\text{Yield} = \frac{\text{Dividend}}{\text{Closing Share Price}} \times 100$
Or
$\text{Yield} = \frac{\text{Dividend}}{\text{Average Share Price}} \times 100$

**4.1 (c) Book Value per share**
$\text{BV per share} = \frac{\text{Net Worth}}{\text{No. of equity shares}}$

**4.1 (d) Market Price per share**
$\text{MP per share} = \text{PE Ratio} \times \text{EPS}$
$\text{MP per Share} = \frac{\text{Op. Price} + \text{Cl. Price}}{2}$

### Point of View

**4.2(a) Return on Equity (ROE)**
$ROE = \frac{\text{PAT} - \text{Pref. Div.}}{\text{Net Worth}}$

**4.2(b) Earning Per Share [EPS]**
$EPS = \frac{\text{PAT} - \text{Pref. Div.}}{\text{Number of ordinary share outstanding}}$

**4.2(c) Dividend Per Share [DPS]**
$DPS = \frac{\text{Total Dividend}}{\text{Number of equity share}}$

### 4.3 Based on Assets/Investments

**4.3(a) Return on Capital Employed/ Return on Investment**
$ROCE = \frac{EBIT(1-t)}{\text{Capital Employed}}$

Capital Employed= Total Assets- Current Liabilities

**4.3(b) Return on Asset (ROA)**
$ROA = \frac{\text{Net Profit After Taxes}}{\text{Average Total Assets}}$

### 4.4 Based on Sales

**4.4(a) Gross Profit Ratio**
$GPR = \frac{\text{Gross profit}}{\text{Sales}} \times 100$

**4.4(b) Operating Profit Ratio**
$OPR = \frac{\text{Operating profit}}{\text{Sales}} \times 100$
Where, OP= Sales–Cost of Sales

**4.4(c) Net Profit Ratio**
$NPR = \frac{\text{Net profit}}{\text{Sales}} \times 100$

## 5. Activity Ratios

**Capital turnover ratio**
$CTR = \frac{\text{Sales}}{\text{Capital Employed}}$

**Fixed Asset turnover ratio**
$FATR = \frac{\text{Sales}}{\text{Fixed Assets}}$

**Working capital turnover ratio**
$WCTR = \frac{\text{Sales}}{\text{Working Capital}}$

**Inventory Turnover Ratio**
$ITR = \frac{\text{Cost of Goods Sold}}{\text{Avg. Inventory}}$

**Debtors Turnover Ratio**
$DTR = \frac{\text{Credit Sales}}{\text{Avg. accounts receivable}}$

**Creditors Turnover Ratio**
$CTR = \frac{\text{Credit Purchases}}{\text{Avg. accounts payables}}$

# Cash Flow Statement: Indirect Method

| | | ₹ | |
|---|---|---|---|
| **Cash Flow from Operating Activities** | | | |
| Net profit before tax and extraordinary items | | XXX | |
| Adjustments for: | | | |
| - Depreciation | | XXX | |
| - Foreign exchange | | XXX | |
| - Investments | | XXX | |
| - Gain or loss on sale of fixed assets | | (XXX) | |
| - Interest/dividend | | XXX | |
| **Operating profit before working capital changes** | | XXX | |
| Adjustments for: | | | |
| - Trade and other receivables | | XXX | |
| - Inventories | | (XXX) | |
| - Trade Payables | | XXX | |
| Cash Generation from operations | | XXX | |
| - Interest paid | | (XXX) | |
| - Direct Taxes | | (XXX) | |
| Cash before extraordinary items | | XXX | |
| Deferred revenue | | XXX | |
| Net cash flow from operating activities | (a) | | XXX |
| **Cash Flow from Investing Activities** | | | |
| Purchase of fixed assets | | (XXX) | |
| Sale of fixed assets | | XXX | |
| Purchase of Investments | | XXX | |
| Interest received | | (XXX) | |
| Dividend received | | XXX | |
| Loans to subsidiaries | | XXX | |
| Net cash flow from investing activities | (b) | | XXX |
| **Cash Flow from Financing Activities** | | | |
| Proceeds from issue of share capital | | XXX | |
| Proceeds from long term borrowings | | XXX | |
| Repayment to finance/lease liabilities | | (XXX) | |
| Dividend paid | | (XXX) | |
| Net cash flow from financing activities | (c) | | XXX |
| **Net increase/(decrease) in Cash and Cash Equivalents** | (a+b+c) | | XXX |
| Cash and Cash Equivalents at the beginning of the year | | | XXX |
| Cash and Cash Equivalents at the end of the year | | | XXX |

# Cash Flow Statement: Direct Method

| | | ₹ | |
|---|---|---|---|
| **Cash Flow from Operating Activities** | | | |
| Cash Receipts from the customers | | XXX | |
| Cash paid to suppliers and employees | | (XXX) | |
| Cash generated from operations | | XXX | |
| Income tax paid | | (XXX) | |
| Cash flow from extraordinary items | | XXX | |
| Proceeds from earthquake disaster settlement etc. | | XXX | |
| Net Cash flow from operating activities | (a) | | XXX |
| **Cash Flows from Investing Activities** | | | |
| Purchase of fixed assets | | (XXX) | |
| Proceeds from sale of equipment | | XXX | |
| Interest received | | XXX | |
| Dividend received | | XXX | |
| Net cash flow from investing activities | (b) | | XXX |
| **Cash Flows from Financing Activities** | | | |
| Proceeds from issuance of share capital | | XXX | |
| Proceeds from long term borrowings | | XXX | |
| Repayments of long term borrowings | | (XXX) | |
| Interest Paid | | (XXX) | |
| Dividend Paid | | (XXX) | |
| Net cash from Financing Activities | (c) | | XXX |
| Net increase (decrease) in Cash and Cash Equivalents | (a+b+c) | | XXX |
| Cash and Cash Equivalents at the beginning of the period | | | XXX |
| Cash and Cash Equivalents at the end of the period | | | XXX |

# Fund Flow Statement

| Particulars | Working Note | Amount | Amount |
|---|---|---|---|
| **Sources of Funds** | | | |
| Funds from Operations | 1 | XX | |
| Issue of Equity shares | | XX | |
| Issue of Debentures | | XX | |
| Loan raised from bank | | XX | |
| Sale of Fixed Assets | | XX | |
| Sale of Investments | | XX | |
| Decrease in Working Capital | | XX | XXX |
| **Application of Funds** | | | |
| Purchase of Plant and Machinery | | XX | |
| Purchase of Investments | | XX | |
| Payment or Redemption of Debentures | | XX | |
| Tax Payment | | XX | |
| Dividend Payment | | XX | |
| Increase in Working Capital | | XX | |
| Loan Repayment | | XX | XXX |

Note that the above list is not exhaustive.

**Statement of Changes in Working Capital**

| Particulars | 31.03.2013 | 31.03.2014 | Increase in WC | Decrease in WC |
|---|---|---|---|---|
| **Current Assets** | | | | |
| Stock | XXX | XXX | | |
| Debtors | XXX | XXX | | |
| Inventory | XXX | XXX | | |
| Cash and Bank | XXX | XXX | | |
| Prepaid Expenses | XXX | XXX | | |
| **Current Liabilities** | | | | |
| Creditors | XXX | XXX | | |
| Other Liabilities | XXX | XXX | | |
| **Net Working Capital** | | | | |
| **Net Increase/Decrease in WC** | | XXX | | |

**Working Note 1: Funds from Operations**

| | |
|---|---|
| Net Income | XXX |
| Additions | |
| - Depreciation of fixed assets | XX |
| - Amortization of intangible and deferred charges (i.e. amortization of goodwill, trade marks, patent rights, copyright, discount on issue of shares and debentures, on redemption of preference shares and debentures, preliminary expenses, etc.) | XX |
| - Amortization of loss on sale of investments | XX |
| - Amortization of loss on sale of fixed asset | XX |
| - Losses from other non-operating items | XX |
| - Tax provision (created out of current profit) | XX |
| - Proposed dividend | XX |
| - Transfer to reserve | XX |
| Deductions | |
| - Deferred credit (other than the portion already charged to Profit and Loss A/c) | (XX) |
| - Profit on sale of investment | (XX) |
| - Profit on sale of fixed assets | (XX) |
| - Any subsidy credited to P & L A/c. | (XX) |
| - Any written back reserve and provision. | (XX) |
| **Funds from Operations** | XXX |

**Note:** Here, Fund from Operations, is calculated after adding back tax provision and proposed dividend. Students should note that if provision for taxation and proposed dividend are excluded from current liabilities, then only these items are to be added back to find out the 'Fund from Operations'. By fund from operations if we want to mean gross fund generated before tax and dividend, then this concept is found useful. At the same time, fund from operations may also mean net fund generated after tax and dividend. For explaining the reasons for change in fund it would be better to follow the gross concept.

**Doctors Prescription ☺**

Time Value of Money and Ratio Analysis is all about formulas and basic concept. While studying these chapters don't just mug up the formulas, if you know the concept behind each it will be easy to remember all the formulas.
In case of any issues don't forget to call.

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It is advisable to read this chart thrice a week. Wednesday, Friday and Sunday will be a better choice.

# Cost of Capital

## Cost of Debt $[K_d]$

**Cost of Irredeemable Debentures**

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

Where,
$K_d$ = Cost of debt after tax
I = Annual interest payment
NP = Net proceeds of debentures
t = Tax rate

**Cost of Redeemable Debentures**

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

Where, I = Annual interest payment, NP = Net proceeds of debentures, RV = Redemption value of debentures, t = Tax rate
N = Life of debentures

## Cost of Preference Shares $[K_p]$

**Cost of Irredeemable Pref. Shares**

$$K_p = \frac{PD}{NP}$$

Where,
$K_p$ = Cost of preference shares
PD = Amount of Preference Dividend, NP = Net proceeds of of the Preference Shares issue

**Cost of Redeemable Pref. Shares**

$$K_d = \frac{PD + \frac{(RV-NP)}{N}}{\frac{RV+NP}{2}}$$

Where, PD = Amount of Pref. Dividend, NP =Net proceeds of preference issue, RV =Redemption value of preference shares, N = Life of the Preference shares.

## Cost of Equity $[K_e]$

**1. Dividend Price Approach**

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

Where,
$D_1 = [D_0(1+G)]$ i.e next expected dividend payment,
G=Constant growth rate of dividend
If there is a floatation cost [F],

$$K_e = \frac{D_1}{P_0 - F} + G$$

**2. Earning Price Approach**

$$K_e = \frac{E}{P}$$

Where,
E=Current earnings per share
P= Market price per share
If there is a growth G

$$K_e = \frac{E}{P} + G$$

**3. Realized Yield Approach**

$$Y_t = \frac{D_1 + P_{t-1}}{P_{t-1}}$$

Where, $Y_t$=yield for the year t
$D_t$ =Dividend per share at the end of year t, $P_t$ =price per share at the end of year t, $P_{t-1}$ =price per share at the end of year t-1

**4. Capital Asset Pricing Model**

$$K_e = R_f + \beta(R_m - R_f)$$

Where,
$K_e$ = Cost of equity
$R_f$ = Risk free rate of return
$R_m$ = Market return
$\beta$ = beta of the security

## Cost of Retained Earnings

**Discounted Cash Flow Method**

$$K_s = \frac{D_1}{P_0} + G$$

Where,
$D_1 = [D_0(1+G)]$ i.e next expected dividend payment,
G=Constant growth rate of dividend

**Capital Asset Pricing Model**

$$K_s = R_f + \beta(R_m - R_f)$$

Where,
$K_e$ = Cost of equity
$R_f$ = Risk free rate of return
$R_m$ = Market return
$\beta$ = beta of the security

## Weighted Average Cost of Capital

Weighted average cost of capital (WACC) is the average after tax cost of all the sources. It is calculated by multiplying the cost of each source of finance by the relevant weight and summing the products up.

Formula

$$WACC = K_e\frac{E}{E+D+P} + K_d(1-t)\frac{D}{E+D+P} + K_p\frac{P}{E+D+P}$$

Where, $K_e$ = Cost of equity, $K_d$ = Cost of debt, $K_p$ = Cost of preference shares
E= Value of equity in capital structure [Covers equity & retained earnings both], P= Value of preference shares in capital structure
D= Value of debt in capital structure

There is a choice between the book value weights and market value weights. While the book value weights may be operationally convenient, the market value basis is theoretically more consistent, sound and a better indicator of firm's capital structure.
The desirable practice is to employ market weights to compute the firm's cost of capital. This rationale rests on the fact that the cost of capital measures the cost of issuing securities – stocks as well as bonds – to finance projects, and that these securities are issued at market value, not at

## Marginal Cost of Capital

The marginal cost of capital may be defined as the **cost of raising an additional rupee of capital.** Since the capital is raised in substantial amount in practice, marginal cost is referred to as the cost incurred in raising new funds. Marginal cost of capital is derived, when the average cost of capital is calculated using the marginal weights.
The marginal weights represent the proportion of funds the firm intends to employ. Thus, the problem of choosing between the book value weights and the market value weights does not arise in the case of marginal cost of capital computation.

To calculate the marginal cost of capital, the **intended** financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. When a firm raises funds in proportional manner and the component's cost remains unchanged, there will be no difference between average cost of capital (of the total funds) and the marginal cost of capital. The component costs may remain constant upto certain level of funds raised and then start increasing with amount of funds raised.

# Capital Structure Decisions

Capital structure refers to the mix of a firm's capitalisation (i.e. mix of long term sources of funds such as debentures, preference share capital, equity share capital and retained earnings for meeting total capital requirement).

**Financial Break-even and Indifference Analysis**

Financial break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charges i.e. interest and preference dividends. It denotes the level of EBIT for which the firm's EPS equals zero.
The equivalency or indifference point can also be calculated algebraically in the following manner:

$$\frac{(EBIT - I_1)(1-T) - PD}{E_1} = \frac{(EBIT - I_2)(1-T) - PD}{E_2}$$

Where, EBIT= Indifference point, $E_1$ = Number of equity share in alternative 1, T= Tax rate,
$E_2$ = Number of equity share in alternative 2, $I_1$ = Interest charges in alternative 1,
$I_2$ = Interest charges in alternative 2, Alternative 1= All Equity finance, Alternative 2= Debt-Equity finance

## Capital Structure Theories

**(a) Net income approach:** The value of the firm on the basis of Net Income Approach can be ascertained as follows:

$$V = S + D$$

Where, V = Value of the firm, S = Market value of equity , D = Market value of debt

$$\text{Market Value of Equity} = \frac{\text{Earnings Available for Equity shareholders}}{K_e}$$

Under, NI approach, the value of the firm will be maximum at a point where weighted average cost of capital is minimum. Thus, the theory suggests total or maximum possible debt financing for minimising the cost of capital. The overall cost of capital under this approach is:

$$\text{Cost of Equity} = \frac{\text{EBIT}}{\text{Value of the firm}}$$

**(b) Net operating income approach:** NOI means earnings before interest and tax. According to this approach, capital structure decisions of the firm are irrelevant. Any change in the leverage will not lead to any change in the total value of the firm and the market price of shares, as the overall cost of capital is independent of the degree of leverage.

**(c) Modigliani-Miller approach:** The above approach (NOI approach) is definitional or conceptual and lacks behavioural significance. It does not provide operational justification for irrelevance of capital structure.
Based on the assumptions, Modigliani-Miller derived the following three propositions:

1. Total market value of a firm is equal to its expected net operating income dividend by the discount rate appropriate to its risk class decided by the market.
2. Average cost of capital is not affected by financial decision.

# Types of Leverages

## 1. Operating Leverage

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

## 2. Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$$

## 3. Combined Leverage

Operating Leverage x Financial Leverage

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$$

$$\textbf{Combined Leverage} = \frac{\textbf{Contribution}}{\textbf{EBIT} - \textbf{Interest}}$$

$$\text{Degree of Operating Leverage} = \frac{\%\text{ change in EBIT}}{\%\text{ change in sales}}$$

$$\text{Degree of Financial Leverage} = \frac{\%\text{ change in EBT}}{\%\text{ change in EBIT}}$$

$$\textbf{Degree of Combined Leverage} = \frac{\%\textbf{ change in EBT}}{\%\textbf{ change in sales}}$$

**Operating Structure**

| | |
|---|---|
| Sales | XXX |
| - Variable Cost | XX |
| **Contribution** | **XXX** |
| - Fixed Cost | XX |
| **Earnings Before Interest and Tax** | **XXX** |
| - Interest | XX |
| **Earnings Before Tax** | **XXX** |
| - Tax | XX |
| Earnings After Tax | XXX |

**Disclaimer:** The discussion in the present text is fully academic and does not tantamount to any professional service to the readers on the related subject matter. It may be taken note of that neither the MKC, nor the author, will be responsible for any damage or loss of any kind arising due to investment decisions made on the basis of the theories in the present text.
Further comments and suggestions for improving quality are welcome and will be gratefully acknowledged.

## What is Venture Capital Financing? [Topics from Types of Financing]

- ✓ The venture capital financing refers to financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas.
- ✓ In broad sense, under venture capital financing venture capitalist make investment to purchase equity or debt securities from inexperienced entrepreneurs who undertake highly risky ventures with a potential of success.
- ✓ Some of the characteristics of Venture Capital Funding are:-
  - (ii) It is basically a equity finance in new companies.
  - (iii) It can be viewed as a long term investment in growth-oriented small/medium firms.
  - (iv) Apart from providing funds, the investor also provides support in form of sales strategy, business networking and management expertise, enabling the growth of the entrepreneur.

## What is Debt Securitisation?[Topics from Types of Financing]

Debt Securitisation is the process of conversion of existing assets or future cash flows into marketable securities. In other words, securitisation deals with the conversion of assets which are not marketable into marketable ones.
The originator, entity owning the assets out of an agreement identifies a pool of homogeneous assets, which it desires to securitize.

1. Originator makes sales to customers in the normal course of business.
2. Originator transfers the assets to a different entity who has trust agreement with trustee, Guarentee agreement with guarentee and is top rated by rating agency, commonly known as special purpose vehicle (SPV)
3. SPV will convert such assets into certificates known as Pay through or Pass through certificates and sell those certificates to public.
4. Public subscribes to such certificates and pay to the SPV.
5. SPV after deducting his charges transfers the proceeds to Originator.
6. The debtors will due amount.
7. As and when SPV collects money from debtors, it will be immediately distributed to public (In case of pass through certificates) or will accumulate upto a point of time say a year and then distribute to public (In case of pay through certificates).

**Doctors Prescription ☺** Cost of Capital and Capital Structure are basically chapters where we learn to know how the funds are brought in the company and what are the risks (cost) associated with it.

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It is advisable to read this chart twice a week. Tuesday and Saturday will be a better choice.

It's simple, "Work hard when it's time to work and drink hard when it's time to celebrate, don't put average efforts, this is what everybody is doing around you and you are doing no good. You can do much better than everyone else. Put that extra effort because this is what going to change your entire life. When you are going to travel on your dream path, it's not going to be easy but yes it's going to be worth it.

# Capital Budgeting Techniques

## Discounted Techniques

### 1. Net Present Value

*Here, Cash inflows and outflows are discounted to the present value and then compared with each other. The difference between these two is called as NPV.*

$$\text{NPV} = \text{Present value of Cash Inflow} - \text{Present Value of Cash Outflow}$$

*If the NPV is positive, that means we are earning more than the expected return on the project under consideration and hence the project should be accepted.*
*If the NPV is negative, that means we are earning less than what is expected from the project under consideration and hence the project should not be accepted.*

Draft Format

| Year (n) | Cash inflow/(outflow) | Discount rate ( r ) | Present Value |
|---|---|---|---|
| 0 | -ve | 1 | XX |
| 1 | +ve | $1/(1+r)^1$ | XX |
| 2 | +ve | $1/(1+r)^2$ | XX |
| 3 | +ve | $1/(1+r)^3$ | XX |
| **NPV** | | | **XXXX** |

### 3. Internal Rate of Return

<u>Internal rate of return</u> for an investment proposal is the discount rate that equates the present value of the expected net cash flows with the initial cash outflow. IRR is the discount rate that sets **NPV to zero.**

**Calculating IRR**

Scenario 1: Investment with same cash inflows each year
Step 1: Calculate present value annuity factor using following formula:

$$\text{Annual cash inflow} \times \text{PVAF} = \text{Present value of cash outflow}$$

Step 2: Find out discount rate (IRR) for the present value annuity factor calculated above in the annuity table. Or else Interpolation formula can also be used.

Scenario 2: Investment with different cash inflows over its life,
When the cash flows are not uniform over the life of the investment, determination of the discount rate involves using trial and error and interpolation method between interest rates.
Step 1: Trial and error method: Consider two discount rates:
A: One, at which the net present value is more than Zero
B: Other, at which the net present value is less than initial Zero
Step 2: Interpolation formula: Calculate IRR using the following formula

$$\text{IRR} = A + \frac{\text{NPV@A} - 0(\text{Zero})}{\text{NPV@A} - \text{NPV@B}} \times (B - A)$$

### 5. Discounted Payback Period

A discounted payback period is the same as the payback period except for the fact that it takes into account the time value of the money. Discounted payback period discounts the amount recovered, resulting in a longer payback period.
Formula:

$$\text{Discounted Payback Period} = A + \frac{B}{C}$$

Where, A= Last period with a negative discounted cumulative cash flow;
B= Value of discounted cumulative cash flow at the end of the period A;
C= Discounted cash flow during the period just after A.

Ex: An initial investment of ₹23,24,000 is expected to generate ₹600,000 per year for 6 years. Calculate the discounted payback period of the investment if the discount rate is 11%.

Step 1: Prepare a table to calculate discounted cash flow of each period by multiplying the actual cash flows by present value factor. Create a cumulative discounted cash flow column.

| Year<br>n | Cash Flow<br>CF | Present Value Factor<br>$PV₹1=1/(1+i)^n$ | Discounted Cash Flow<br>CF×PV₹1 | Cumulative Discounted Cash Flow |
|---|---|---|---|---|
| 0 | −23,24,000 | 1 | −23,24,000 | −23,24,000 |
| 1 | 6,00,000 | 0.9009 | 5,40,541 | − 17,83,459 |
| 2 | 6,00,000 | 0.8116 | 4,86,973 | − 12,96,486 |
| 3 | 6,00,000 | 0.7312 | 4,38,715 | − 8,57,771 |
| 5 | 6,00,000 | 0.5935 | 3,56,071 | − 1,06,462 |
| 6 | 6,00,000 | 0.5346 | 3,20,785 | 2,14,323 |

**Step 2: Discounted Payback Period** = 5 + |-106,462| / 320,785 ≈ 5.32

### 2. Profitability Index

**Profitability Index** is defined as a tool for measuring profitability of a proposed project by comparing the cash inflows of the project with the investment required for the same project.

$$\text{PI} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outfolws}}$$

**Important notes:**

i. The profitability index is often used to rank the company's possible investment projects. Since companies have limited resources hence the top ranked PI projects are accepted and companies make investments in these projects in order to achieve maximum profit. Profitability index is also known as Profit Investment ratio or Value Investment ratio.
ii. Rules for selection or rejection of project
- If PI > 1 , then the project should be accepted
- If PI < 1 , then the project should be rejected
- PI of 1 indicates the breakeven of the project.

**Standard Deviation and Variance of Cash Flows**

**Standard Deviation** (represented by the symbol sigma, σ) shows how much variation or dispersion exists from the average (mean), or **expected value**.

$$\sigma = \frac{(R - \bar{R})^2}{N}$$

**a. When there is a probability**

$$\sigma = \sum_{i=1}^{n} P_i(CF_i - EVCF)^2$$

Where, P = Probabilities of occurence,
CF = Cash Flows,
EVCF = Expected value of Cash Flows

**b. When there is no probability**

$$\sigma = \frac{\sum_{i=1}^{n}(CF_i - EVCF)^2}{N}$$

### 4. Modified Internal Rate of Return

As mentioned earlier, there are several limitations attached with the concept of the conventional Internal Rate of Return. The MIRR addresses some of these deficiencies e.g, it eliminates multiple IRR rates; it addresses the reinvestment rate issue and produces results which are consistent with the Net Present Value method.
Under this method , all cash flows , apart from the initial investment , are brought to the terminal value using an appropriate discount rate(usually the Cost of Capital). This results in a single stream of cash inflow in the terminal year. **The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash inflow as mentioned above. The discount rate which equates the present value of the terminal cash in flow to the zeroth year outflow is called the MIRR.**

## Non-Discounted Techniques

### 1. Payback Period

Payback period in capital budgeting refers to the period of time required for the return on an investment to "repay" the sum of the original investment. For example, a ₹1000 investment which returned ₹500 per year would have a two year payback period.
Formula:

$$\text{Payback Period} = \frac{\text{Total initial capital investment}}{\text{Annual expected after tax net cash flow}}$$

**Payback Reciprocal**
As the name indicates it is the reciprocal of payback period.
The payback reciprocal can be calculated as follows:

$$\text{Payback Reciprocal} = \frac{\text{Average Annual Cash Inflows}}{\text{Initial Investment}}$$

### 2. Accounting Rate of Return

The accounting rate of return of an investment measures the average annual net income of the project (incremental income) as a percentage of the investment.

$$\text{Accounting rate of return} = \frac{\text{Average Annual Net Income}}{\text{Average Investment}}$$

The denominator can be either **the initial investment or the average investment** over the useful life of the project.

# Working Capital Management

**Operating or Working Capital Cycle**

Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. For example, a company holds raw materials on an average for 60 days, it gets credit from the supplier for 15 days, production process needs 15 days, finished goods are held for 30 days and 30 days credit is extended to debtors. The total of all these, 120 days, i.e., 60 – 15 + 15 + 30 + 30 days is the total working capital cycle.
In the form of an equation, the operating cycle process can be expressed as follows:

**Operating Cycle = R + W + F + D – C**

$$\text{Raw Material Storage period} = \frac{\text{Average stock of raw material}}{\text{Average cost of raw material consumption per day}}$$

$$\text{Work in progress holding period} = \frac{\text{Average Work in progress inventory}}{\text{Average cost of prodcution per day}}$$

$$\text{Finished goods storage period} = \frac{\text{Average stock of finished goods inventory}}{\text{Average cost of goods sold per day}}$$

$$\text{Debtors Collection period} = \frac{\text{Average Debtors}}{\text{Average credit sales per day}}$$

$$\text{Creditors Payment period} = \frac{\text{Average Creditors}}{\text{Average credit purchases per day}}$$

## Estimate of Amount of different components of Current Assets and Current Liabilities

**Current Assets**

**Raw Material Inventory**

$$\frac{\text{Estimated production (in units) x Estimated cost of raw material per unit}}{\text{12 months or 360 days}} \text{ x Avg. raw material holding period (in months or in days)}$$

**Work in Progress Inventory**

$$\frac{\text{Estimated production (in units) x Estimated WIP cost per unit}}{\text{12 months or 360 days}} \text{ x Avg. WIP holding period (in months or in days)}$$

**Finished Goods Inventory**

$$\frac{\text{Estimated production (in units) x Cost of production (per unit) excluding depreciation}}{\text{12 months or 360 days}} \text{ x Avg. finishedgoods holding period(in months or in days)}$$

**Debtors**

$$\frac{\text{Estimated Credit Sales (in units)x Cost of Sales(per unit) excluding depreciation}}{\text{12 months or 360 days}} \text{ x Avg. debtors collection period (months/days)}$$

**Current Liabilities**

**Creditors**

$$\frac{\text{Estimated yearly production (in units )x Raw material requirements per unit}}{\text{12 months or 360 days}} \text{ xCreditor period granted by suppliers (months/days)}$$

**Direct Wages Payables**

$$\frac{\text{Estimated production (in units)x Direct Labour cost per unit}}{\text{12 months or 360 days}} \text{ x Avg. time lag in payment ofwages (months/days)}$$

**Overheads Outstanding**

$$\frac{\text{Estimated yearly production (in units)x overhead cost per unit}}{\text{12 months or 360 days}} \text{ xAvg. time lag in payment of Overheads(months/days)}$$

**Management of Payables**

**Computation of Cost of Payables**

$$\left(\frac{100}{100 - d}\right)^{\frac{365}{t}} - 1$$

Where, d = size of discount, i.e. for 6% discount. d=6, t=The reduction in the payment period in days, necessary to obtain the early discount or Days Credit Outstanding – Discount Period.

**Doctors Prescription ☺** Capital Budgeting and Working Capital Management are altogether chapters for the business people. While studying this chapter it is advised that you should think from the point of view of a businessman with long term goals and objectives.
In case of any issues don't forget to call.

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**Dr. Mac ☺**
**+91-8983-47-5152**

It is advisable to read this chart twice a week.
Monday & Thursday will be better choice.

# Types of Financing

## External Commercial Borrowing

i. ECBs refer to commercial loans (in the form of bank loans, buyer's credit, suppliers credit, securitised instruments (e.g. floating rate notes and fixed rate bonds) availed from non-resident lenders with minimum average maturity of 3 years.
ii. Borrowers can raise ECBs through internationally recognised sources like (i) international banks, (ii) international capital markets, (iii) multilateral financial institutions (iv) export credit agencies, (v) suppliers of equipment, (vi) foreign collaborators and (vii) foreign equity holders.
iii. External Commercial Borrowings can be accessed under two routes viz (i) Automatic route and (ii) Approval route.
iv. Under the Automatic route there is no need to take the RBI/Government approval whereas such approval is necessary under the Approval route.
v. Company's registered under the Companies Act and NGOs engaged in micro finance activities are eligible for the Automatic Route where as Financial Institutions and Banks dealing exclusively in infrastructure or export finance and the ones which had participated in the textile and steel sector restructuring packages as approved by the government are required to take the Approval Route.

## Euro Bonds

i. The name Eurobonds can be misleading because from the word, you'd think either Eurobonds were about the European bond markets, or about the European currency, Euros.
ii. Eurobonds are actually bonds that are denominated in a currency other than that of the country in which they are issued. They are usually issued in more than one country of issue and traded across international financial centres
iii. Corporations, including banks and multinational entities issue Eurobonds for many purposes including financing for capital and other projects.
iv. Eurobonds are not regulated by the country of the currency in which they are denominated.
Eurobonds are so-called "bearer bonds", they are not registered anywhere centrally, so whomever holds or bears the bond is considered the owner.
vi. Their "bearer" status also enables Eurobonds to be held anonymously.

## Foreign Bonds

i. These are debt instruments issued by foreign corporations or foreign governments.
ii. Such bonds are exposed to default risk, especially the corporate bonds.
iii. These bonds are denominated in the currency of the country where they are issued, however, in case these bonds are issued in a currency other than the investors home currency, they are exposed to exchange rate risks. An example of a foreign bond 'A British firm placing Dollar denominated bonds in USA'

## Medium Term Notes

i. Certain issuers need frequent financing through the Bond route including that of the Euro bond.
ii. However it may be costly and ineffective to go in for frequent issues. Instead, investors can follow the MTN programme.
iii. Medium-term note ("MTN") programs enable companies to offer debt securities on a regular and/or continuous basis.
iv. Notes range in maturity from one to 10 years. By knowing that a note is medium term, investors have an idea of what its maturity will be when they compare its price to that of other fixed-income securities.
v. All else being equal, the coupon rate on medium-term notes will be higher than those achieved on short-term notes.

## Certificate of Deposit (CD)

- ✓ A certificate of deposit is a promissory note issued by a bank. It is a time deposit that restricts holders from withdrawing funds on demand. Although it is still possible to withdraw the money, this action will often incur a penalty.
- ✓ CDs can be issued by (i) scheduled commercial banks {excluding Regional Rural Banks and Local Area Banks}; and (ii) select All-India Financial Institutions (FIs) that have been permitted by RBI to raise short-term resources within the umbrella limit (prescribed in paragraph 3.2 below) fixed by RBI.
- ✓ Minimum amount of a CD should be Rs.1 lakh, i.e., the minimum deposit that could be accepted from a single subscriber should not be less than Rs.1 lakh, and in multiples of Rs. 1 lakh thereafter.
- ✓ The maturity period of CDs issued by banks should not be less than 7 days and not more than one year, from the date of issue.
- ✓ CDs in physical form are freely transferable by endorsement and delivery.

## Floating Rate Notes

i. A debt instrument with a variable interest rate. Also known as a "floater" or "FRN,"
ii. Floaters are mainly issued by financial institutions and governments, and they typically have a two- to five-year term to maturity.
iii. Interest rates are adjusted to reflect the prevailing exchange rates.
iv. They provide cheaper money than foreign loans.
v. An FRN's interest rate can change as often or as frequently as the issuer chooses, from once a day to once a year. The "reset period" tells the investor how often the rate adjusts. The issuer may pay interest monthly, quarterly, semi-annually or annually. FRNs may be issued with or without a call option.

## Deep Discount Bonds

1. Deep Discount Bonds is a form of zero-interest bonds.
2. These bonds are sold at a discounted value and on maturity face value is paid to the investors.
3. In such bonds, there is no interest payout during lock in period.
4. IDBI was the first to issue a deep discount bond in India in January, 1992. The bond of a face value of ₹1 lakh was sold for ₹2,700 with a maturity period of 25 years. The investor could hold the bond for 25 years or seek redemption at the end of every five years with a specified maturity value as shown below.

| Holding Period (years) | 5 | 10 | 15 | 20 | 25 |
|---|---|---|---|---|---|
| Maturity Value | 5,700 | 12,000 | 25,000 | 50,000 | 1,00,000 |
| Annual rate of interest | 16.12 | 16.09 | 15.99 | 15.71 | 15.54 |

The investor can sell the bonds in stock market and realise the difference between face value (₹2,700) and market price as capital gain.
Note that Deep Discount Bond may have interest rates which can be lower than the usual rate.

## Zero Coupon Bonds

- ✓ A zero-coupon bond (also discount bond or deep discount bond) is a bond bought at a price lower than its face value, with the face value repaid at the time of maturity.
- ✓ It does not make periodic interest payments, or have so-called "coupons", hence the term zero-coupon bond. When the bond reaches maturity, its investor receives its par (or face) value.
- ✓ Some zero coupon bonds are inflation indexed, so the amount of money that will be paid to the bond holder is calculated to have a set amount of purchasing power rather than a set amount of money, but the majority of zero coupon bonds pay a set amount of money known as the face value of the bond.
- ✓ Zero coupon bonds may be long or short term investments. Long-term zero coupon maturity dates typically start at ten to fifteen years. The bonds can be held until maturity or sold on secondary bond markets. Short-term zero coupon bonds generally have maturities of less than one year and are called bills. The U.S. Treasury bill market is the most active and liquid debt market in the world.

## Double Option Bonds

- ✓ These have also been recently issued by the IDBI. The face value of each bond is ₹5,000.
- ✓ The bond carries interest at 15% per annum compounded half yearly from the date of allotment. The bond has maturity period of 10 years.
- ✓ Each bond has two parts in the form of two separate certificates, one for principal of ₹5,000 and other for interest (including redemption premium) of ₹16,500.
- ✓ Both these certificates are listed on all major stock exchanges.
- ✓ The investor has the facility of selling either one or both parts anytime he likes.

## Commercial Paper

**1. What is Commercial Paper (CP)?**
Commercial Paper (CP) is an unsecured money market instrument issued in the form of a promissory note.
**2. Who can issue CP:** Corporate, primary dealers (PDs) and the All-India Financial Institutions (FIs) are eligible to issue CP.
**3. What is the minimum and maximum period of maturity prescribed for CP?**
CP can be issued for maturities between a minimum of 7 days and a maximum of up to one year from the date of issue. However, the maturity date of the CP should not go beyond the date up to which the credit rating of the issuer is valid.
**4. In what denominations a CP that can be issued?**
CP can be issued in denominations of Rs.5 lakh or multiples thereof.
**5. Who can invest in CP?**
Individuals, banking companies, other corporate bodies (registered or incorporated in India) and unincorporated bodies, Non-Resident Indians (NRIs) and Foreign Institutional Investors (FIIs) etc. can invest in CPs.
**6. Whether CP can be held in dematerialised form?** Yes.
**7. Whether CPs are traded in the secondary market?**
Yes. CPs are actively traded in the OTC [over the counter] market. Such transactions, however, are to be reported on the reporting platform within 15 minutes of the trade for dissemination of trade information to market participation thereby ensuring market transparency.

## Lease Financing

Types of lease contract
1. Operating Lease
2. Finance Lease

**Distinguish between Financial and Operating lease**

| Basis | Financial Lease | Operating Lease |
|---|---|---|
| Lease term | Covers the economic life of the equipment | Covers significantly less than the economic life of the equipment |
| Cancellation | Financial lease cannot be cancelled during the primary lease period. | Operating lease can be cancelled by the lessee prior to its expiration. |
| Amortization | The lease rentals are more or less fully amortized during the primary lease period. | The lease rentals are not sufficient enough to amortize the cost of the asset. |
| Risk of obsolescence | The lessee is required to take the risk of obsolescence. | The lessee is protected against the risk of obsolescence. |
| Costs of maintenance, taxes, insurance etc. | Incurred by the lessee unless the contract provides otherwise. | Incurred by the lessor. |

## American Depositary Receipts

- ✓ Shares of many non-US companies trade on US stock exchanges through ADRs.
- ✓ ADRs are denominated and pay dividends in US dollars and may be traded like regular shares of stock.
- ✓ This is an excellent way for the public in US to buy shares in a non US company while realizing any dividends and capital gains in U.S. dollars.
- ✓ One ADR may represent a portion of a foreign share, one share or a bundle of shares of a foreign corporation.
- ✓ If the ADR's are "sponsored," the corporation provides financial information and other assistance to the bank and may subsidize the administration of the ADR.
- ✓ "Unsponsored" ADRs do not receive such assistance.
- ✓ Fees associated with the creating or releasing of ADRs from ordinary shares, charged by the commercial banks with correspondent banks in the international sites.

## Global Depositary Receipts

- ✓ A bank certificate issued in more than one country for shares in a foreign company.
- ✓ The shares are held by a foreign branch of an international bank.
- ✓ The shares trade as domestic shares, but are offered for sale globally through the various bank branches.
- ✓ Several international banks issue GDRs, such as JPMorgan Chase, Citigroup, Deutsche Bank, The Bank of New York Mellon.
- ✓ GDRs are often listed in the Frankfurt Stock Exchange, Luxembourg Stock Exchange and in the London Stock Exchange, where they are traded on the International Order Book (IOB).

## Indian Depositary Receipts

- ✓ An Indian Depository Receipt (IDR) is a financial instrument denominated in Indian Rupees in the form of a depository receipt created by a Domestic Depository against the underlying equity of issuing company to enable foreign companies to raise funds from the Indian securities Markets.
- ✓ The foreign company IDRs will deposit shares to an Indian depository.
- ✓ The depository would issue receipts to investors in India against these shares.
- ✓ The benefit of the underlying shares (like bonus, dividends etc.) would accrue to the depository receipt holders in India.

## Seed Capital Assistance

- ✓ The Seed capital assistance scheme is designed by IDBI for professionally or technically qualified entrepreneurs and/or persons possessing relevant experience, skills and entrepreneurial traits.
- ✓ All the projects eligible for financial assistance from IDBI, directly or indirectly through refinance are eligible under the scheme.
- ✓ The Seed Capital Assistance is interest free but carries a service charge of one per cent per annum for the first five years and at increasing rate thereafter.
- ✓ However, IDBI will have the option to charge interest at such rate as may be determined by IDBI on the loan if the financial position and profitability of the company so permits during the currency of the loan.
- ✓ The repayment schedule is fixed depending upon the repaying capacity of the unit with an initial moratorium upto five years.
- ✓ The project cost should not exceed ₹2 crores and the maximum assistance under the project will be restricted to 50 percent of the required promoter's contribution or ₹15 lacs, whichever is lower.

**What is Bridge Financing**

- ✓ Bridge finance refers to loans taken by a company normally from commercial banks for a short period because of pending disbursement of loans sanctioned by financial institutions.
- ✓ The bridge loans are repaid/ adjusted out of the term loans as and when disbursed by the concerned institutions.
- ✓ Bridge loans are normally secured by hypothecating movable assets, personal guarantees and demand promissory notes. Generally, the rate of interest on bridge finance is higher as compared with that on term loans.

## Floating Rate Bonds

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