

COST OF CAPITAL

FINANCING DECISION

- ↳ In financing decision, it is totally concentrated on how to generate finance from long term sources
- ↳ It is also considered the following points:
 - ☞ Cost of Finance
 - ☞ Time period
 - ☞ Purpose of Finance
 - ☞ Amount of Finance
 - ☞ Risk involvement

SOURCES OF FINANCE

Finance required for investing purpose may be from one or combination of the following sources:

- 1) From Debt Source
- 2) From Equity Source
 - i. Ordinary Shares
 - ii. Preference Shares
 - iii. Retained Earning

Why do we use different source of finance?

COST OF FINANCE

It is the minimum rate of return that a firm must earn on its investment for the market value of the firm to remain unchanged.

WEIGHTED AVERAGE COST OF CAPITAL

Capital is the combination of different components (sources) and the cost of each component is called specific cost. When these specific costs are combined to arrive at overall cost of capital, it is referred to as the weighted average cost of capital.

Assumptions

- ✍ Entity's financial and business risks are unaffected by the acceptance and financing of projects.
- ✍ Financial structure of the entity remains constant. It means that if the entity needs additional funds then are to be raised in accordance with the existing proportion.

Components of Cost of Capital

- ✧ Risk-free cost of particular type of financing (r)
- ✧ Business risk premium (b)
- ✧ Financial risk premium (f)

$$k = r + b + f$$

Explicit and Implicit Cost

Explicit Cost

The explicit cost of any source of capital is the discount rate that equates the PV of the cash inflows that are incremental to the taking of the financing opportunity with the PV of its incremental cash outflows.

- ✱ It is the rate that the firm pays to procure financing.
- ✱ It is concerned with the raising funds.
- ✱ It is similar to the IRR with one difference. In IRR, the cash outflows are involved in the beginning, followed by cash inflows. While in explicit cost, the inflows are occurred first then followed by cash outflows.

Implicit Cost

The cost of retained earning would be equivalent to the opportunity cost of earning by investing elsewhere by the shareholders themselves or by the company itself. Opportunity costs are technically referred as implicit cost of capital. It is the rate of return associated with the best investment opportunity for the firm and its shareholders that would be foregone. (It was accepted, if the projects presently under construction)

MEASUREMENT OF SPECIFIC COSTS

It includes

- 📁 Cost of Debt
- 📁 Cost of Preference Shares
- 📁 Cost of Equity
- 📁 Cost of Retained Earning

COST OF DEBT

Cost of debt is the after tax cost of long term funds through financing.

Data required:

- ✱ the net cash proceeds (issue price/amount of loan minus all floating costs) from specific source of debts
- ✱ the net cash outflows in terms of periodic interest payments and repayment of principal on maturity

The interest payment on debt issues qualify for tax deduction in determining net taxable income. Therefore, the effective cash outflows are less than the actual payment of interest made by the firm because of tax shield.

Tax shield is the reduction in taxable income due to expense allowed by the tax authority.

COST OF IRREDEEMABLE (PERPETUAL) DEBT

It is the rate of return which the lender expects.

$$\begin{array}{ccc} \text{Rate of Return} & = & \text{Cost of Finance} \\ (\text{investor point of view}) & = & (\text{investee point of view}) \end{array}$$

$$K_d = \frac{I}{MV_d}$$

Because of tax effect, the formula will be

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

Example: A company has 10% perpetual debt of Rs.100000. The tax rate is 35%. Determine the cost of capital (before tax as well as after tax). Assuming that debt is issued at (a) at par (b) 10% discount (c) 10% premium. Answers: (a) 10%, 6.5% (b) 11.11%, 7.22% (c) 9.09%, 5.91%

COST OF REDEEMABLE DEBT

Cost of redeemable debt is the rate at which the PV of cash flows generated from the issuance of debt equal to the PV of all future interest payment plus the PV of the principal amount which is to be paid on maturity.

PV of Cash Flows = PV of all future Interest payment + PV of Redeemable Debt

It is computed by trial and error approach & also by short-cut method.

Shortcut Method:

$$Kd = \frac{I(1-t) + (f + d + pr - pi)/Nm}{(SV + RV)/2}$$

Where

I = Annual interest payment T = tax rate
 F = flotation cost D = discount on issue of debentures
 Pr = premium on issue of debentures Pi = premium on redemptions of debentures
 RV = Redeemable value of debentures Nm = Period of debt
 SV = Sale proceed minus issuance expense

Example

A company issues 10% debentures of Rs.1000 face value (issued at 5% discount) redeemable after 10 years. Floating charges 5% and the tax rate is 35%. What would be the cost of debt? (Using both trial & error and shortcut approach)

Example

A company issued 10% debentures aggregating Rs.100000. the floating cost is 4%. The company has agreed to repay the debentures at par in 5 equal annual installments at the end of each year. The company's tax is 35%. Find the cost of debt.

Note: Shortcut approach cannot be applied when the principal is repaid in number of installments.

COST OF PREFERENCE SHARES

- ✳ It is the annual preference share dividend divided by the net proceeds from the sale of preference shares.
- ✳ They are paid out of the after-tax earning of the company therefore no tax adjustment is required while computing the cost of preference shares.
- ✳ There are two types of preference shares (1) irredeemable (2) redeemable.

COST OF IRREDEEMABLE PREFERENCE SHARES

$$K_p = \frac{D_p}{P_p}$$

(Simple)

$$K_p = \frac{D_p}{P_p - f}$$

(Including Floating charges)

$$K_p = \frac{D_p(1 + D_t)}{P_p - f}$$

(Including Dividend Tax & Floating Charges)

Example: A company issues 11% irredeemable preference shares of the face value of Rs.100 each. Floatation costs are estimated at 5% of the expected sale price. (a) what is k_p if issued at par, 10% discount, 10% premium. (b) Also compute K_p in these situation if dividend tax 13.125%

Answers: (a) 11.6%, 10.5%, 12.2% (b) 13.1%, 11.9%, 13.8%

COST OF REDEEMABLE PREFERENCE SHARES

- ☆ Cost of redeemable preference shares is that discount rate which equates the net proceeds of the sale of preference shares with the present value of the future dividends and principal repayments.

$$\text{Net Proceeds CF} = \text{PV of all future Dividend} + \text{PV of Redeemable Principal Amount}$$

- ☆ It is computed by trial and error approach.

Example: ABC Ltd has issued 11% preference shares of the face value of Rs.100 each to be redeemed after 10 years. Floatation cost is expected to be 5%. Determine the cost of preference shares (k_p)

COST OF EQUITY CAPITAL**Definition**

It is defined as the discount rate that equates the PV of all expected future cash dividends per share with the net proceeds of the sale (or the current market price) of a share.

DIVIDEND VALUATION MODEL (NO GROWTH)

According to this model, the cost of equity (k_e) is calculated on the basis of a required rate of return in terms of future dividends to be paid on the shares.

Assumption

- ☆ Company is strictly following the Going concern assumption
- ☆ Ordinary shares are irredeemable
- ☆ Annual dividends are known and would remain unchanged
- ☆ CF of dividend convert into perpetuity basis.

$$PV_{\text{of Perpetuity}} = \frac{\text{For Ever Cash Flows}}{\text{Discount Rate}}$$

$$\text{Market Price Of Shares} = \frac{\text{Annual Dividends}}{\text{Cost Of Equity}}$$

$$P_o = \frac{D}{K_e}$$

Where

- P_o = Current Market Price of a share
- D = Annual Dividend
- K_e = Cost of Equity

$$K_e = \frac{D}{P_o}$$

IF CONSIDERING GROWTH

Growth may be takes place in two manners:

- * Constant Growth
- * Irregular Growth

Constant Growth Model (Gordon Valuation Model)

According to this model, dividends will increase steadily at a constant growth rate forever. Because dividend varies due to growth rate, the formula will be:

$$K_e = \frac{D_o(1 + g)}{P_o} + g \quad D_1 = D_o(1 + g)$$

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

k_e = Dividend yield + Capital gain yield

g = ROE x b Retention Rate

b = 1 – Dividend payout ratio

Weaknesses

Irregular Growth

Considering the following data

Growth

1 – 3 years	$g = 7\%$	4 – 5 years	$g = 5\%$	6 – ∞	$g = 3\%$
$k_e = 16\%$	$D_o = \text{Rs.}5$	$P_o = ???$			

Solution

Our objective is to find the present market value of shares. As we know that MV equals to the present value of all future dividends.

Years	Description	Amount	PV Factor	PV CF
1	Dividend	5.35	0.862	4.61
2	Dividend	5.7	0.743	4.24
3	Dividend	6.12	0.6407	3.92
4	Dividend	6.43	0.553	3.56
5	Dividend	6.75	0.4762	3.21
	PV on the basis of 5 years CF			19.54
5	Dividend	53.48	0.4761	25.46
				45.00

Now to calculate the Amount of Dividend after 5 years is computed as

$$P_5 = \frac{D_5(1+g)}{Ke - g} \quad P_5 = \frac{6.75(1.03)}{0.16 - 0.03} \quad P_5 = 53.48$$

$D_6 = D_5 (1 + g)$ 6th year dividend

It is divided by the discount rate because of the perpetuity nature.

CAPITAL ASSET PRICING MODEL (CAPM)

CAPM formally describes the risk-return trade-off for securities.

The CAPM explains the behavior of security prices and provides a mechanism whereby investors could assess the impact of proposed security investment on their overall portfolio risk and return.

The basic assumptions of CAPM are:

(a) The efficiency of the security markets

It implies that

- ⇒ All investors have common expectations
- ⇒ All have same and perfect knowledge about securities
- ⇒ No restriction on investments
- ⇒ No taxes
- ⇒ No transaction costs
- ⇒ No single investor can affect price significantly

(b) Investor Preference

It implies that all investors prefer the security that provides the highest return for a given level of risk or the lower amount of risk for a given level of return.

Risks are categorized into two groups: diversifiable and non-diversifiable risks. **Diversifiable** (unsystematic) risk presents that portion of total risk which investor can minimize or eliminate through diversification. Sources of such risks include management capabilities and decisions, strikes, unique govt. regulations, level of operating and financial leverage. **Non-diversifiable** (systematic) risks present that part of risk that cannot be eliminated therefore relevant. Sources of such risks include changing in interest rate, inflation rate, and investor expectations.

According to CAPM, the non-diversifiable risk of an investment is assessed in terms of the beta coefficient. Beta is the indicator of risk related to the market rate.

$$k_e = \text{Risk free Rate} + \text{Risk Premium}$$

$$\text{Risk Premium} = \text{Market Rate} - \text{Risk free rate}$$

Beta β = Indicator of risk related to market rate
 If Beta = 1 (Means risk of the specified security is equal to the market)

Formula

$$k_e = k_{rf} + \beta (k_m - k_{rf})$$

Where

- k_e = Cost of equity
- k_{rf} = Risk free rate on security
- k_m = Market rate of return
- β = Beta coefficient

Example:

The Hypothetical Ltd. wishes to calculate its cost of equity capital. It is found that the risk free rate of return equals to 10%, the firm's beta equal to 1.5 and the return on the market portfolio equals to 12.5%.

Solution

$$\begin{aligned} K_e &= 10\% + 1.5 (12.5 - 10) \\ &= 13.75\% \end{aligned}$$

COST OF RETAINED EARNING

It is defined as the opportunity cost in terms of dividends foregone by the equity holders. The opportunity cost of retention of earnings is the rate of return that could be earned by investing the funds in another enterprise by the firm instead of what would be obtained by the shareholders on other investments.

Its cost (k_r) almost equal to the cost of equity (k_e) but due to floatation and dividend payment tax its cost would be lower than cost of equity.

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

The expected average future cost of funds over the long run found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure is called WACC.

The term cost of capital means overall composite cost of capital defined as WACC.

The computation of WACC (k_o) involves the following steps

- ☞ Assigning weights to specific costs
- ☞ Multiplying the cost of each of the sources by the appropriate weights
- ☞ Dividing the total weighted cost by the total weights

Assignment of Weights

The aspects relevant to the selection of appropriate weights are:

- (1) Historical Vs Marginal Weights
- (2) If Historical then can be –
 - i. Book value weights or
 - ii. Market value weights

HISTORICAL VS MARGINAL WEIGHTS

✶ Which system of weighting i.e. marginal or historical is preferable? The critical assumption is that the firm will raise capital in the specified proportions.

MARGINAL WEIGHTS

- § It represents the percentage share of different financing sources the firms intends to raise.
- § The use of marginal weights involves weighting the specific costs by the proportion of each type of fund to the total funds to be raised rather than the existing proportion.

Merits

- ✍ The use of marginal weights is more attuned (adjusted) to the actual process of financing projects.
- ✍ Capital expenditure a decision is concerned with the selection of new investment therefore the relevant cost which is the marginal cost should be considered.

Demerits

- ✍ This approach does not consider the long-term implications of firm current financing.
- ✍ By using this approach, firm may select the wrong project and may reject the right one.

Example

Following is the capital structure and cost of each source of finance of ABC Ltd.

Source	Cost	Amount
Debt	8%	3,00,000
Preference Capital	14%	2,00,000
Equity Capital	17%	5,00,000

The firm wishes to raise Rs.500000 for expansion of its plant. It estimates that Rs.100000 will be available as retained earning and the balance of the additional funds will be raised as follows:

Long-term Debt	Rs.300000
Preference Shares	Rs.100000

Using marginal weights, compute the WACC.

Solution**WACC (Marginal Weights)**

Sources	Amount	Proportion %	Cost %	Total Cost	WACC
Debt	300000	60	8	24000	4.8%
Preference Shares	100000	20	14	14000	2.8%
Retained Earning	100000	20	17	17000	3.4%
Total	500000	100		55000	11 %

$$\begin{aligned} \text{WACC} &= 55000/500000 \\ &= 11\% \end{aligned}$$

The fact that today's financing affects tomorrow's cost is not considered in using marginal weights.

HISTORICAL WEIGHTS

The use of the historical weights is based on the assumption that the firm's existing capital structure is optimal and therefore should be maintained in the future. This existing proportion of various sources of long term funds will be followed whenever the firm raises additional long-term funds to finance the new investment projects.

✂ Problem: Is there no constraint on raising funds from these sources?

Merit

It takes into account a long term view. The long term goal of the firm is to maximize the shareholders wealth therefore it is treated as superior to marginal weights.

Book Value & Market Value Weights**Book Value**

- ◆ It uses accounting book values to measure the proportion of each type of capital to calculate the weighted average cost of capital.
- ◆ Book value is operationally convenient because it is easily available from the published books and also firms set their capital targets in terms of book values rather than market values.

Market Value

- ◆ Market value weights use market values to measure the proportion of each type of capital to calculate the weighted average cost of capital.
- ◆ It is theoretically sound and consistent, therefore a better indicator of a firm's true capital structure.

Example:

Following is the capital structure and cost of each source of finance of ABC Ltd.

Source	Cost	BV	MV
Debt	8%	3,00,000	270000
Preference Capital	14%	2,00,000	230000
Equity Capital	17%	5,00,000	750000

Calculate the WACC using Book Value weights & Market Value weights.

Solution**WACC (BV Weights)**

Sources	Amount	Proportion %	Cost %	Total Cost	WACC %
Debt	300000	30	8	24000	2.4
Preference Shares	200000	20	14	28000	2.8
Retained Earning	500000	50	17	85000	8.5
Total	1000000	100		137000	13.7

$$\begin{aligned} \text{WACC} &= 137000/1000000 \\ &= 13.7\% \end{aligned}$$

WACC (MV Weights)

Sources	Amount	Proportion %	Cost %	Total Cost	WACC %
Debt	270000	21.6	8	21600	1.728
Preference Shares	230000	18.4	14	32200	2.576
Retained Earning	750000	60	17	127500	10.2
Total	1250000	100		181300	14.504

$$\begin{aligned} \text{WACC} &= 181300/1250000 \\ &= 14.504\% \end{aligned}$$