THE COST OF CAPITAL / WACC

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COST OF CAPITAL

The cost of capital of any investment (project, business, or company) is the rate of return the suppliers of capital would expect to receive if the capital were invested elsewhere in an investment (project, business, or company) of comparable risk.

- The cost of capital reflects expected return
- The cost of capital represents an opportunity cost

COST OF CAPITAL

- Average Rate of Return required by the investors who provide capital to the company.

Required Rate of Return / Cost of Capital

- It is a **market determined rate** & reflects compensation to investors for the **time value of money and risk** of the investment project.
- Risk free rate (compensation for time)
- Risk Premium (compensation for risk)

Project's cost of capital & Firm's cost of capital

- The **project's cost of capital** is the minimum required rate of return on funds committed to the project, which depends on the riskiness of its cash flows.
- **The firm's cost of capital** will be the overall, or average, required rate of return on the aggregate of investment projects.

COMPANY COST OF CAPITAL AND PROJECT COST OF CAPITAL

- The **company cost of capital** is the rate of return expected by the existing capital providers.
- It reflects the business risk of existing assets & the capital structure currently employed.
- The **project cost of capital** is the rate of return expected by capital providers for a new project the company proposes to undertake. It will depend on the business risk & debt capacity of the new project.

Using WACC for evaluating a New Investment

OR

Can we use Firm's Cost of Capital for discounting the cash flows of an investment project?

- Business Risk of the new investment is the same as the average business risk of existing investments.
- Capital Structure of the firm will not be affected by the new investment.

PROJECT COST OF CAPITAL

- In absence of a reliable formal procedure in calculating the cost of capital for projects, the firm's cost of capital can be adjusted upward or downward to account for risk differentials of investment projects.
- Investment project's required rate of return = Firm's cost of capital +/- risk adjustment factor.

$$\text{Adjusted WACC} = \text{WACC} \pm R$$

- For calculating Risk-adjusted cost of capital for projects, one uses CAPM.

SIGNIFICANCE OF THE COST OF CAPITAL

- **Evaluating investment decision**

✓ NPV

✓ IRR

✓ Minimum required rate of return on an investment project. Also known as cut-off or hurdle rate.

SIGNIFICANCE OF THE COST OF CAPITAL

- **Designing a firm's debt policy**

✓ Interest on debt is a tax-deductible expense

✓ Interest tax shield reduces the overall cost of capital

✓ Though debt also increases the financial risk of the firm.

✓ Design the financial policy, proportion of debt & equity in the capital structure should aim at maximising the firm value by minimising the overall cost of capital.

Specific costs of capital

- A firm obtains capital from various sources.
- The cost of capital of each source is known as component costs or specific costs of capital.

Weighted Average cost of capital

- The component costs are combined according to the weight of each component capital to obtain the average cost of capital.
- The overall cost is known as WACC.

KEY POINTS

- Only three types of capital

✓ Equity;

✓ nonconvertible, noncallable Preference;

✓ and nonconvertible, noncallable Debt are considered.

- Debt includes long-term debt as well as short-term debt.

- Non-interest bearing liabilities, such as trade creditors, are not included in the calculation of WACC.

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

$$WACC = w_E r_E + w_p r_p + w_D r_D (1 - t_c)$$

w_E = proportion of equity

r_E = cost of equity

w_p = proportion of preference

r_p = cost of preference

w_D = proportion of debt

r_D = pre-tax cost of debt

t_c = corporate tax rate

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

- If the capital structure consists of Debt & Equity, the WACC can be calculated as follows:

- $WACC = \frac{D}{V} r_D (1-t) + \frac{E}{V} r_E$

COST OF DEBT

$$P_0 = \sum_{t=1}^{n} \frac{C}{(1 + r_D)^t} + \frac{M}{(1 + r_D)^n}$$

P_0 = current price of the debenture

C = annual interest payment

n = number of years left to maturity

M = maturity value

r_D is computed through trial-and-error. A very close approximation is:

$$r_D = \frac{C + (M - P)/n}{0.4M + 0.6P}$$

M = Maturity Value *P = Price of the bond*

ILLUSTRATION

Face value = 1,000

Coupon rate = 12 percent

Period to maturity = 4 years

Current market price = Rs.1040

The approximate yield to maturity of this debenture is :

$$r_D = \frac{120 + (1000 - 1040) / 4}{0.6 \times 1040 + 0.4 \times 1000} = 10.7 \text{ percent}$$

- The above calculation shows the pre tax cost of debt.

- Since interest on debt is a tax deductible expense, the pre tax cost of debt has to be adjusted for the tax factor to arrive at post tax cost of debt.

- **Post tax cost of Debt = Pre Tax cost of debt (1-t).**

COST OF PREFERENCE

Given the fixed nature of preference dividend and principal repayment commitment and the absence of tax deductibility, the cost of preference is simply equal to its yield.

ILLUSTRATION

Face value : Rs.100

Dividend rate : 11 percent

Maturity period : 5 years

Market price : Rs.95

Approximate yield :

$$\frac{11 + (100 - 95) / 5}{0.6 \times 95 + 0.4 \times 100} = 12.37 \text{ percent}$$

COST OF EQUITY

- Equity finance comes by way of

(a) retention of earnings and (Internal Equity)

(b) issue of additional equity capital (External Equity)

- Irrespective of whether a firm raises equity finance by retaining earnings or issuing additional equity shares, the cost of equity is the same. The only difference is in flotation costs.

- Floatation costs will be discussed separately.

APPROACHES TO ESTIMATE COST OF EQUITY

- Security Market Line Approach
- Bond Yield Plus Risk Premium Approach
- Dividend Growth Model Approach
- Earnings-Price Ratio Approach

SECURITY MARKET LINE APPROACH

$$r_E = R_f + \beta_E [E(R_M) - R_f]$$

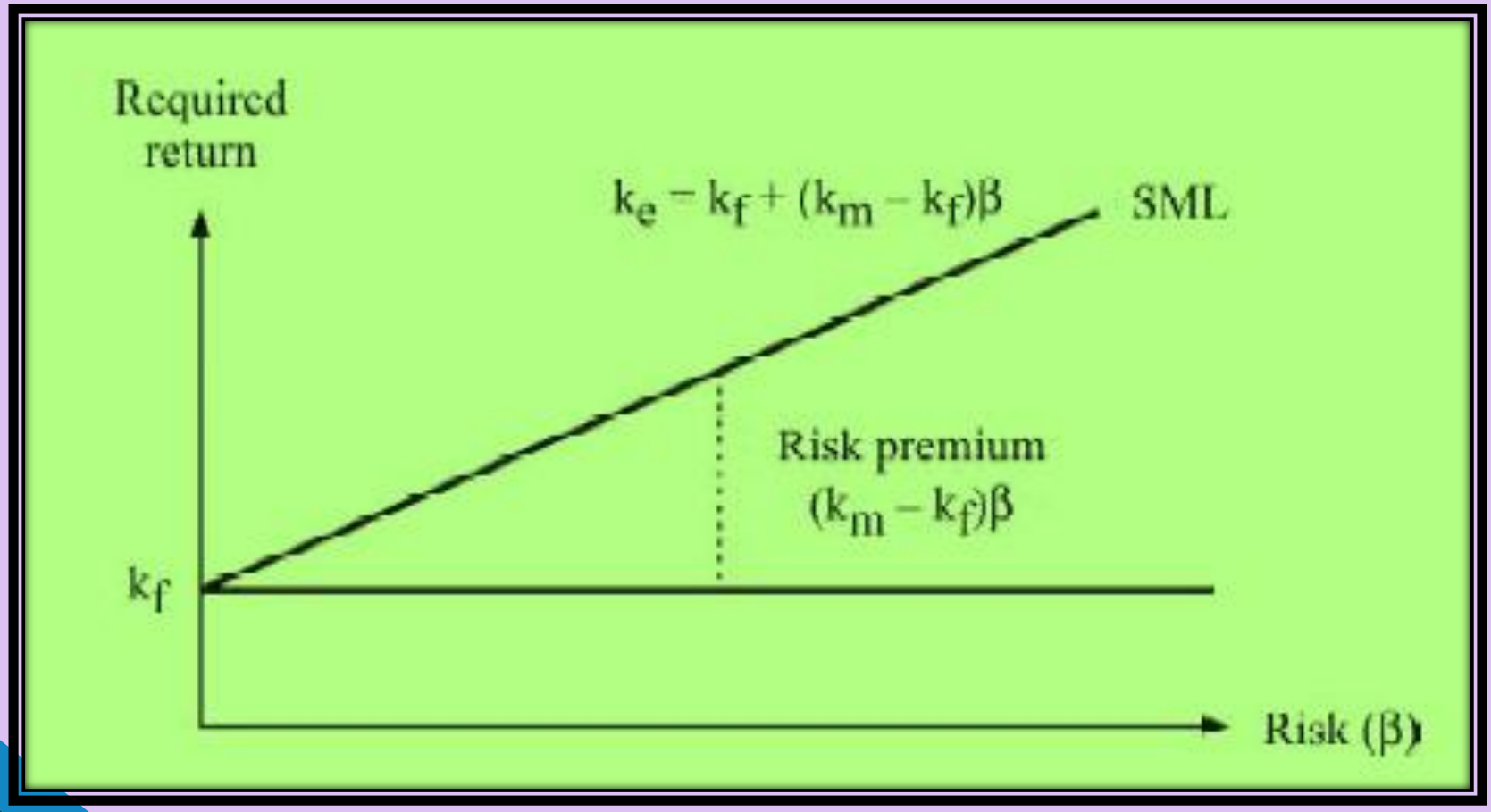
r_E = required return on the equity of the company

R_f = risk-free rate

β_E = beta of the equity of the company

$E(R_M)$ = expected return on the market portfolio

Cost of equity under CAPM



INPUTS FOR THE SML

While there is disagreement among finance practitioners, the following would serve.

- The risk-free rate may be estimated as the yield on long-term bonds that have a maturity of 10 years or more.
- The market risk premium may be estimated as the difference between the average return on the market portfolio and the average risk-free rate over the past 10 to 30 years.
- The beta of the stock may be calculated by regressing the monthly returns on the market index over the past 60 months or so.

BOND YIELD PLUS RISK PREMIUM APPROACH

Cost of equity = **Yield on the long-term bonds of the firm** + **Risk premium**

Should the risk premium be 2 percent, 4 percent, or *n* percent ?

There seems to be no objective way of determining it.

Most analysts look at the operating & financial risks of the business & arrive at a subjectively determined risk premium.

DIVIDEND GROWTH MODEL APPROACH

If the dividend per share grows at a constant rate of g percent.

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

$$\text{Ke/ } r_E = \frac{D_1}{P_0} + g$$

Thus, the expected return of equity shareholders, which in equilibrium is also the required return, is equal to the dividend yield plus the expected growth rate

Expected Growth Rate (g)

- Look at the dividend for 5 – 10 years
- Calculate Annual Growth rates
- Average them.

Year	Dividend	Rupee Change	Growth
1	3	-	-
2	3.5	0.5	16.7
3	4	0.5	14.3
4	4.25	0.25	6.3
5	4.75	0.5	11.8

If you average the growth rates, the result is 12.3% which can be used as an estimate of expected growth rate.

Expected Growth Rate (g)

- Retention growth rate method
- g = Retention rate X Return on Equity
- g = b X r

EARNINGS-PRICE RATIO APPROACH

Cost of equity $= \mathbf{E_1 / P_O}$

where E_1 = the expected EPS for the next year

P_O = the current market price

This approach provides an accurate measure in the following two cases:

- When the EPS is constant and the dividend payout ratio is 100 percent.
- When retained earnings earn a rate of return equal to the cost of equity.

DETERMINING THE PROPORTIONS OR WEIGHTS

- The appropriate weights are the target capital structure weights stated in market value terms.
- The primary reason for using the target capital structure is that the current capital structure may not reflect the capital structure expected in future.
- Market values are superior to book values because in order to justify its valuation the firm must earn competitive returns for shareholders and debtholders on the current (market) value of their investments.

WACC

Source of Capital	*Proportion (1)*	*Cost (2)*	*Weighted Cost [(1) x (2)]*
Debt	0.60	16.0%	9.60%
Preference	0.05	14.0%	0.70%
Equity	0.35	8.4%	2.94%
WACC = 13.24%			

Book Value Versus Market Value Weights

- **Market-value weights are theoretically superior to book-value weights:**
  - They reflect economic values and are not influenced by accounting policies.
  - They are also consistent with the market-determined component costs.
- **The difficulty in using market-value weights:**
  - The market prices of securities fluctuate widely and frequently.
  - A market value based target capital structure means that the amounts of debt and equity are continuously adjusted as the value of the firm changes

Flotation Costs

- Flotation costs are the costs that are incurred by a company when issuing new securities.
- The costs can be various expenses including, but not limited to brokerage expenses, underwriting costs, legal, registration, audit fees etc.
- Flotation expenses are expressed as a percentage of an issue price.

FLOTATION COSTS

- One approach to deal with floatation costs is to adjust the WACC to reflect the floatation costs:

$$\text{Revised WACC} = \frac{\text{WACC}}{1 - \text{Flotation costs}}$$

- A better approach is to leave the WACC unchanged but to consider floatation costs as part of the project cost.

DIVISIONAL AND PROJECT COST OF CAPITAL

- Generally investors are risk averse & demand a premium for bearing risk.
- The greater the risk of an investment opportunity, the greater is the risk premium required by the investors.
- Therefore, the required rate of return of a division/project, depends on its risks.
- Divisions/ Projects with differing risk should be evaluated using their risk adjusted required rate of return.

Firm's Risk

- **Operating Risk** – arises due to uncertainty of cash flows of the firm's investment.
- **Financial Risk** – arises on account of use of debt for financing investments.

DIVISIONAL AND PROJECT COST OF CAPITAL

- Firm’s cost of capital as required rate of return for all projects may work well in case of companies that have a single line of business or where different businesses are highly correlated.
- In highly diversified, multiple business firms (L&T, Hindustan Unilever, Tata) all projects cannot have the same risk.
- Hence, it is required to estimate the required rate of return for each division or project instead of using the firm’s cost of capital.

DIVISIONAL AND PROJECT COST OF CAPITAL

- For ex – the risk of introducing a new, innovative product will be higher than the expansion of an existing product.
- Hence, there is a need for calculating the required rate of return for projects within a division.

CAPM for determining Required Rate of Return for a Project/ Division

- Risk free rate & market premium for the division / project are same as for the firm.
- Estimation of Divisional/ Project betas

DIVISIONAL AND PROJECT COST OF CAPITAL

- Using WACC for evaluating investments whose risks are different from those of the overall firm leads to poor decisions. In such cases, the expected return must be compared with the risk-adjusted required return, as calculated by the security market line.

- Multidivisional firms that have divisions characterised by differing risks may calculate separate divisional costs of capital. Two approaches are commonly employed for this purpose:

    - The pure play approach
    - The subjective approach

The Pure Play approach

- A most commonly suggested method for calculating the required rate of return for a division (or project) is the **pure-play technique**.
- The basic idea is to use the beta of the comparable firms, called **pure-play firms**, in the same industry or line of business as a proxy for the beta of the division or the project.

The pure-play approach for calculating the divisional cost of capital involves the following steps:

- Identify comparable firms
- Estimate equity betas for comparable firms:
- Estimate asset betas for comparable firms:
- Calculate the division's beta:
- Calculate the division's all-equity cost of capital
- Calculate the division's equity cost of capital:
- Calculate the division's cost of capital

The subjective approach

Suppose WACC of a firm is 16%.
A firm may place its projects into one of the several risk classes & adjust the overall WACC

Category	Example	Adjustment Factor	Adjusted Discount Rate
Mandatory	Pollution control Equipment	n.a	n.a.
Low Risk	Replacement Equipment	-4%	12%
Moderate Risk	Capacity expansion	0	16%
High Risk	New product investment	+4%	20%

The Cost of Capital for Projects

- A simple practical approach to incorporate risk differences in projects is to adjust the firm's WACC (upwards or downwards), and use the *adjusted WACC* to evaluate the investment project:

$$\text{Adjusted WACC} = \text{WACC} \pm R$$

- Companies in practice may develop policy guidelines for incorporating the project risk differences. One approach is to divide projects into broad risk classes, and use different discount rates based on the decision maker's experience.

The Cost of Capital for Projects

- For example, projects may be classified as:
  - Low risk projects

  discount rate < the firm's WACC
  - Medium risk projects

  discount rate = the firm's WACC
  - High risk projects

  discount rate > the firm's WACC