The Cost of Capital

Dr. Vijay Shankar Pandey
Asst. Professor
IMS – New Campus
University of Lucknow, Lucknow

Topics to be covered

➢ Explain the concept of cost of capital and opportunity cost of capital.

➢ Concept of project cost of capital and the firm's cost of capital.

➢ Capital structure decisions — cost of capital — computation of cost of debt, preference shares, equity and retained earnings — weighted average cost of capital

➢ Concept and calculation of the marginal cost of capital.

➢ Need for calculating cost of capital for divisions.

➢ Determining the divisional beta and divisional cost of capital.

➢ Illustrate the cost of capital calculation.

Cost of capital

Cost of capital is simply what amount of money a firm is paying to its shareholders against the capital contributed by them in form of debt or equity or in the various combinations.

OR

we can also say that Cost of capital is the amount of return an investment could have garnered if that investment was executed. Loosely defined in general, cost of capital can involve debt, equity or any source of capital.

Capital structure

Capital structure is the mix of the long-term sources of funds used by a firm. It is made up of debt and equity securities and refers to permanent financing of a firm. It is composed of long-term debt, preference share capital and shareholders' funds. In simple words it refers to the particular distribution of debt and equity that makes up the finances of a company. Combination of capital is called capital structure. The firm may use only equity, or only debt, or a combination of equity +debt, or a combination of equity + debt + preference shares or may use other similar combinations.

Ideal capital structure

➢It minimizes cost of capital.
➢It reduces overall risks.
➢It give required flexibility.
➢It provide required control to the managers.
➢It enable the company to have adequate finance.
➢It maximizes the value of the firm

Project cost of capital vs. 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.
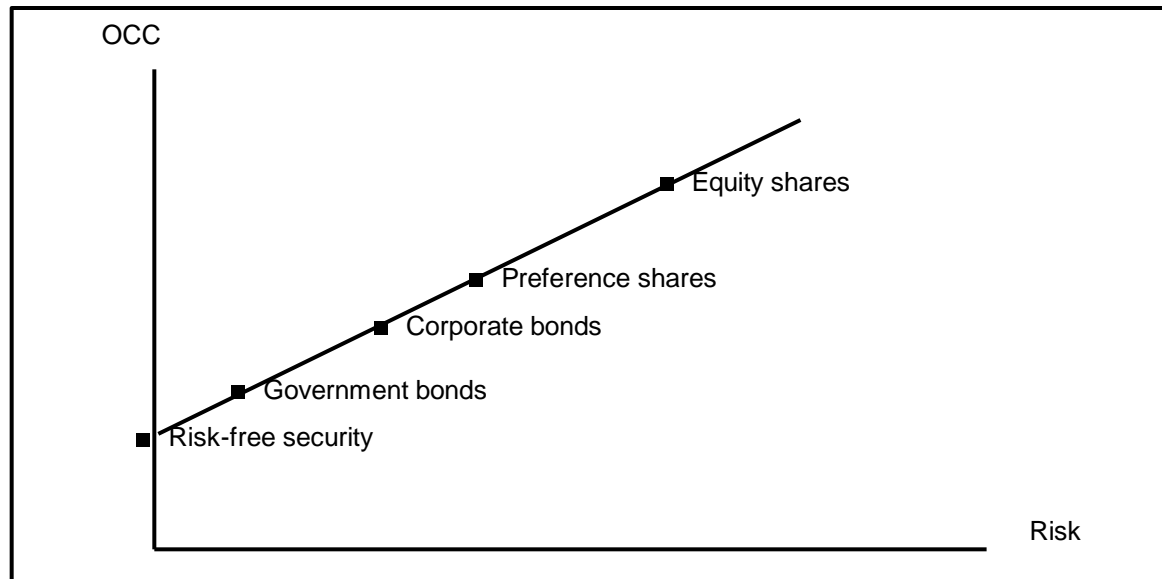
Divisional or Project Weighted Average Cost of Capital (WACC) is the hurdle rate or discount rate for evaluating the divisions or projects having the different risk than the company's overall risk comprising of all projects and divisions. We can also call it a discount rate arrived after making an adjustment to WACC with respect to change in the risk profile of the overall company and the specific divisions or projects.

Significance of the Cost   of Capital

➢ The choice of financing makes the cost of capital a crucial variable for every company, as it will determine the company's capital structure. Companies look for the optimal mix of financing that provides adequate funding and minimizes the cost of capital.

➢ In addition, investors use the cost of capital as one of the financial metrics they consider in evaluating companies as potential investments. The cost of capital figure is also important because it is used as the discount rate for the company's free cash flows in the DCF analysis model.

The Concept of the Opportunity Cost of Capital

The opportunity cost is the rate of return foregone on the next best alternative investment opportunity of comparable risk. It is not an explicit cost which is paid out of the pocket. Hence, there is no mention of this cost in the accounting records. Rather, it is an implicit cost which results out of our investment decisions.

OCC

Equity shares

Preference shares

Corporate bonds

Government bonds

Risk-free security

Risk

General Formula for the Opportunity Cost of Capital

➤ Opportunity cost of capital is given by the following formula:

$$I_0 = \frac{C_1}{(1+k)} + \frac{C_2}{(1+k)^2} + \mathsf{L} + \frac{C_n}{(1+k)^n}$$

where I_o is the capital supplied by investors in period 0 (it represents a net cash inflow to the firm), C_t are returns expected by investors (they represent cash outflows to the firm) and k is the required rate of return or the cost of capital.

➤ The opportunity cost of retained earnings is the rate of return, which the ordinary shareholders would have earned on these funds if they had been distributed as dividends to them.

Weighted Average Cost of Capital Vs. Specific Costs of Capital

➢ The cost of capital of each source of capital is known as **component**, or **specific**, **cost of capital**.

➢ The overall cost is also called the **weighted average cost of capital** (WACC).

➢ Relevant cost in the investment decisions is the **future cost** or the **marginal cost**.

➢ Marginal cost is the new or the incremental cost that the firm incurs if it were to raise capital now, or in the near future.

➢ The **historical cost** that was incurred in the past in raising capital is not relevant in financial decision- making.

Cost of Debt (Kd)

Cost of debt is the interest a company pays on its borrowings. It is expressed as a percentage rate. In addition, cost of debt can be calculated as a before-tax rate or an after-tax rate.

Because interest is deductible for income taxes, the cost of debt is usually expressed as an after-tax rate.

Two cases

➢ Redeemable Debt

   Irredeemable Debt

➢ Issue at Par Value

   Issue in Discount or Premium

Cost of Debt

➢ **Debt Issued at Par**

$$k_d = i = \frac{\text{INT}}{B_0}$$

➢ **Debt Issued at Discount or Premium**

$$B_0 = \sum_{t=1}^{n} \frac{\text{INT}_t}{(1+k_d)^t} + \frac{B_n}{(1+k_d)^n}$$

➢ **Tax adjustment**

After-tax cost of debt $= k_d(1-T)$

INT = Interest earned for the period
B_0 = Sales price or initial price of the bond/debt
B_n = Current Market Price of the bond/debt
K_d = Cost of the debt or discounting rate

Cost of Preference Shares (Kp)

Normally a fixed rate of dividend is payable on preference shares. But in the practical sense preference dividend is regularly paid by the companies when they earn sufficient amount of profit.

Two types
- Irredeemable Preference Shares
- Redeemable Preference Shares

Cost of Preference Shares (Kp)

Irredeemable Preference Share

$$k_p = \frac{\text{PDIV}}{P_0}$$

Redeemable Preference Share

$$P_0 = \sum_{t=1}^{n} \frac{\text{PDIV}_t}{(1+k_p)^t} + \frac{P_n}{(1+k_p)^n}$$

P0 = Sales price or initial price of preference share
Pn = Current market price of preference share
PDIV= Dividend on preference share
Kp = Cost of preference share

Cost of Equity Capital (Ke)

The cost of equity capital is the minimum rate of return that a company must earn on the equity financed portion of its investments in order to maintain the market price of the equity share at the current level. The cost of equity capital is rather difficult to estimate because there is no definite commitment on the part of the company to pay dividends. However, there are various approaches for computing the cost of equity capital.

Different Methods to calculate Ke

➢ Dividend price method (D/P Approach)
➢ Dividend price plus growth (D/P + g Approach)
➢ Earning Price / Earning Per Share Approach (E/P Approach)
➢ CAPM Method

Cost of Equity Capital

Is Equity Capital Free of Cost? No, it has an opportunity cost.

Cost of Internal Equity: The Dividend—Growth Model

Normal growth

$$P_0 = \frac{\text{DIV}_1}{(k_e - g)}$$

Supernormal growth

$$P_0 = \sum_{t=1}^{n} \frac{\text{DIV}_0(1 + g)^t}{(1 + k_e)^t} + \frac{\text{DIV}_{n+1}}{k_e - g_n} \times \frac{1}{(1 + k_e)^n}$$

Zero-growth

$$k_e = \frac{\text{DIV}_1}{P_0} = \frac{\text{EPS}_1}{P_0} \quad (\text{since } g = 0)$$

Cost of Equity Capital

Cost of External Equity: TheDividend— Growth Model

$$k = \frac{DIV_1}{P_0} + g$$

Earnings–Price Ratio and the Costof Equity

$$k_e = \frac{EPS_1(1-b)}{P_0} + br \qquad (g = br)$$

$$= \frac{EPS_1}{P_0} \qquad\qquad (b = 0)$$

K_e = Cost of equity, DIV= Dividend Amount, P_0 = Initial price or purchase price of a share, g = Growth rate, b = Retention ratio, (1-b) = Dividend payout ratio, r = return on equity (ROE)

Earning Price / Earning Per Share Approach

EPS is the portion of a company's profit that is allocated to every individual share of the stock.

It is a term that is of much importance to investors and people who trade in the stock market.

Simply return per share

EPS = Net Income after Tax /Total Number Shares

Earning Price / Earning Per Share Approach

New Shares

Ke=EPS/NP

K e=Cost of equity capital
EPS=Earning per share
NP=Net proceeds

Market Price / Existing Shares

Ke=EPS/MP

K e=Cost of equity capital
EPS=Earning per share
MP= Market Price per share

The Capital Asset Pricing Model (CAPM)

As per the CAPM, the required rate of return on equity is given by the following relationship:

$$k_e = R_f + (R_m - R_f)\beta_j$$

Equation requires the following three parameters to estimate a firm's cost of equity:

The risk-free rate (R_f)

The market risk premium ($R_m - R_f$)

The beta of the firm's share (β)

Cost of Equity: CAPM Vs. Dividend—Growth Model

The dividend-growth approach has limited application in practice

It assumes that the dividend per share is known and will grow at a constant rate, g, forever.

The expected dividend growth rate, g, should be less than the cost of equity, k_e, to arrive at the simple growth formula otherwise model is indeterminate.

The dividend–growth approach not considering the risk factor directly.

Cost of Equity: CAPM Vs. Dividend—Growth Model

CAPM has a wider application although it is also based on certain assumptions:

The only condition for its use is that the company's share is quoted on the stock exchange.

All variables in the CAPM are market determined and except the company specific share price data, they are common to all companies.

The value of beta is determined in an objective manner by using statistical methods. It assumed beta is stable over time while in practical approach it may not remain stable over time.

A security with a zero Beta should give a risk free return. In actual results may not be equal to risk free rate.

CAPM approach is pure theoretical derivation of SML and CML line but in practical result may be different.

Cost of Retained Earnings (Kr)

➢ Many people believe that retained earnings are free of cost, but it includes some cost.

➢ It is the opportunity cost of dividend over one by the shareholders.

➢ It is the return that the share holder could have earned if the would have interest elsewhere.
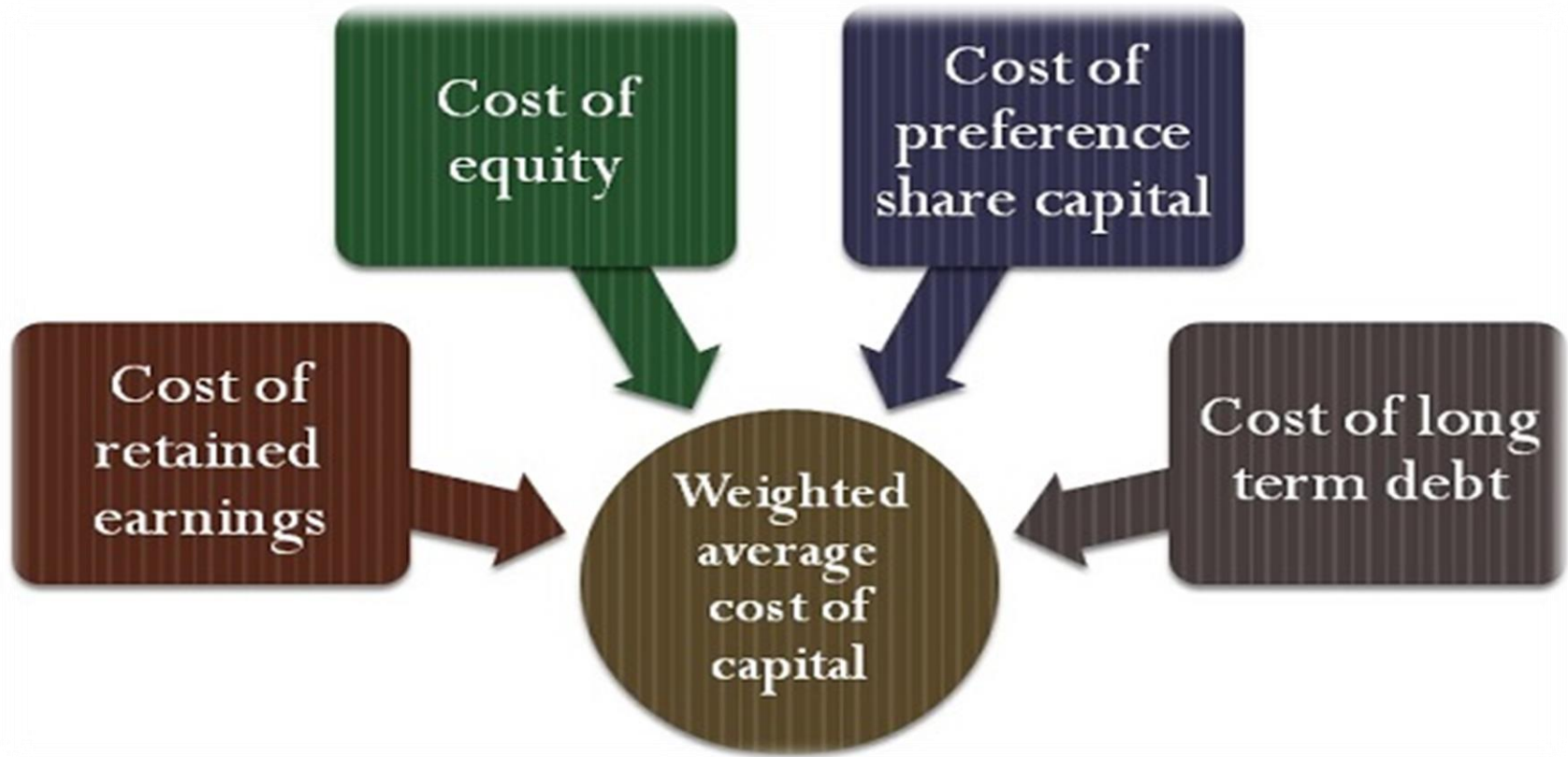
Kr = Ke(1-T)(1-B)
Kr = Cost of retained earnings
Ke = Share holder's required rate of return   T = Share holder's tax rate
B = Brokerage Cost

Thus the opportunity cost of retained earning is the net dividend (After tax and brokerage) available to the shareholders for investment.

The Weighted Average Cost of Capital

The Weighted Average Cost of Capital

WACC is the average cost of various source of capital that is computed by specific cost of individual capital and by putting weightage to specific cost of capital in proportion of the various source of fund to the total.

The weight may be given by using either book value or market value.

If there is a difference between Market value and book value of weight the WACC will also differ.

The Weighted Average Cost of Capital

The following steps are involved for calculating the firm's WACC:

Calculate the cost of specific sources of funds

Multiply the cost of each source by its proportion in the capital structure.

Add the weighted component costs to get the WACC.

$$k_o = k_d(1 - T)w_d + k_e w_e$$

$$k_o = k_d(1-T)\frac{D}{D+E} + k_e\frac{E}{D+E}$$

WACC is in fact the weighted marginal cost of capital (WMCC); that is, the weighted average cost of new capital given the firm's target capital structure.

Book Value Vs. Market Value Weights

Managers prefer the book value weights over market value weight for calculating WACC:

Firms in practice set their target capital structure using book values.

The book value information can be easily derived from the published sources of financial statement.

It is more practical for investor to use book value debt/equity ratios to analyze and evaluate the risk of the firms.

Book Value Vs. Market Value Weights

While the other group have questioned the use of the book-value weights :

First, the component costs are opportunity rates determined in the capital markets based on current market price. Therefore the weights should also be market-determined.

Second, the book-value weights are based on arbitrary accounting policies that are used to calculate retained earnings and value of assets. Therefore, they do not reflect economic values.

Book Value Vs. Market Value Weights

Market-value weights are practically superior to book-value weights:

> They reflect present economic values and are not influenced by accounting policies of the companies. They consists with the market- determined component costs.

The difficulty in using market-value weights:

> The market prices of securities fluctuate widely and frequently.

> So the use of market value based target capital structure means that the amounts of debt and equity are frequently adjusted as the value of the firm changes.

Flotation Costs, Cost of Capital and Investment Analysis

➢ A new issue of debt or shares will invariably involve **flotation costs** in the form of legal fees, administrative expenses, brokerage or underwriting commission.

➢ The correct procedure is to adjust the investment project's cash flows for the flotation costs and use the weighted average cost of capital, unadjusted for the flotation costs, as the discount rate.

➢ On the other hand if some one adjust the flotation costs in the cost of capital the effect of the flotation costs will be compounded over the life of the project while flotation costs are not annual costs; they are one-time costs incurred when the investment project is undertaken and financed.

Divisional and Project Cost of Capital

➤ 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 Cost of Capital for Projects

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

➢ *In* practice companies 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 experience of the managers.

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

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