UNIT 6 :

COST OF CAPITAL

INTRODUCTION

- Crucial decisions in financial management are often made with reference to cost of capital.

- In the capital budgeting decision the cost of capital is reflected in the investor's required rate of return (RRR), which is then used to discount the investment's cash flows so as to derive its NPV.

- Also recall that IRR is compared with the RRR in order to determine if the investment project is feasible or not.

The profitability Index (PI) also relates the present value of inflows to that of outflows, which present values, are partly affected by the RRR.

- In financing decision, the financial manager also seeks to obtain a capital structure for the firm that minimizes its cost of capital. In the same vein, the decision to appropriate the firm's earnings either as dividends or retained profits seeks to minimize the cost of capital for the firm among other things.
- Despite the controversy concerning the relevance of the financing and dividend decision in determining the value of the firm, managers still consider the impact of these decisions on the overall cost of capital in practice.

- The **cost of capital** is the cost of using the funds of creditors and owners.
- Creating value requires investing in capital projects that provide a return greater than the project's cost of capital.

  When we view the firm as a whole, the firm creates value when it provides a return greater than its cost of capital.

- Estimating the cost of capital is challenging.

  We must estimate it because it cannot be observed.

  We must make a number of assumptions.

  For a given project, a firm's financial manager must estimate its cost of capital.

COST OF CAPITAL DEFINED

The term cost of capital is a concept having different meanings. Cost of Capital can be defined in the three *points of view* is given below.

- ***Investors' Point of View:*** It may be defined as "the measurement of the sacrifice made by him/her in order to achieve capital formation." For example, Mr. A an investor invested FRW 100,000 in a company's equity shares, instead of depositing that amount on a bank saving account which pays seven per cent interest. Here investor had sacrificed seven per cent interest for not having invested in the bank.

- ***Firm's Point of View*** : It is the minimum required rate of return needed to justify the use of capital. It is supported by Hompton, John. For example, a firm raised FRW 50 through the issues of 10 per cent minimum rate of return on investment.

- ***Capital Expenditure Point of View:*** The cost of capital is the minimum required rate of return that a firm must generate from any investment to justify the commitment of funds in such an investment. It also referred to as the hurdle rate or target rate or cut off rate reflecting the fact that any investment must realize such rate of return if it is to be feasible.

Generally, Cost of Capital represents the rate of return that a firm must pay to the suppliers of capital for use of their funds. In other words, cost of capital is the weighted average cost of various sources of finance used by the firm in capital formation. The sources are equity shares, preference shares, long term debt and short-term debt.

IMPORTANCE OF COST OF CAPITAL

The concept of cost of capital is very important and it is useful in the following financial management decisions:

- ***Designing Optimal Capital Structure:*** The proportion of debt-equity at which cost of capital is minimum. Thus, it helps in designing a good firm's financing policy.
- ***Investment (Capital budgeting) Evaluation:*** Capital expenditure means investment in long term projects like investment on new machinery. Capital budgeting decisions require a financial standard (cost of capital) for evaluation

- ***Financial Performance Appraisal:*** Cost of capital framework can be used to evaluate the financial performance of top management.

Financial performance evaluation involves a comparison of actual profitability of the project with the project overall cost of capital, and the appraisal of the actual costs incurred by management in raising the required funds.

CLASSIFICATION OF COST OF CAPITAL

Various relevant costs associated with the problem of measurement of cost of capital are:

- **Specific cost of capital:** It is the cost associated with particular source of finance. It is also known as component cost of capital. For example, cost of equity (Ke) or cost of preference share (Kp), or cost of debt (Kd), etc.
- **Overall or Weighted cost of capital** recognizes the fact that a firm uses a pool of funds other than a single source. It is therefore the cost of capital for the aggregate pool of funds used in the firm as opposed to specific cost of capital, which relates to a single source of funds.

- **Historical cost of capital:** refers to the cost of funds already being utilized in the business. These funds were raised sometime in the past and hence its cost being historical . It reflects the book value of the business.

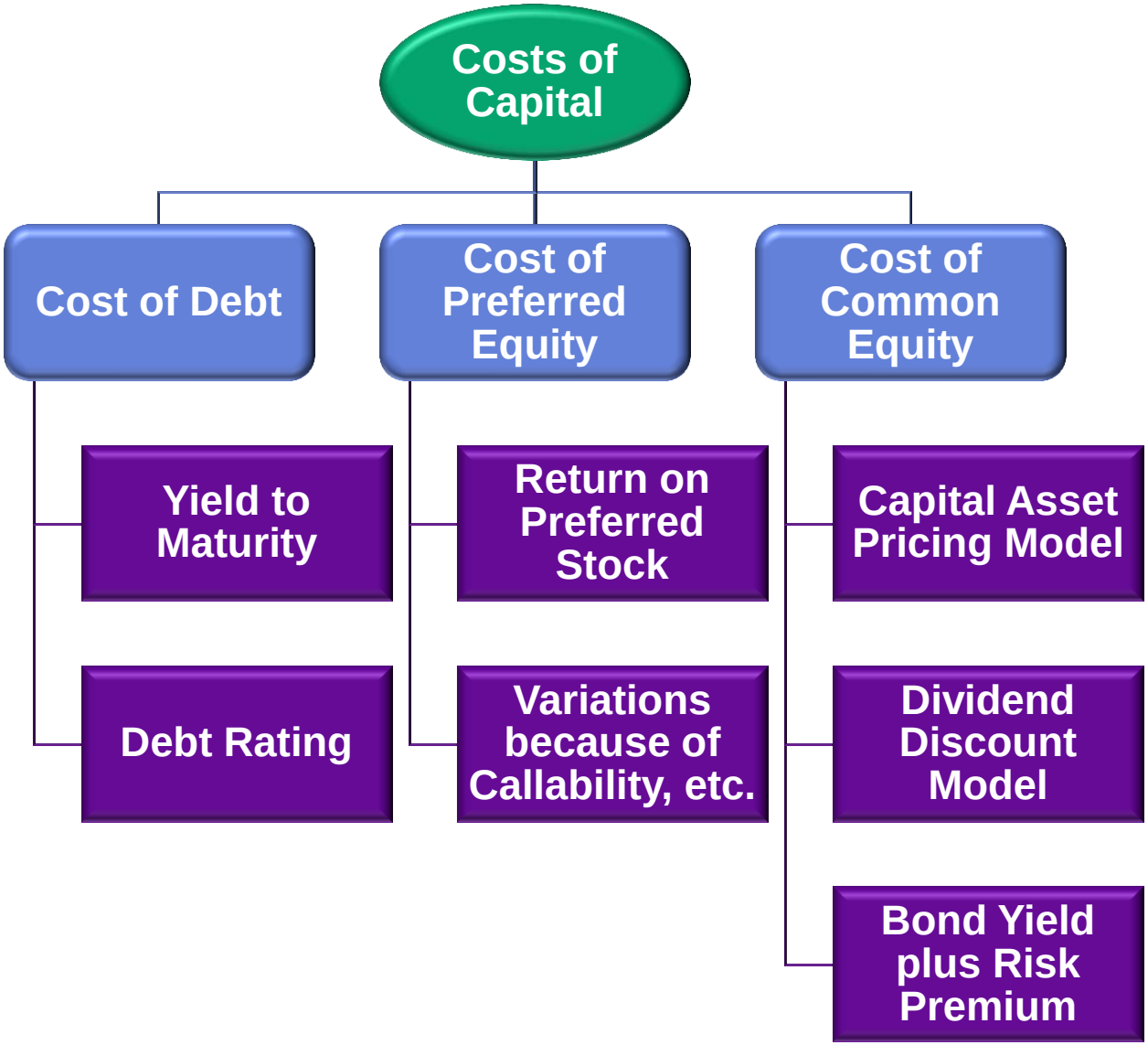
- **Future or Marginal cost of capital:** It is the cost of capital funds yet to be raised by the firm. It refers to the funds, which are being planned for. It is determined by conditions relating to the future when these funds will be raised. Because it is a cost of additional funds to be raised in future, it is also referred to as marginal cost of capital.

TAXES AND THE COST OF CAPITAL

- Interest on debt is tax deductible; therefore, the cost of debt must be adjusted to reflect this deductibility.
  - *We multiple the before-tax cost of debt (r_d) by the factor (1 – t), with t as the marginal tax rate.*
  - *Thus, $r_d \times (1 - t)$ is the after-tax cost of debt.*

- Payments to owners are not tax deductible, so the required rate of return on equity (whether preferred or common) is the cost of capital.

Determination of Specific Cost of Capital



a) The cost of debt capital

The interest rate a firm must pay on its new debt is defined as its **before-tax cost of debt, r_d.** Firms can estimate r_d by asking bankers what it will cost to borrow or by finding the yield to maturity on their currently outstanding debt. *However, the* **after-tax cost of debt, r_d (1-t)**, *should be used to calculate the weighted average cost of capital.* This is the interest rate on new debt, r_d, less the tax savings that results because interest is tax deductible.

After-tax cost of capital = Interest rate on new debt – Tax savings

$$= r_d - r_d t$$

$$= r_d(1-t)$$

In effect, the government pays part of the cost of debt because interest is tax deductible. Therefore, if Allied company can borrow at an interest rate of 10% and its marginal income tax rate is 40%, its after-tax cost of debt will be 6%.

After-tax cost of debt = rd(1-t)

= 10%(1-0.4)

= 10%(0.6)

= 6%

Notes:

- we use after-tax cost of debt in calculating the WACC because we are interested in maximizing the value of the firm's stock, and the stock price depends on after-tax cash flows.

- Because we are concerned with after-tax cash flows and because cash flows and rates of return should be calculated on a comparable basis, we adjust the interest rate downward due to the debt's preferential tax treatment.

b) Cost of preferred stock

The component cost of preferred stock used to calculate the weighted average cost of capital, r_p, is the preferred dividend, d_p, divided by the current price of the preferred stock, p_p.

Cost of preferred stock : $$rp = \frac{dp}{pp}$$

A company's preferred stock currently trades at $80 per share and pays $6 annual dividend per share. What is the company's cost of preferred stock?

Cost of preferred stock:

$$r_p = \frac{6}{80} = 0.075, \text{ which means } 7.5\%$$

c) The cost of equity capital

The costs of debt and preferred stock are based on the returns that investors require on these securities. Similarly, the cost of common equity is based on the rate of return that investors require on the company's common stock. Note, though, that new common equity is raised into two ways:

- by retaining some of the current year's earnings and
- by issuing new common stock.

We used the symbol $\mathbf{r_s}$ to designate the cost of retained earnings and $\mathbf{r_e}$ to designate the cost of new common stock, or external equity.

Using the CAPM to estimate the cost of equity capital

The most widely used method for estimating the cost of common equity is the Capital Asset Pricing Model (CAPM). Here are the steps used to find r_s:

Step 1: Estimate the risk free-rate, r_f .

Step 2: Estimate the stock's beta coefficient, b_i, and use it as an index of the stock's risk.

Step 3: Estimate the market risk premium r_p. This is the difference between the return that investor require on an average stock and the risk free-rate.

Step 4: Substitute the preceding values in the CAPM equation to estimate the required rate of return on the stock in question:

$$\mathbf{r_s = r_f + b_i(r_p)}$$

Where, $R_p = (r_m - r_f)$

Assume that in today's market risk free-rate r_f is 5.6%, the market risk premium r_p is 5%, and Company's beta is 1.48. Using the CAPM approach, company's cost of equity is estimated to be 13%.

$$R_s = 5.6\% + (1.48)\,(5\%)$$

$$= 13\%$$

Problem:

If the risk-free rate is 3%, the expected market risk premium is 5%, and the company's stock beta is 1.2, what is the company's cost of equity?

Solution:

Cost of equity:

$$= 0.03 + (1.2 \times 0.05)$$

$$= 0.03 + 0.06$$

$$= 0.09, \text{ or } 9\%$$

d) Composite or Weighted Average Cost of Capital (WACC)

The WACC is the firm's weighted average or overall cost of capital. The target proportions of debt (w_d), preferred stock (w_p), and common equity(w_c), along with the costs of those components, are used to calculate the firm's WACC. We assume at this point that all new common equity is raised as retained earnings, as is true for most companies; hence the cost of common equity is r_s.

WACC = (% of debt)(After-tax cost of debt)

+ (% of preferred stock)(cost of preferred stock)

+ (% of common equity)(cost of common equity)

$$= \mathbf{w_d r_d(1-t) + w_p r_p + w_c r_s}$$

Note that only debt has a tax adjustment factor, (1-t).

This is because interest on debt is tax deductable but preferred dividends and the returns on common stock (dividends and capital gains) are not.

A company's target capital structure calls for 45% debt, 2% preferred stock, and 53% common equity. Its before-tax cost of debt is 10%, its cost of preferred stock of 10.3%, its cost of common equity from retained earnings is 13.5%, and its marginal tax rate is 40%. Calculate the company's WACC. Assume all of the new common equity comes from retained earnings:

$$\mathbf{WACC = w_d r_d(1-t) + w_p r_p + w_c r_s}$$

$$\mathbf{= 0.45(10\%)(1-0.4) + 0.02(10.3\%) + 0.53(13.5\%)}$$

$$\mathbf{= 10.1\%}$$

Under these conditions, every dollar of new capital that this company raises would consist of 45% of debt with an after-tax cost of 6%, 2% of preferred stock with 10.3%, and 53% of common equity from additions to retained earnings with a cost of 13.5%. The average cost of each whole dollar, or the WACC would be 10.1%.

If the company had to issue new common stock, its WACC would be slightly higher because of additional flotation costs.

EXAMPLE: WACC

Suppose the Widget Company has a capital structure composed of the following, in billions:

Debt	€10
Common equity	€40

If the before-tax cost of debt is 9%, the required rate of return on equity is 15%, and the marginal tax rate is 30%, what is Widget's weighted average cost of capital?

Solution:

$$\begin{aligned} \text{WACC} &= [(0.20)(0.09)(1–0.30)]+ [(0.80)(0.15)] \\ &= 0.0126 + 0.120 \\ &= 0.1325, \text{ or } 13.25\% \end{aligned}$$

Interpretation:

When the Widget Company raises €1 more of capital, it will raise this capital in the proportions of 20% debt and 80% equity, and its overall cost will be 13.25%.

FACTORS THAT AFFECT THE WACC

The cost of capital is affected by a number of factors. Some are beyond the firm's control, but others can be influenced by its financing and investment decisions.

a) Controllable Factors

Controllable factors are those factors that are within the firm control. They are

- **Capital Structure Policy:** As we have assumed that a firm has given target capital structure where we assigned weights based on that target capital structure to calculate WACC. However, a firm can change its capital structure or proportion of components of capital that affects its WACC. For example, when a firm decides to use more debt and less equity, which will lead to reduction of WACC. At the same time increasing proportion of debt in capital structure increases the risk of both debt and equity holder, because it increases fixed financial (commitment) charges.

- **Dividend Policy:** The required capital may be raised by equity or debt or by combination of both sources. Equity capital can be raised by issue of new equity shares or through retained earnings. Sometimes companies may prefer to raise equity capital by retention of earnings, because it involves no floatation costs.

  Firms may feel that retained earnings is less costly when compared to issue of new equity. But it is different it is more costly, since the retained earnings is the income that is not paid as dividend. Hence, investors expects more return so it affects cost of capital.

- **Investment Policy:** While estimation of initial cost of capital, generally we use the starting point the required rates of return on the firm's existing stock and bonds.

  Therefore, we implicitly assume that new capital will be invested in assets of the same type and with the same degree of risk. But it is not correct as no firm invest in assets similar to they currently operate, when a firm changes its investment policy.

  For example, investment in diversified business.

b) Uncontrollable factors

The factors that are not possible to control by the firm that mostly affects the cost of capital. This type of factors are known as External factors.

- **Tax Rates:** Tax rates are beyond the control of a firm, have an important effect on overall cost of capital. Computation of debt involves consideration of tax.

In addition lowering capital gains tax rate relative to the rate on ordinary income makes stocks more attractive and that reduces cost of equity and it would lower the overall cost of capital

- **Interest Rates:** Cost of debt is interest rate. If interest rates increases, automatically cost of debt also increases. On the other hand, if interest rates are low then the cost of debt is less. The reduced cost of debt reduces WACC and this will encourage an additional investment.

- **General level of stock prices:** If stock prices in general decline, pulling the firm's stock price down, its cost of equity will rise. This goes together with market risk associated.

QUIZ 2:The following is the information related to the capital structure of a firm:

Source of Finance	**Amount ($)**	**Expected Specific cost of capital after tax**
Ordinary Share Capital	4 500 000	18%
Retained Earnings	1 500 000	18%
Preferential Share Capital	1 000 000	11%
Debt	3 000 000	8%
Total Capital Structure	**10 000 000**	

Required: Compute the Weighted Average Cost of Capital (WACC) for that particular firm.