UNIT 2nd

Financial Management BBA 4th

Cost of capital

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Cost of capital is vital part of investment decision as it is used to measure the value of investment proposal provided by the business concern. It is used as a discount rate to determine the present value of future cash flows related with capital projects. Cost of capital is also termed as cut-off rate, target rate, hurdle rate and required rate of return.

Assumption of Cost of Capital

It is documented in theoretical studies that cost of capital is based on some assumptions which are directly related while calculating and measuring the cost of capital. There are three basic concepts:

1. It is not a cost as such. It is merely a hurdle rate.
2. It is the minimum rate of return.
3. It consists of three important risks such as zero risk level, business risk and financial risk.

Importance of Cost of Capital

Computation of cost of capital is significant part of the financial management to decide the capital structure of the business concern.

1. Importance to Capital Budgeting Decision: Capital budget decision mainly depends on the cost of capital of each source. According to net present value method, present value of cash inflow must be more than the present value of cash outflow. Therefore, cost of capital is used for capital budgeting decision.
2. Importance to Structure Decision: Capital structure is the mix or proportion of the different types of long term securities. Company uses particular type of sources if the cost of capital is suitable. Therefore, cost of capital supports to take decision regarding structure.
3. Importance to Evolution of Financial Performance: Cost of capital is imperative to determine which affects the capital budgeting, capital structure and value of the firm. It helps to estimate the financial performance of the firm.
   Importance to Other Financial Decisions: Cost of capital is also used in some other areas

such as, market value of share, earning capacity of securities etc. hence, it plays a major part in the financial management.

(TOPIC 2) Measurement of Cost of Capital:

It refers to the cost of each specific sources of finance such as:

- Cost of equity
- Cost of debt
- Cost of preference share
- Cost of retained earnings

1. Cost of Equity: Cost of equity capital is the rate at which investors discount the expected dividends of the firm to determine its share value. Theoretically, the cost of equity capital is described as the "Minimum rate of return that a firm must earn on the equity financed portion of an investment project in order to leave unchanged the market price of the shares".
Cost of equity can be calculated from the following approach:

- Dividend price (D/P) approach.
- Dividend price plus growth (D/P + g) approach.
- Earning price (E/P) approach.
- Realized yield approach.

Dividend Price Approach: The cost of equity capital will be that rate of expected dividend which will maintain the present market price of equity shares.
Dividend price approach can be measured with the following formula:

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

Where,
Ke = Cost of equity capital
D = Dividend per equity share

Np = Net proceeds of an equity share

Dividend Price Plus Growth Approach:

The cost of equity is calculated on the basis of the expected dividend rate per share plus growth in dividend.

It can be measured by the following formula:

$$K_e = \frac{D}{N_p} + g$$

Where,

Ke = Cost of equity capital

D = Dividend per equity share

g = Growth in expected dividend

Np = Net proceeds of an equity share

2. Cost of Debt: Cost of debt is the after tax cost of long-term funds through borrowing. Debt may be issued at par, at premium or at discount and also it may be perpetual or redeemable.

Debt Issued at Par: Debt issued at par means, debt is issued at the face value of the debt. It may be calculated with the following formula

$$K_d = (1 - t) R$$

Where,

Kd = Cost of debt capital

t = Tax rate

R = Debenture interest rate

Debt Issued at Premium or Discount: If the debt is issued at premium or discount, the cost of debt is calculated with the following formula.

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

Where,
Kd = Cost of debt capital
I = Annual interest payable
Np = Net proceeds of debenture
t = Tax rate
Cost of Perpetual Debt and Redeemable Debt: It is the rate of return which the lenders expect. The debt carries a certain rate of interest.

$$K_{db} = \frac{I + 1/n(P - N_p)n}{1/n(P + N_p)/2}$$

Where,
I = Annual interest payable
P = Par value of debt
Np = Net proceeds of the debenture
n = Number of years to maturity
Kdb = Cost of debt before tax
Cost of debt after tax can be calculated with the following formula:

$$K_{da} = K_{db} \times (1-t)$$

Where,
Kda = Cost of debt after tax
Kdb = Cost of debt before tax
t = Tax rate

3. Cost of Preference Share Capital: Cost of preference share capital is the annual preference share dividend by the net proceeds from the sale of preference share. There are two types of preference shares irredeemable and redeemable. Following formula is used to calculate the cost of redeemable preference share capital:

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

Where,
Kp = Cost of preference share
Dp = Fixed preference dividend
Np = Net proceeds of an equity share
Cost of irredeemable preference share is calculated with the following formula:

$$K_p = \frac{D_p + (P - N_p)/n}{(P + N_p)/2}$$

Where,
Kp = Cost of preference share
Dp = Fixed preference share
P = Par value of debt
Np = Net proceeds of the preference share
n = Number of maturity period.

4. Cost of Retained Earnings: Retained earnings is one of the sources of finance for investment proposal. It is dissimilar from other sources like debt, equity and preference shares. Cost of retained earnings is the same as the cost of an equivalent fully subscripted issue of additional shares, which is measured by the cost of equity capital.
Cost of retained earnings can be calculated with the following formula:

$$K_r = K_e (1 - t)(1 - b)$$

Where,
Kr = Cost of retained earnings
Ke = Cost of equity
t = Tax rate
b = Brokerage cost

(Topic 2) overall or weighted average cost of capital

It is also known as weighted average cost of capital and composite cost of capital. Weighted average cost of capital is 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.

The computation of the overall cost of capital (Ko) involves the following steps.
(a) Assigning weights to specific costs.
(b) Multiplying the cost of each of the sources by the appropriate weights.
(c) Dividing the total weighted cost by the total weights.
The overall cost of capital can be calculated with the following formula;

$$K_o = K_d W_d + K_p W_p + K_e W_e + K_r W_r$$

Where,
Ko = Overall cost of capital
Kd = Cost of debt
Kp = Cost of preference share
Ke = Cost of equity
Kr = Cost of retained earnings
Wd= Percentage of debt of total capital
Wp = Percentage of preference share to total capital
We = Percentage of equity to total capital
Wr = Percentage of retained earnings

(Topic 3) Capital Budgeting and its technique

Capital budgeting, and **investment appraisal**, is the planning process used to determine whether an organization's long term investments such as new machinery, replacement of machinery, new plants, new products, and research development projects are worth the funding of cash through the firm's capitalization structure (debt, equity or retained earnings). It is the process of allocating resources for major capital, or investment, expenditures.

Capital Budgeting Technique

Non-Discounted Cash Flow Criteria: -

(a) Pay Back Period (PBP)

(b) Accounting Rate of Return (ARR)

Discounted Cash Flow Criteria: -

(a) Net Present Value (NPV)

(b) Internal Rate of Return (IRR)

(c) Profitability Index (PI)

1 Accounting Rate of Return

Accounting rate of return, also known as the Average rate of return, or ARR is a financial ratio used in capital budgeting.

$$\text{ARR} = \frac{\text{Average Annual Profit after Tax}}{\text{Average Investment}}$$

Decision Rule: The ARR can be used as a decision criterion to select investment proposal.

- If the ARR is higher than the minimum rate established by the management, accept the project.
- If the ARR is less than the minimum rate established by the management, reject the project.

Merits:

1. It is simple to calculate.

2. It is based on accounting information which is readily available and familiar to businessman.

3. It considers benefit over entire life of the project.

Demerits:

1. It is based upon accounting profit, not cash flow in evaluating projects.

2. It does not take into consideration time value of money so benefits in the earlier years or later years cannot be valued at par.

3. This method does not take into consideration any benefits which can accrue to the firm from the sale or abandonment of equipment which is replaced by a new investment. ARR does not make any adjustment in this regard to determine the level of average investments.

4. Though it takes into account all years income but it is averaging out the profit.

5. The firm compares any project's ARR with the one which is arbitrarily decided by management generally based on the firm's current return on assets. Due to this yardstick sometimes super normal growth firm's reject profitable projects if it's ARR is less than the firm's current earnings.

2. Pay Back Period

The pay back period (PBP) is the traditional method of capital budgeting. It is the simplest and perhaps, the most widely used quantitative method for appraising capital expenditure decision.

Methods to compute PBP:

There are two methods of calculating the PBP.

(a) The first method can be applied when the CFAT is uniform. In such a situation the initial cost of the investment is divided by the constant annual cash flow: For example, if an investment of Rs. 100000 in a machine is expected to generate cash inflow of Rs. 20,000 p.a. for 10 years. Its PBP will be calculated using following formula:

$$\text{PBP} = \frac{\text{Initial Investment}}{\text{Constant Annual Cash Inflow}}$$

$$\text{PBP} = \frac{100000}{20000} = 5 \text{ years}$$

(b) The second method is used when a project's CFAT are not equal. In such a situation PBP is calculated by the process of cumulating CFAT till the time when cumulative cash flow becomes equal to the original investment outlays.

For example, A firm requires an initial cash outflow of Rs. 20,000 and the annual cash inflows for 5 years are Rs. 6000, Rs. 8000, Rs. 5000, Rs. 4000 and Rs. 4000 respectively. Calculate PBP. Here, When we cumulate the cash flows for the first three years, Rs. 19,000 is recovered. In the fourth year Rs. 4000 cash flow is generated by the project but we need to recover only Rs. 1000 so the time required recovering Rs. 1000 will be (Rs.1000/Rs.4000)× 12 months = 3 months. Thus, the PBP is 3 years and 3 months (3.25 years).

Decision Rule: The PBP can be used as a decision criterion to select investment proposal.

If the PBP is less than the maximum acceptable payback period, accept the project.

If the PBP is greater than the maximum acceptable payback period, reject the project.

Merits:

1. It is simple both in concept and application and easy to calculate.

2. It is a cost effective method which does not require much of the time of finance executives as well as the use of computers.

3. It is a method for dealing with risk. It favours projects which generates substantial cash inflows in earlier years and discriminates against projects which brings substantial inflows in later years . Thus PBP method is useful in weeding out risky projects.

4. This is a method of liquidity. It emphasizes selecting a project with the early recovery of the investment.

Demerits:

1. It fails to consider the time value of money. Cash inflows, in pay back calculations, are simply added without discounting. This violates the most basic principles of financial analysis that stipulates the cash flows occurring at different points of time can be added or subtracted only after suitable compounding/ discounting.

2. It ignores cash flows beyond PBP. This leads to reject projects that generate substantial inflows in later years.

3. It is a measure of projects capital recovery, not profitability so this can not be used as the only method of accepting or rejecting a project. The organization need to use some other method also which takes into account profitability of the project

4. It is not consistent with the objective of shareholders' wealth maximization. The PBP of the projects will not affect the market price of equity shares.

3 . Net Present Value (NPV):

The net present value is one of the discounted cash flow or time-adjusted technique.

The NPV is the difference between the present value of future cash inflows and the present value of the initial outlay.

Method to compute NPV: The important steps for calculating NPV are given below.

1. Cash flows of the investment project should be forecasted based on realistic assumptions. These cash flows are the incremental cash inflow after taxes and are inclusive of depreciation (CFAT) which is assumed to be received at the end of each year.

2. Appropriate discount rate should be identified to discount the forecasted cash flows. The appropriate discount rate is the firm's opportunity cost of capital. which is equal to the required rate of return expected by investors on investments of equivalent risk.

3. Present value (PV) of cash flows should be calculated using opportunity cost of capital as the discount rate.

4. NPV should be found out by subtracting present value of cash outflows from present value of cash inflows. The project should be accepted if NPV is positive (i.e. NPV >0) The NPV can be calculated with the help of equation.

NPV = Present value of cash inflows – Initial investment

Decision Rule: The present value method can be used as an accept-reject criterion. The present value of the future cash streams or inflows would be compared with present value of outlays. The present value outlays are the same as the initial investment.

If the NPV is greater than 0, accept the project.

If the NPV is less than 0, reject the project. Symbolically, accept-reject criterion can be shown as below:

PV > C → Accept [NPV > 0]

PV < C → Reject [NPV < 0]

Where, PV is present value of inflows and C is the outlays

Merits: This method is considered as the most appropriate measure of profitability due to following virtues.

1. It explicitly recognizes the time value of money.

2. It takes into account all the years cash flows arising out of the project over its useful life.

3. It is an absolute measure of profitability.

4. A changing discount rate can be built into NPV calculation. This feature becomes important as this rate normally changes because the longer the time span, the lower the value of money & higher the discount rate.

Demerits:

1. This method requires estimation of cash flows which is very difficult due to uncertainties existing in business world due to so many uncontrollable environmental factors.

2. It requires the calculation of the required rate of return to discount the cash flows. The discount rate is the most important element used in the calculation of the present values because different discount rates will give different present values. The relative desirability of the proposal will change with a change in the discount rate.

3. When projects under consideration are mutually exclusive, it may not give dependable results if the projects are having unequal lives, different cash flow pattern, different cash outlay etc.

4. It does not explicitly deal with uncertainty when valuing the project and the extent of management's flexibility to respond to uncertainty over the life of the project.

4. Profitable Index (PI)

Profitability Index (PI) or Benefit-cost ratio (B/C) is similar to the NPV approach. PI approach measures the present value of returns per rupee invested.

$$\text{PI} = \frac{\text{Present value of cash inflow}}{\text{initial investment}}$$

Decision Rule:

- Accept the project when PI>1
- Reject the project when PI<1
- May or may not accept when PI=1, the firm is indifferent to the project.

Merits:

1. PI considers the time value of money as well as all the cash flows generated by the project.
2. At times it is a better evaluation technique than NPV in a situation of capital rationing especially. For instance, two projects may have the same NPV of Rs. 20,000 but project A requires an initial investment of Rs. 1, 00,000 whereas B requires only Rs. 50,000. The NPV method will give identical ranking to both projects, whereas PI will suggest project B should be preferred. Thus PI is better than NPV method as former evaluate the worth of projects in terms of their relative rather than absolute magnitude.

3. It is consistent with the shareholders' wealth maximization. Demerits: Though PI is a sound method of project appraisal and it is just a variation of the NPV, it has all those limitation of NPV method too.

Demerits:

1. When cash outflow occurs beyond the current period, the PI is unsuitable as a selection criterion.

2. It requires estimation of cash flows with accuracy which is very difficult under ever changing world.

3. It also requires correct estimation of cost of capital for getting correct result.

4. When the projects are mutually exclusive and it has different cash outlays, different cash flow pattern or unequal lives, it may not give unambiguous results.

5. Internal Rate of Return (IRR)

The internal rate of return (IRR) is the discount rate that equates the NPV of an investment opportunity with Rs.0 (because the present value of cash inflows equals the initial investment).

IRR is the rate at NPV = 0

Decision Rule: When IRR is used to make accept-reject decisions, the decision criteria are as follows:

- If the IRR is greater than the cost of capital, accept the project. (r >k)
- If the IRR is less than the cost of capital, reject the project. (r<k)

Step to find out IIR

1. Calculate the fake payback period on the basis of average cash flows.
2. Locate the closest figure to fake payback period in the annuity table A-2 and find the first discount rate.
3. Find the NPV at first discount rate if NPV is positive than calculate again NPV at higher rate than first so that second NPV May be negative. (Note if NPV is negative at first rate than calculate NPV at lower than first rate so that NPV may be positive.)
4. Apply following formula

$$\text{IIR} = \text{Lower discount rate } X \frac{\text{NPV at Lower Rate}}{\text{NPV at Lower rate} - \text{NPV at higher rate}} \text{ x Difference in discount rate}$$

Merits: 1. It considers the time value of money and it also takes into account the total cash flows generated by any project over the life of the project.
2. IRR is a very much acceptable capital budgeting method in real life as it measures profitability of the projects in percentage and can be easily compared with the opportunity cost of capital.
3. It is consistent with the overall objective of maximizing shareholders wealth.

Demerits:
1. It requires lengthy and complicated calculations.
2. When projects under consideration are mutually exclusive, IRR may give conflicting results.

3. We may get multiple IRRs for the same project when there are nonconventional cash flows especially.
4. It does not satisfy the value additively principle which is the unique virtue of