C H A P T E R 6

COST OF CAPITAL & CAPITAL STRUCTURE THEORIES



LEARNING OBJECTIVES

- To understand the concept of Cost of Capital
- To know the costs Associated with the Principal Sources of Long-term Finance
- To understand the concept of Weighted Average Cost of Capital
- To know the factors affecting the Capital Structure
- To apply the theories of Capital Structure

LOWER THE COST – HIGHER THE PROFITS

If money is raised at a lower cost, every activity done with money would also turn out to be cost effective, resulting in higher profits...

SECTION 1

COST OF CAPITAL

INTRODUCTION

Now that we are familiar with the different types of long-term financing, let's determine how much it costs the business to obtain each of these sources. A company's cost of capital is the minimal rate of return it must earn on its investments in order to satisfy all of the different categories of investors who have invested in the form of shares, debentures, or term loans.

If the company does not earn this minimum rate, investors will be induced to withdraw their funds and refrain from further capital investments. Returns for the investors is the cost for the company. Investors are ready to part their money if they get good returns. For instance, equity investors anticipate a minimum return in the form of dividends or capital appreciation based

on their perception of the risk undertaken based on the company's historical performance; if they did not receive these returns, they would try to withdraw from the company.

The cost of capital is the weighted arithmetic mean of the costs of the various financial resources employed by a business. Let us look at a basic example. A company's total capital base is ₹100 billion in the ratio of 1:1 of debt-equity, *i.e.*, divided equally between debt and equity; ₹50 billion of debt and ₹50 billion of equity. If the cost of debt and equity are 10% and 20%, respectively, the company's cost of capital will be equal to the weighted average cost, which is;

$$= 0.50 \times 10\% + 0.50 \times 20\%$$

$$= 15\%$$

Before calculating the firm's cost of capital, we must define the cost of its various sources of financing. Typically, a company makes use of the following sources of financing: (*a*) Equity, (*b*) Retained Earnings, (*c*) Bonds/Debentures, (*d*) Term Loans, and (*e*) Preference Capital. The following section discusses the process of calculating the costs of these financing sources.

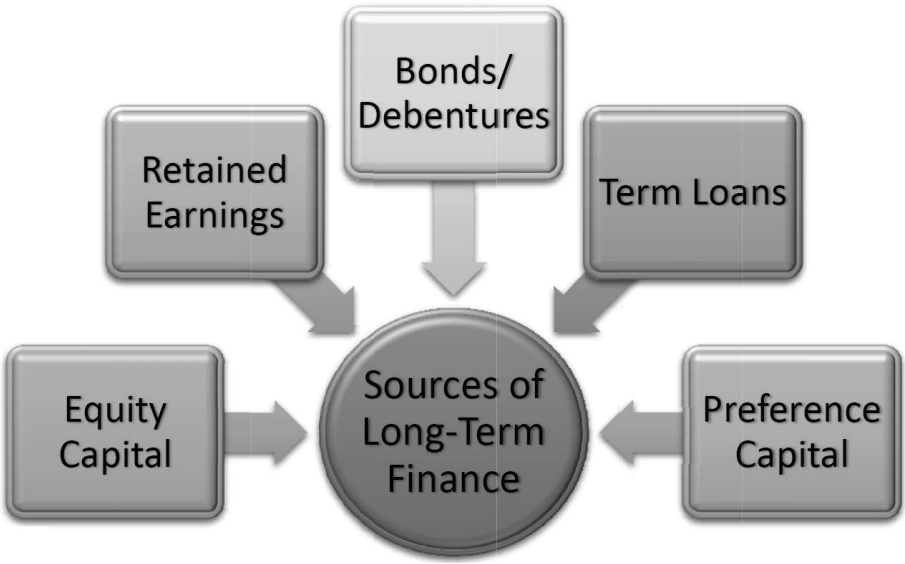


FIGURE 6.1: SOURCES OF LONG-TERM FINANCE

MONEY IS NOT FREE!!

Money never comes free; the supplier charges a cost, high or low, sooner or later...

FACTORS AFFECTING COSTS

As mentioned earlier, the cost of capital is the weighted cost of different sources of finance. Due to numerous factors, the cost of money differs for each source of financing. The following factors contribute to the formation of cost differentials:

A. Opportunity Cost – No money comes for free. The provider of money would charge an interest rate based on his opportunity cost of money. Opportunity cost of money can be understood from two perspectives:

1. **Next Best Opportunity**: If the investable funds are not borrowed, but rather the investor's own funds, the investor would have a Plan B for investing their funds. As opportunity cost, the rate of interest that can be earned in the next best opportunity should be considered. The example provided below will facilitate a more pragmatic understanding of the concept.

Example

Mr. Vijay is analyzing a potential investment opportunity to lend money to 'Project X'. Before quoting his lending rate, he would like to determine the cost of his own funds. Considering all investment opportunities, he is certain that, if he did not invest in 'Project X,' he would place his funds in a Bank Fixed Deposit yielding 6.00% p.a. In this instance, it is evident that Mr. Vijay's money is not free, as the next best investment opportunity is a Bank FD with a return of 6.00% per annum; therefore, his Opportunity Cost of Money is 6.00% per annum.

2. **Borrowing Cost**: If the investable funds are borrowed, it is very likely that they are going to come at a cost. In this situation, the borrowing interest rate should serve as a minimum investment decision threshold. This illustration will help us comprehend the concept in a more practical manner.

Example

Mr. Akash is evaluating the identical investment opportunity to lend money to 'Project X'. Before quoting his lending rate, he would like to determine the cost of his own funds. Mr. Akash didn't have his own resources, so he borrowed money from a bank at an annual interest rate of 8.00%. Even in the worst-case scenario, he must invest this money at a minimum of 8.00%, so his Opportunity Cost of Money is 8.00% p.a.

B. Investment Risk – Investment risk refers to the possibility for an investment to experience a loss or a decline in value. Every investment carries some degree of risk, and the level of risk varies depending on the type of investment, the market conditions, and other factors.

There are several types of investment risks, including:

1. **Market Risk:** This refers to the risk that the overall market will decline, leading to a decrease in the value of an investment.
2. **Credit Risk:** This is the risk that the borrower may delay or default on the payment of interest or principal.
3. **Liquidity Risk:** This is the risk that an investment cannot be sold quickly enough to avoid a loss.
4. **Inflation Risk:** This refers to the risk that inflation will erode the purchasing power of an investment.

5. **Political Risk:** This refers to the risk that political instability or changes in government policy may affect the value of an investment.

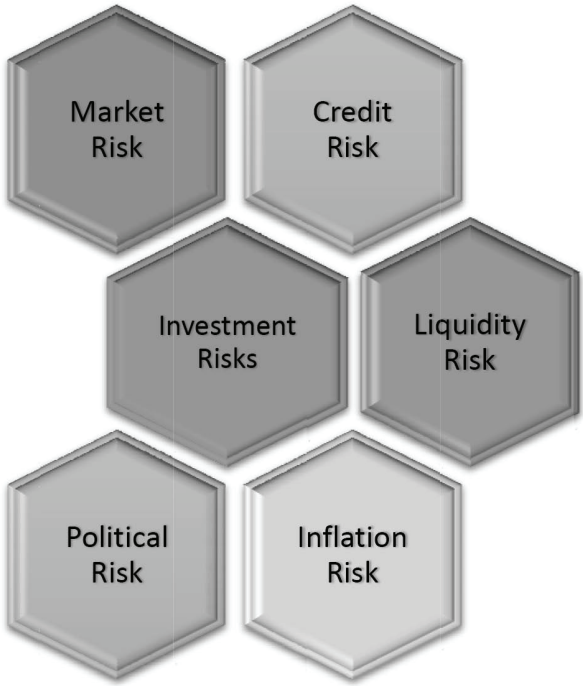


FIGURE 6.2: TYPES OF INVESTMENT RISKS

Investors should attempt to reduce investment risk by diversifying their holdings across asset classes and industries. However, the investment would still entail some degree of risk, and the investor should demand a **risk premium** in addition to the opportunity cost of money as compensation for taking this risk.

C. Tax Shield – Tax shield or tax advantage refers to the reduction in taxable income that results from taking deductions, credits, or other tax exemptions. In other words, it is a way to lower the amount of taxes owed by deducting eligible expenses (tax deductible expenses[10]) from taxable income.

Capital raised from sources such as Equity and Preference shares result in distribution of dividend, which is not an expense, but a portion of profits. Since, dividends are not an expense, they do not provide any tax shield, making equity or preference an expensive source of financing.

In contrast, debt financing results in interest payments, which are legitimately tax-deductible expenses. The tax shield earned on the interest paid effectively reduces the post-tax interest expense, thereby making debt a relatively less expensive source of financing.

10. Tax Deductible Expenses (TDE) can be identified by a generalized principle, *"Expenses incurred to earn the specific Income are Tax Deductible"*. The Income-tax Act, 1961, identifies expenses that are genuinely incurred to earn the income as Tax Deductible Expenses (TDE).

Understanding the calculation of Tax Shield

Taxes on income are based on the net income (income minus expenses). If expenditures increase, net income will decrease, and consequently, so will tax liability. This reduction in tax liability resulting from additional expenditures is known as a tax shield. Let's examine some scenarios to comprehend the concept of tax shield.

Scenario – 1: No Expenditure

Profit & loss account of 'X' Ltd. for the year ending on 31st Mar., 2023

(₹billion)

Expenditures	Amount	Income	Amount
Total expenditure	0	Total Income	100
Net taxable income	100		
Total	**100**	**Total**	**100**

If the applicable Income Tax Rate is 30%, the amount of Tax Due is **30 billion** (100 × 0.30)

To see the impact of the tax shield effect, let's continue with the same example, assuming the company has obtained a ₹200 billion corporate loan from the State Bank at a rate of 10% per annum. The interest paid on the loan is a legitimate expense incurred for the purpose of earning business income and is therefore tax deductible.

Scenario – 2: Corporate Loan of ₹200 billion at a rate of 10% per annum.

Profit & loss account of 'X' Ltd. for the year ending on 31st Mar., 2023

(₹billion)

Expenditures	Amount	Income	Amount
Interest	20	Total Income	100
Net taxable income	80		
Total	**100**	**Total**	**100**

The amount of tax would be ₹24 billion (80 × 0.30). Consequently, this results in a tax savings of ₹6 billion (30 - 24). The tax savings resulted from ₹20 bn. in tax-deductible expenditures. Consequently, tax shield can also be computed as:

$$TS = TDE \times TR$$

Where,

TS = Tax Shield

TDE = Tax Deductible Expenditure

TR = Tax Rate

In the above example,

$$TS = TDE \times TR$$

$$= 20 \times 0.30$$

TS = ₹6 billion

Critically evaluating the above example, we can conclude that it was due to the interest paid of ₹20 bn. that the tax liability was saved by ₹6 bn. thus, the effective interest paid would be ₹14 bn. (20 – 6), *i.e.*, the effective rate of interest post-tax (after considering the tax effect) would be 14%.

$$Post-Tax\ Rate = Pre-Tax\ Rate \times (1-t)$$

Where,

t = Tax rate

In the above example,

$$Post-Tax\ Rate = Pre-Tax\ Rate \times (1-t)$$

$$= 20 \times (1-0.30)$$

$$Post-Tax\ Rate = 14\%$$

Thus,

$$Pre-Tax\ Rate = \frac{Post-Tax\ Rate}{(1-t)}$$

TABLE 6.1: COST SYMBOLS

Sources of Capital	Cost	Pre-Tax Cost Symbols	Post-Tax Cost Symbols
Debt	Cost of Debt	$\mathbf{k_D}$	$\mathbf{k_d}$
Term Loans	Cost of Term Loan	$\mathbf{k_T}$	$\mathbf{k_t}$
Preference Shares	Cost of Preference Shares	$\mathbf{k_P}$	$\mathbf{k_p}$
Equity	Cost of Equity	$\mathbf{k_E}$	$\mathbf{k_e}$
Retained Earnings	Cost of Retained Earnings	$\mathbf{k_R}$	$\mathbf{k_r}$
Capital	Cost of Capital	$\mathbf{k_C}$	$\mathbf{k_c}$



Interpretation of Table of Cost Symbols

Cost of various sources of capital is denoted by letter 'k'

Letters in Upper Case (D, T, P, E, R, C) denotes Pre-Tax Cost of respective sources

Letters in Lower Case (d, t, p, e, r, c) denotes Post-Tax Cost of respective sources

'Cost of Money' to the borrower is equivalent to 'Earnings on Money' to the lender.

COSTS OF VARIOUS SOURCES OF FINANCE

I. Cost of Debt

The cost of raising capital through a Bond/Debenture for a company is defined as the Discount Rate (k_d) that equates the Net amount realized (P) from the issuance of Bond/Debenture to the expected cash outflows in the form of Coupon/Interest (C) and Principal Repayments (R)

$$P = C(1-t) \times PVIFA_{(kd\%,n)} + R \times PVIF_{(kd\%,n)}$$

Where,

C = Coupon/ Interest

k_d = Post-tax cost of debenture capital

t = Corporate Tax Rate

R = Redemption Value

P = Net amount realized per Bond/Debenture

n = Maturity Period.

The interest payment (C) is multiplied by the factor (1–t) because interest on debt is a tax-deductible expense and only post-tax costs are considered. The following approximation formula can also be used.

$$k_d = \frac{C(1-t) + \frac{(R-P)}{n}}{\frac{(R+P)}{2}}$$

Illustration 6.1

Alloy Steel Ltd. has issues non-convertible debentures for ₹500 billion. The covenants (terms) of the issue are: Each Debenture has a face value of ₹100 and carries a rate of interest of 12% p.a. The Interest is payable annually and the debenture is redeemable at a premium of 5% after 10 years.

If Alloy steel Ltd. realizes ₹97 per debenture and the corporate tax rate is 30%, calculate the cost of debenture to the company?

Solution:

Given C = ₹12, t = 0.3, P = ₹97, and n = 10 years, R = ₹105, the cost per debenture (k_d) will be:

$$k_d = \frac{C(1-t) + \frac{(R-P)}{n}}{\frac{(R+P)}{2}}$$

$$= \frac{12(1-0.30) + \frac{(105-97)}{10}}{\frac{(105+97)}{2}}$$

k_d = 9.11% (approximate)

Solution with Excel

It is observed that through approximate formula the Cost of Debt (k_d) is 9.11%, whereas, the **'RATE'** function in Excel generates the precise value of Cost of Debt (k_d) as 9.20%.

	A	B
1	**Illustration-6.1**	
2	**Description**	**Values**
3	Face Value (Given)	100
4	Issue Price (Given)	97
5	Coupon Rate (Given)	12%
6	Frequency (Given)	Annual
7	Redemption Amount (Given)	105.00
8	Tenure (Years)	10
9	Tax Rate	30.0%
10	**AfterTax Cost of Debt**	**9.20%**
11	**After Tax Cost of Debt (Function)**	**=RATE(B8,B5*B3*(1-B9),-B4,B7)**

Ia. Cost of Term Loans

The cost of the term loans will be calculated by multiplying the interest rate by (1 – tax rate). The applicable interest rate here will be the rate applicable to the new term loan. As interest on term loan is also tax-deductible, it is multiplied by (1 – tax rate).

$$k_t = I(1-t)$$

Where,

k_t = Post-tax Interest Rate of Term Loan
I = Pre-tax Interest Rate of Loan
t = Tax Rate

II. Cost of Preference Capital

The cost of a redeemable preference share (k_p) is the discount rate that equates the proceeds from a preference capital issue to the payments associated with it, such as dividend payments and principal payments.

$$P = D \times PVIFA_{(kp\%,n)} + R \times PVIF_{(kp\%,n)}$$

Where,

k_p = Cost of Preference Capital
D = Preference Dividend Per Share payable annually
R = Redemption Price
P = Net Amount Realized Per Share
n = Maturity Period

An approximation formula as given below can also be used.

$$k_p = \frac{D + \frac{(R-P)}{n}}{\frac{(R+P)}{2}}$$

Illustration 6.2

The terms of the preference share issue made by National Aluminum are as follows: Each preference share has a face value of ₹100 and carries a dividend rate of 13 per cent payable annually. The share is redeemable after 12 years at par. If the net amount realized per share is ₹95, what is the cost of the preference capital?

Solution:

Given that D = 13, R = 100, P = 95 and n = 12

$$k_p = \frac{D + \frac{(R-P)}{n}}{\frac{(R+P)}{2}}$$

$$k_p = \frac{13 + \frac{(100-95)}{12}}{\frac{(100+95)}{2}}$$

k_p = 13.76% (approximate)

Solution with Excel

It is observed that through approximate formula the Cost of Preference Share (k_p) is 13.76%, whereas, the **'RATE'** function in Excel generates the precise value of Cost of Preference Share (k_p) as 13.88%

	A	B
1	**Illustration-6.2**	
2	**Description**	**Values**
3	Face Value (Given)	100
4	Issue Price (Given)	95
5	Dividend Rate (Given)	13%
6	Frequency (Given)	Annual
7	Redemption Amount (Given)	100.00
8	Tenure (Years)	12
9	Tax Rate	30.0%
10	**Cost of Preference Share**	**13.88%**
11	**Cost of Preference Share (Function)**	**=RATE(B8,B5*B3,-B4,B7)**

III. Cost of Equity Capital

Measuring the required rate of return for equity shareholders is a difficult and complex task because the equity shareholders' dividend stream is not specified and committed by

a legal contract (unlike for debenture holders). Various methods are used to estimate this rate of return, including the Dividend Forecast Method, the Capital Asset Pricing Method, the Earnings-Price Ratio Method, and the Bond Yield Plus Risk Premium Method.

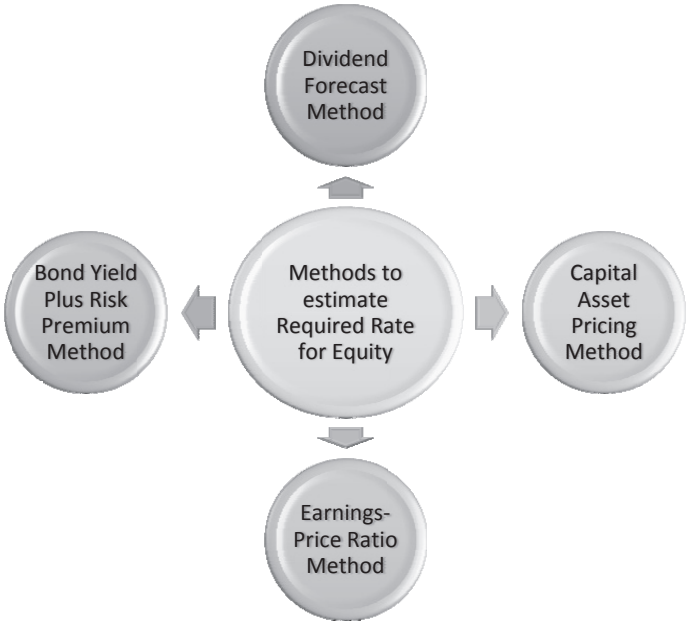


FIGURE 6.3: METHODS TO ESTIMATE REQUIRED RATE FOR EQUITY

IIIa. Dividend Forecast Method

According to the Dividend Forecast Method, the intrinsic value (true value) of an equity is equal to the sum of the present values of the expected dividends associated with the stock.

$$P_e = \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t}$$

Where,

P_e = Price Per Equity Share

D_t = Expected Dividend Per Share at the end of year one, and

K_e = Required Rate of Return by the equity shareholders.

If we know the current market price (P_e) and can predict the future dividend stream, we can calculate the required rate of return for equity shareholders, which is equivalent to the cost of equity capital.

In practice, the above-mentioned model cannot be used in its current form because it is impossible to predict the dividend stream precisely and completely over the company's lifetime. Therefore, dividend growth can be classified as Zero Growth, Constant Growth, or Supernormal Growth, and the above equation can be modified accordingly.

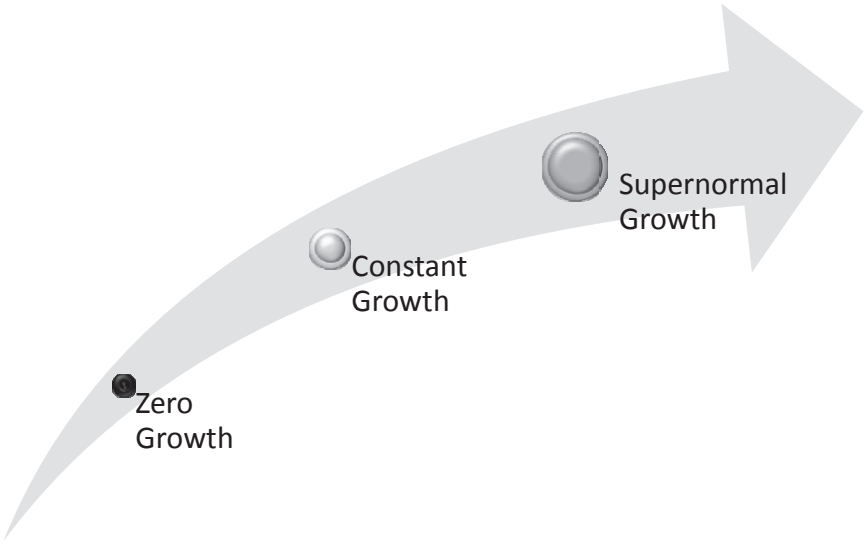


FIGURE 6.4: CLASSIFICATIONS OF GROWTH RATE IN EQUITY DIVIDEND

How to value a security based on the required rate of return along with its growth pattern will be discussed later in the chapter titled "Valuation of Securities." From the perspective of the company, the cost of equity is simply the rate at which the intrinsic value of the market price of the share equals the discounted value of the dividends. Let us take an example of a Constant Growth Rate (g) in DPS. Assuming a Constant Dividend Growth Rate, the preceding equation can be simplified as follows:

$$P_e = \frac{D_1}{k_e - g}$$

The cost of equity capital (k_e) will be:

$$k_e = \frac{D_1}{P_e} + g$$

Illustration 6.3

The market price per share of Cereals & Pulses Ltd. is ₹750. The dividend expected per share a year hence is ₹20 and the DPS is expected to grow at a constant rate of 10% per annum. What is the cost of the equity capital to the company?

Solution:

$$k_e = \frac{D_1}{P_e} + g$$

$$= \frac{20}{750} + 0.10$$

$$\text{ke} = 12.67\%$$

Solution with Excel

	A	B
1	**Illustration-6.3**	
2	**Description**	**Values**
3	Face Value (Not Given)	-
4	Market Price (Given)	750
5	Dividend Growth Rate (Given)	10%
6	Expected Dividend	20
7	**Cost of Equity**	**12.67%**
8	**Cost of Equity (Function)**	**=(B6/B4+B5)**

IIIb. Capital Assets Pricing Model

Sharpe, Lintner, and Mossin conceived of the Capital Asset Pricing Model (CAPM). This model is also known as SLM (the initials of Sharpe, Lintner, and Mossin), but is more commonly known as CAPM. This model is used for pricing (valuation) capital assets, as its name suggests. Any asset's pricing (valuation) requires at least two sets of data:

(1) Series of Cash Flows attached with the asset.

(2) Required Rate of Return for that asset.

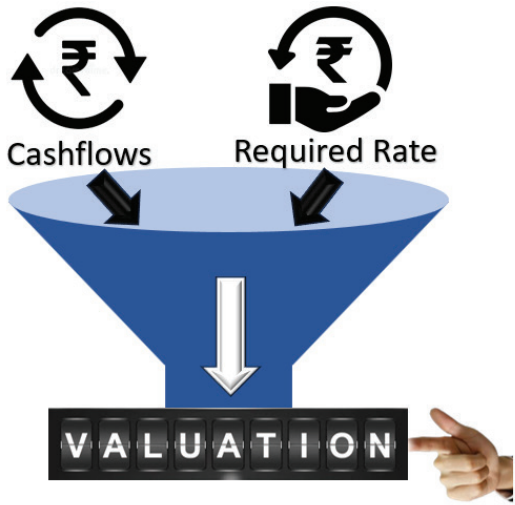


FIGURE 6.5: KEY FACTORS DRIVING VALUATION

Capital Asset Pricing Model (CAPM) estimates only one of these variables, namely the required rate of return for that asset. Before applying the model to realistic market conditions, it is essential to grasp the model's underlying assumptions.

Assumptions of Capital Asset Pricing Model (CAPM)

1. The investors are rational.
2. Investment decisions are based single period Risk & Return.
3. All investors have same time horizon of investment.
4. All assets are perfectly divisible.
5. There is no transaction cost.
6. No taxes prevail.
7. All investors are fully informed.
8. Inflation can be forecasted accurately by all.
9. Presence of a risk-free asset in the system.
10. Borrowing and lending is possible at risk-free rate.

With all the above assumptions, CAPM assumes that markets are 'Perfect' and there is no unknown factor affecting the asset returns, hence no unsystematic risk. In the absence of unsystematic risk, the only risk left back is systematic risk, which is measured in terms of Beta (β). Thus, every investor would require at least risk-free rate (opportunity cost) and compensation for systematic risk (risk premium).

$$R_i - R_f + \beta_i (R_m - R_f)$$

Where,

R_i = Required Rate of Return of Security 'i'
β_i = Beta value of Security 'i'
R_m = Market Returns
R_f = Risk-free Rate of Return
$(R_m - R_f)$ = Risk Premium

Here CAPM attempts to draw a linear relationship between Risk (Beta) and Return. Higher the risk higher the return; lower the risk lower the return; and for no risk *i.e.*, zero beta, at least risk-free rate of return.

The above relationship can be graphically displayed as: