CHAPTER – 1

INTRODUCTION
Corporate finance was considered a part of economics till 19th century. The role of financial management has undergone a tremendous change during the last century. The word ‘Finance’ was used in the same sense as the word ‘Capital’ by the economists. But in the early part of 19th century, corporate finance emerged as a separate field.

Initially, it dealt with only the instruments, institutions and procedural aspects of the capital markets. Technological innovations and establishment of new industries, resulting in industrial revolution sweeping the world over, created a need for more funds. This prompted the study of finance to focus on liquidity and financing of the firm. During this period, the capital markets were primitive and the investors were reluctant to purchase stocks and bonds. So finance concentrated heavily on legal issues related to the issuance of securities only. This trend continued till 1920s.

The great recession of 1930s, caused a large number of business failures in the USA. So, the focus of finance shifted to bankruptcy or reorganization of capital market. Emphasis shifted from expansion to a descriptive, institutional subject viewed from the outside rather than the inside. These developments led to significant contributions from financial researchers and academicians. Harry Markowitz(1952) developed the portfolio theory which is widely applied even today. This theory deals with the risk and return characteristics of a security and advocates that an investor can reduce his /her overall risk by having securities of different risk and return characteristics in his / her portfolio. Thus given one’s risk aversion level, one can choose a portfolio that gives maximum possible return.

In another significant work, David Durand(1959) developed two theories of capital structure viz., Net operating income (NOI) and Net Income (NI) theories. These theories were based on the assumptions of (i) Perfect capital markets, (ii) No growth in operating income, (iii) 100% dividend payout ratio, (iv) Debt and stock can be sold to repurchase the other security, (v) Constant Business risk (vi) Homogeneous expectations of investors, and (vii) Cost of debt, \(K_d\), remains constant. In NOI theory, he suggested, cost of equity capital increased with leverage, but keep the Weighted Average cost of Capital (WACC) remained constant. Thus, both the value of a firm and it’s cost of capital were independent of its capital structure.

The NI theory suggested that costs of debt and equity remained constant irrespective of change in degree of leverage. Since cost of debt is less than cost of equity, increase in
leverage will gradually decrease the WACC. As a result, the value of a firm increases with increase in leverage.

Late 1950’s witnessed significant developments in the field of corporate finance. Financial analysis techniques were designed to help the firms in maximizing their profits. Growth of stock markets, development of computers, valuation models and models for managing inventories, cash, accounts receivable and fixed assets, played an important role in shifting the focus from outside to inside point of view. Financial decisions within the firm were recognized critical issues in corporate finance.

These developments completely changed the role of a financial manager. Instead of playing a secondary role in the organization, he was required to play a more important, positive and responsible role. He was confronted with the problem of how to maximize the value of the firm. So the scope of his activities increased significantly. At the time of these rapid changes in corporate finance, came the most stunning, controversial and path breaking works of Franco Modigliani and Merton Miller (M-M). They can rightly be called the fathers of modern finance. Their path breaking articles transformed the study of finance from an institutional orientation to an economic orientation.

**COST OF CAPITAL**

Over the years, cost of capital has been one of the most disputed topics in financial management. It occupies a very important place because it determines the capital structure of a firm which further determines the financial risk, profitability, liquidity, earnings per share, future growth and above all the market value of a firm. So cost of capital plays a crucial role in financial decision-making. In this section, measurement of cost of capital and its relationship with capital structure of a firm are discussed.

1.1 Cost of Capital Concept

The term cost of capital is interpreted differently for different financial decisions. For capital budgeting decisions, it is used as a decision criterion for evaluating different investment opportunities. Viewed this way, cost of capital is the minimum rate return required for a project investment. It is also used in designing the capital structure of a firm. It can also be used to evaluate the financial performance of the top management.
1.2 Definition

Since there have been different interpretations and uses of the term ‘cost of capital’, hence it has been defined in a lot of different ways. For capital budgeting decisions it is defined as the cut-off rate or hurdle rate for accepting or rejecting a project investment. When Net Present Value method is used, cost flows to the present investment value. It can also be defined as the rate at which the earnings of a firm are capitalized. Most commonly it is defined as the weighted average of specific costs of capital.

A firm requires funds for investment in productive/revenue generating assets and activities. These funds can be arranged from different sources like equity capital, preference share capital, retained earnings, debentures and other loans and advances. In true sense, cost of capital can be defined as, “the rate of return the funds used should produce to justify their use within the firm in the light of the wealth maximization objective.”

1.3 Relevant Costs in Cost of Capital

The term cost of capital comprises of the following costs:

(i) **Explicit Costs**: These are the direct or clearly visible costs associated with a finance availing opportunity. Annual cash outflow, in the form of return to the holders of a specific security is the explicit cost of that security for the firm, for example, explicit cost of debt is the rate of interest, in case of share capital it is the dividend percent and in case of a non-interest bearing loan, is zero as only the principal is to be returned.

Explicit cost can be computed by applying following formula:

\[
I_q = \frac{A_1}{1 + K} + \frac{A_2}{(1 + K)^2} + \frac{A_3}{(1 + K)^3} + \ldots + \frac{A_n}{(1 + K)^n}
\]

\[
= \frac{n}{r=1} \frac{A_r}{(1 + K)^r}
\]

Where \( I_0 = \) net cash inflow in period \( 0 \)

\( A_t = \) cash outflow in period \( 1,2,\ldots,n \)

\( K = \) explicit cost of capital
(ii) **Implicit Costs**: These are the hidden costs, i.e., the cost of sacrifice made in availing a financing opportunity. The sacrifice is in the form of an alternative opportunity foregone while selecting a specific source of finance. Thus it may be defined as, “the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project under consideration by the firm is accepted.” Retained earnings have no explicit costs but definitely have implicit costs because had they been distributed among the shareholders, they might have earned some return by investing them in other securities. This expected rate of return is the implicit cost of retained earnings. Measurement of these costs is very difficult because estimating the expected rate of return on alternatives not availed of is not an easy task.

Total cost of capital = Explicit cost + Implicit cost.

(iii) **Floatation Costs**: These are the costs incurred when the firm raises from capital market, i.e., when a new issue is offered to the public. These costs include administrative expenses, brokerage and underwriters’ commission. They reduce the net proceeds from a new issue and thus increase the cost of capital.

Net proceeds = Face value of the issue – Flotation costs

1.4 **Measurement of Cost of Capital**

‘Capital’, as used here represents the funds (usually long term) employed by a firm to finance its assets and operations. These funds are raised from different sources which are called capital components. These components constitute, what we call, the capital structure of a firm shown on left hand side or top of the balance sheet, under the heading ‘Sources of Funds’. In the present day balance-sheets, current liabilities are not shown on the liability side. They are shown on the asset side as current Assets less Current Liabilities. So the capital structure will show the proportion in which various capital components, viz., (i) Equity share capital, (ii) Preference share capital, (iii) Reserves and Surplus (Retained Earnings), (iv) Debentures, (v) Secured and loans and advances, are used by a firm.

Different capital components have different costs because they differ from one another in respect of three characteristics, viz., time, return and risk. These characteristics
determine the specific costs of capital. Since combined cost of capital can be only after knowing the specific costs, so they are calculated first.

1.4.1 Specific Costs of Capital

(A) Cost of Debt: A debt certificate is characterized by three salient features namely (i) Fixed maturity period, (ii) Fixed interest payments in a given period and (iii) legal entitlement of the holder to receive the interest and principal at due date irrespective of the financial results of the company. So debentures they have these three features. When we use the term cost of debt, we refer to the combined cost of debt.

The cost of debt can be derived by solving the following equation:

\[
I_q = \frac{A_1}{1+K} + \frac{A_2}{(1+K)^2} + \frac{A_3}{(1+K)^3} + \ldots + \frac{A_n}{(1+K)^n}
\]

\[
= \sum_{i=1}^{n} \frac{A_i}{(1+K)^i}
\]

If the debt is issued at par, involves a fixed periodical interest payments and redeemed at par on the maturity date, the above equation is reduced in the form:

Since the interest paid on debt is tax deductible, therefore K should be adjusted for tax effect. If T is the corporate tax rate then after tax cost of debt, K_{id}, is given by

\[
K_{id} = k \left(1 - T \right)
\]

The values of k_{id}, computed for sample companies are shown in appendix B, table 1.
(B) Cost of Preference Capital: The cost of preference capital is a function of its stated dividends. A preference shareholder gets a fixed rate of dividend. This cost is not adjusted for tax effects since the dividend are paid from the profit net of taxes. Cost of preference capital is given by the following equation:

\[ K = \frac{\text{Preference Dividend}}{\text{Price of Preference Share}} = \frac{D_p}{P} \]  

(1.4)

(C) Cost of Equity Capital: The cost of equity capital is the most difficult cost to measure. The returns to an equity holder, in the form of dividends are neither guaranteed nor fixed in amount. He is entitled to residual profits and so the dividends paid to him are uncertain, variable and fluctuating. His total returns include dividends plus capital gain.

Theoretically cost of equity can be defined as the “minimum rate of return that a company must earn on the equity financed portion of the investment project in order to leave unchanged the market price of the stock”.

The three models developed to measure the cost of equity capital are as follows:

Developed by Gordon (1962), this model expresses market value of a firm as a function of dividends received by a shareholder. It is based on the assumptions of (i) unlevered firm, (ii) no external source of funds, (iii) content internal rate of return (r) and discount rate (Ke) (iv) no corporate taxes, (v) constant retention ratio (b) and thus growth rate g (=br) is also constant, (vi) Ke>g.

According to this model, the current share price is expressed as the present value of all future cash dividends to be received by a shareholder. Thus

\[ P_o = \frac{D_1}{1 + Ke} + \frac{D_2}{(1 + Ke)^2} + \frac{D_3}{(1 + Ke)^3} + \ldots + \frac{D_n}{(1 + Ke)^n} \]

\[ = \frac{a^n}{\alpha} \cdot \frac{D_i}{(1 + Ke)^i} \]  

(1.5)
Where \( P_o \) = Market price per share at time \( o \)

\( D_t \) = Expected dividend/share, to be paid in time ‘t’

\[(t = 1,2,...........,n)\]

\( K_e \) = explicit cost of capital

When the dividends remain constant over time (i.e. zero growth rate), then the above equation is reduced to

\[
P_o = \frac{D}{1+K_e} + \frac{D}{(1+K_e)^2} + \frac{D}{(1+K_e)^3} + ......+ \frac{D}{(1+K_e)^n}
\]

\[
= D \sum_{t=0}^{n} \frac{1}{(1+K_e)^t}
\]

(1.6)

On solving we get

\[
P_q = \frac{D}{K_e}
\]

(1.7)

When the dividends grow at a constant rate, \( g \) then Eq. (1.7) becomes

\[
P_o = \frac{D}{K_e - g}
\]

\[
K_e = \frac{D}{P_o} + g
\]

(1.8)

The limitations of this model are its assumptions. The main problem lies in the measurement of growth rate (\( g \)) because it is assumed to increase at a constant rate forever. Historic values of a \( g \) can be accurately calculated using the past figures but future values can at best be estimated only (by observing the past trend). These estimated value may not be realistic if the observations of the past fail to show a stable trend which can be projected in to future.
Secondly this model is very difficult to apply to companies which pay either no dividends or very negligible dividends. In such cases both dividends and time magnitudes have to be estimated.

(2) EARNING PRICE MODEL

This model measures the cost of equity in terms of earning (E) – price (P) ratio.

\[ Ke = \frac{E_1}{P_0} + g \] (1.9)

Where \( E_1 = \) Earning at the end of period

\( P_0 = \) Market price of share at the beginning of period 1.

This model is based on the assumptions: (i) growth of future earnings at a constant rate, and (ii) market price is determined by the expected earnings stream.

Out of these two models, earning – price model is widely used in practice, though the dividend valuation model is more logical. But Vanhorne argues that in general it is inappropriate to use this ratio as a measure of the cost of equity because in most cases, earnings per share (EPS) IS not a realistic estimate to the return that investors expect to receive. However, in the two cases given below this ratio can be used as a measure of the cost of the equity capital:

Case1. No growth in earnings and 100% dividend pay-out ratio.

We know that

\[ P_0 = \frac{n}{\sum_{t=1}^{n} \frac{D_t}{(1 + Ke)^t}} = \frac{n}{\sum_{t=1}^{n} \frac{(1 - b)}{(1 + Ke)^t}} \]

Now \( E_1 = E_2 = E_3 = \ldots = Ed = E1 \) and \( b = 0 \)

\[ P_0 = \frac{h}{\sum_{t=1}^{h} \frac{E1}{(1 + Ke)^t}} = \frac{E1}{Ke} & Ke = \frac{E1}{P_0} \]
Case 2. The firm is only expanding (not growing).

Here \( r = K_e \). So equation \( P_0 = D_1 (K_e - g) \) becomes

\[
P_0 = \frac{D_1}{K_e - K_e b} = \frac{E_1 (1 - b)}{K_e (1 - b)}
\]

or \( K_e = \frac{E_1}{P_0} \)

(3) **CAPITAL ASSET PRICING MODEL (CAPM)**

Developed by Sharpe (1964) and Lintner (1965) this model occupies previous two models do not consider the investors’ expectations while calculating the cost of equity capital. So the cost calculated is not the realistic one. An investor’s expected rate of return, on his investment in a firm’s stocks is given by:

\[
E (r) = K_e = i + B + Q
\]

Where \( i = \) Risk free rate

\( B = \) Business risk premium and

\( Q = \) Financial risk premium

The CAPM measures the return on a risky asset in the context of the overall market. Out of all the securities of a company equity has the maximum risk, so this model gives quite a reasonably accurate estimate of \( k_e \).

The return on a security in a period is given by

\[
R = \frac{D_1 + P_1 - P_0}{P_0}
\]

\[
= \frac{D_1 + P_1}{P_0} - 1
\]

(1.11)
Where R = return on a security in a period (usually one year),

Po = price of the security at the beginning of period 1,

P1 = price at the end of the period 1, and

D = dividend paid in period 1.

Risk associated with a security can be estimated by measuring it’s variance.

\[ \text{Variance}(\sigma^2) = \frac{(r_t - r)^2}{n - 1} \]

(1.12)

Where \( r = \) Mean return over a period of n years

\( r_t = \) Yearly return is period t (t = 1,2,3,--------n)

Each security, outstanding in the market, is evaluated on the basis of it’s risk and return characteristics. In general, higher the risk on a security, higher the return required on it. An investor holding a security is exposed to certain degree of risk. If he wants to reduce this risk, he will select two or more securities to invest in. This combination of different securities is called portfolio. Portfolio return and risk will be lower than those of a single security.

Portfolio return, \( R_p \), is given by

\[ R_p = \sum_{j=1}^{m} \hat{A}_j R_j \]

(1.13)

Where \( R_j = \) Return on security ‘j’

\( A_j = \) Portion of funds invested in security ‘j’

\( m = \) Number of securities in portfolio.

Portfolio variance is given by \( \sigma^2 \).

\[ \sigma^2 = \sum_{j=1}^{m} \sum_{k=1}^{m} \hat{A}_j \hat{A}_k T_{jk} \]

(1.14)
The two Greek summation signs suggest that every possible combination must be included in the total. In a portfolio having ‘m’ securities in it, there will be m variances (Covariance between a security’s return and itself) and \((m^2-m)/2\) covariances. There sum give us total portfolio variance.

After these considerations of risk and return associated with a security and a portfolio, the components of CAPM are discussed.

**Risk Free Rate:** It can be defined as the return required on a riskless investment. In reality is no such thing as riskless financial asset. Government T-bills could be considered as risk free financial assets. The returns on these bills is taken as the risk free rate. This risk free rate consists of two elements: (i) a real or inflation free rate, \(k\) and (ii) an inflation premium (IP) equal to the anticipated rate of inflation.

Thus \(i = k + IP\)

As the value of IP increases, \(i\) will also increase because the investors have to be compensated for the loss of purchasing power.

**Market Portfolio:** Market portfolio of common stocks can be represented by all available stocks, weighted according to their market values outstanding. Because of large number of shares, outstanding in the Indian capital market, it is not possible to include all of them in the portfolio. The base for selecting the market portfolio are the market values of 30 companies which are used by Bombay Stock Exchange for preparing the Sensitivity Index.

Let there be \(m\) securities in a market portfolio having market values \(S_1, S_2, \ldots \ldots \ldots \ldots \ldots S_m\), there total value being

\[
\sum_{j=1}^{m} S_j
\]

Now proportion of each security’s value to total value, \(p_j\), can be given by

\[
p_j = \frac{S_j}{\sum_{j=1}^{m} S_j} = \frac{S_j}{\sum_{j=1}^{m} S_j} = 1.00 \text{ or } 100\% 
\]
If \( R_j \) is the return on security \( j \) (calculate by using eq. 1.11), than market return, \( R_m \), is given by

\[
R_m = \hat{a} \sum_{j=1}^{m} p_j R_j
\]

(1.15)

**Systematic Risk:** This is the most important and difficult component of CAPM to measure. As already discussed, an investor’s expected rate of return on a security is the sum of risk free return and risk premium. The total risk involved in holding a security is composed of two parts: (i) unavoidable risk and (ii) avoidable risk.

Unavoidable risk cannot be avoided or reduced by an individual investor. He has to bear this risk. Changes in a action’s economy, corporate tax structure, government’s policies and regulations, represent risks that cannot be avoided. Each investor is exposed to this type of risk. It affects the capital market in a systematic manner. That is why this risk is also called systematic risk.

Avoidable risk affects a particular company only. Strike in a company, increased competition, obsolescence, change in management and character, operating results government restrictions and legal actions against a company, represent the risk associated with holding the stock of a particular company. This risk component is independent of economic, political and other factors that affect the securities in a systematic manner. This risk can be reduced or even eliminated by having a good number of securities in a portfolio. It is also called the unsystematic or residual risk. So now total risk can be represented as

\[
\text{Total risk} = \text{systematic risk} + \text{unsystematic risk}.
\]

CAPM considers only systematic risk because unsystematic risk can be reduced towards zero by having a good number of randomly selected securities (approximately 15-20), in the portfolio. So total risk is nearly equal to systematic risk, whose measure is given by \( \beta \) (Beta).

Beta is simply the slope of the characteristic line, which graphically shows the relationship between excessive return on stock (\( R_j - i \)) and excessive return on market portfolio (\( R_m - i \)).
Thus, Beta can be defined as the rate of change of excessive return on stock for 1% change in excessive return on market portfolio. Mathematically Beta can be measured by

\[
b = \frac{\text{cov.}(R_j - R_m - i)}{\text{Var.}(R_m - i)}
\]

\[
= \frac{r_{jm,oj} - i_{om} - i}{o^2 m - i}
\]

(1.16)

Some authors have used the following equation for measuring Beta:

\[
b = \frac{\text{cov.}(R_j, R_m)}{\text{Var.}(R_m)}
\]

(1.17)

In the present study, eq. (1.17) is used to determine the value of Beta.

Now the cost of equity capital is given by the equation:

\[
Ke = R_f + (R_m - R_f)
\]

(1.18)

If beta=1 then Ke = Rm, i.e., that both the security and market portfolio have same risk. Thus both will have same rate of return.

When \( \beta = 0 \), \( ke = R_f \), i.e., the security is risk free.

When \( \beta >1 \), the security is termed as aggressive because it is more risky, and when it is less than one, the security is termed as defensive or conservative because it is less risky. The values of Ke calculated by using CAPM are shown in appendix – B, table 2.

(D) Cost of Retained Earnings: Retained earnings represent that portion of the net profits which instead of being distributed as dividends to the existing shareholders, have been retained by the firm for investment within the firm’s operations and activities. In the balance sheet of a company these are shown as reserves and surplus.

Since no cash outflows are associated with this source of finance, some authors argue that the cost of retained earnings is zero. But there is a fallacy in this argument. Though the explicit cost is zero but retained earnings have implicit costs which cannot be ignored. Had
this amount been distributed as dividends among the shareholders they might have invested it in other securities and earned some return on them. This return is the opportunity cost which is also defined as the cost of retained earnings. This cost is measured as

\[ Kr = (1 - c) (1 - t) \]  \hspace{1cm} (1.19)

where \( Kr = \) cost of retained earnings

\( c = \) brokerage commission (weighted average)

\( t = \) weighted average tax rate for all stock holders.

The main difficulty of this model is the determination of marginal tax rate for all stock holders and of resolving the differences in these tax rates. In the absence of any published data or significant work, it is extremely difficult to make even an estimate relationship can be used to measure the cost of retained earnings:

\[ Kr = Ke \] \hspace{1cm} (1.20)

1.4.2 Weighted Average Cost of Capital

So far we have discussed the measurement of specific costs of capital. But they are not the right criteria for finding the value of a firm. For this purpose we need to know the average of all costs, as Alexander Barges (1963) clearly points out, “when used in this sense (specific cost of capital), the term carried the implication that profitability of a proposed capital project could be evaluated on two different cost bases. If the expected rate of return of a proposed project (Rp) exceeds \( ke \), the project could be financed either by debt or by equity funds. But if \( Rp < ke \), then the project could be considered only if \( Rp > kd \) and it will be financed by debt only. But while \( kd \) is much lower than \( ke \), use of debt creates risk to the shareholders which result from debt financing should be regarded as part of the costs of debt funds.”

Because of this relationship between the methods of financing and their costs, it has now been agreed that a weighted average cost of capital should be used instead of specific costs of capital. This cost represented as \( ka \), is measured as:
\[ Ka = Kp \frac{P}{P + D + E} + Kd \frac{D}{P + D + E} + Ke \frac{E}{P + D + E} \]

\[ Kp = \frac{(P/V)}{V} + Kd \frac{(D/V)}{V} + Ke \frac{(E/V)}{V} \]  \hspace{1cm} (1.21)

Where \( D, P, E = \) Market value of debt, preference share and equity share capital respectively

\[ V = \text{Total market value of a firm} \quad (V = D + P + E) \]

The values of \( ka \) obtained for samples companies are shown in appendix – B, table 3.

1.5 Cost of Capital and Capital Structure

A lot of work has been done on finding the effect of capital structure on cost of capital. In the first study, M-M (1954) used the previous works of Allen (1954) and Smith (1958). They used the following relationship:

\[ x = a + bd \]

Where \( x = \text{Average cost of capital and given as} \)

\[ x = \frac{\text{Total Earnings after taxes}}{\text{Market value of all securities}} = \frac{xt}{V} \]

and \( d = \frac{\text{Market value of Senior Securities}}{\text{Market value of all securities}} = \frac{D}{V} \)

The regression results were as follows:

Electric utilities, \( x = 5.3 + 0.006 \ d \quad R = .12 \) \hspace{1cm} (1.22)

Oil Companies \( x = 85 + 0.006 \ d \quad R = .04 \) \hspace{1cm} (1.23)

Since the value of \( R \) is statistically insignificant, the results supports their irrelevancy model.

In another study, Barges (1963) analyses the relationship between the average cost of capital and leverage by selecting the samples from railroad companies, departmental stores and cement industries. In his study, he used the book value measures for leverage. The
average cost was computed by dividing the 3 year average income before interest (1954-56) by the average total market value.

He obtained the following results for the railroads:

$$Y = 12.39 - 0.244X + 0.00258X^2$$ (1.24)

The results are significant at 1% level of F-value and supports the traditional view.

In another study, Weston(1963) included size of the firm (measured by assets) and growth (income per share over a 10 year period) as additional explanatory variables in his model. He obtained the following results:

$$X = 5.91 - 0.025d + OA - 0.822E \quad R = .5208$$ (1.25)

Where  

\[ d = \text{Market value debt ratio} \]

\[ A = \text{Size of the Firm} \]

\[ E = \text{EPS growth over a 10 years period.} \]

The correlation co-efficient is significant and the regression co-efficients of leverage is negative and significant. Thus when the influence of growth is isolated, leverage is found to be negatively related with cost of capital.

In their second study, M-M(1963) concluded that leverage factor was significant only because of tax advantage and dividends have no effect on the value of a firm.

Some studies have been done in India also. Sharma and Hanumanta Rao(1963) tested MM hypothesis on the 3 years data of 30 general engineering companies. They concluded that the value of a firm is independent of its capital structure after allowing for the tax advantage. Future, the cost of capital is affected by debt apart from its tax advantage.

Pandey(1981), in his study, concluded that cost of capital remains invariant to capital structure changes in the beginning but rises slowly, as compared to these changes, later on. Average cost of capital supports the traditional view. Further, no generalization can be made regarding the role of corporate debt in influencing the cost of equity.
CAPITAL STRUCTURE

Whether or not the capital structure of a firm affects its value, has been actively debated over the years. Though no universally accepted model has been developed so far, yet the work in this area has definitely helped us in understanding the problem in a better way.

1.6 Meaning of Capital Structure

Capital structure represents the proportion in which various long term capital components are employed by a firm. In a typical balance-sheet, they are shown on the left hand side or at the upper half under the heading ‘Sources of Funds’, in the following manner:

Sources of Funds

1. Shareholders funds:

   (i) Share capital

   Equity

   Preference

   (ii) Reserves and surplus

   Net Worth (E)

2. Loan funds:

   (i) Debentures

   (ii) Secured Loans (other than debentures)

   (iii) Unsecured Loans

   Total (D)  

Current liabilities are not shown here. They are shown on the asset side (application of funds) as:

Current Assets
Less current liabilities
1.7 Types of Capital Structure

Broadly, capital structure can be classified into two categories:

(1) Pure Equity Capital Structure

When a firm’s assets are financed by equity only (no borrowing), the capital structure is termed as pure equity capital structure and the firm is called an unlevered firm.

(2) Mixed Capital Structure

When the firm employs both equity and debt capital to finance its assets, the capital structure is termed as mixed/hybrid capital structure and the firm is called a levered firm. The specific mix of debt and equity which maximizes the value of a firm is called the Optimal Capital Structure.

In the present era, most of the companies have mixed capital structure because of two main advantages of debt financing: (i) lower cost and (ii) interest payments being tax-exempted. But excessive leverage may prove to be counter productive because of increased probability of bankruptcy (discussed in detail later on in this chapter).

1.8 Theories of Capital Structure

1.8.1 Traditional Approach

Prior to the works of Durand and M-M most academicians and practitioners considered this approach to be perfectly valid. This approach suggests that initially when debt is introduced in the capital structure, the investors do not consider a noticeable increase in their risk. So both cost of equity (Ke) and cost of debt (Kd) remain constant and since Kd < Ke, the average cost of capital (Ka) declines which in turn results in an increase in the value of the firm. But use of additional debt beyond a certain level will cause a decline in the market value of a firm because both the equity-holders and debt-holders feel an increase in their risk. So, both Ke and Kd start rising. The debt level at which the value of a firm is maximum is termed as optimal capital structure.
The main limitation of this approach lies in the fact that it is more judgmental than quantitative in nature. Till date the problem how to determine the optimal capital structure remains unsolved.

1.8.2 NI and NOI Theories

Out of the earliest formal works on the theory of capital structure was the 1952 study of David Durand (1959) who identified the two extreme approaches: (1) Net Income (NI) approach and (2) Net Operating Income (NOI) Approach.

This study was based on the following assumptions:

(i) Perfect capital markets (no information, transaction and bankruptcy costs).
(ii) No corporate taxes (relaxed later on).
(iii) No growth in operating income (constant EBIT).
(iv) 100% dividend pay-out ratio.
(v) Firm’s capital structure changeable by selling debt to repurchase stock or by selling stock to retire debt.
(vi) Homogeneous expectations of investors.
(vii) Cost of debt (Kd) remaining constant irrespective of the debt level in the capital structure.

These two approaches differ from one another in respect of what the investors capitalize, i.e., how they value the equity and debt of a firm.

(1) Net Income (NI) Theory

This theory assumes that investors capitalize the firm’s net income at constant rate (Ke).

\[ NI = EBIT (X) - Interest (I) \]

Value of the firm (V) = Value of Stock (E) + Value of Debt (D)

Now,

\[ E = \frac{X - I}{Ke} \text{ and } D = I/Kd \]
So

\[ V = \frac{X-I}{Ke} + \frac{I}{Kd} \]

\[ = \frac{X}{Ke} + (1/Kd - 1/Ke)I \] (1.26)

So for each unit of debt introduced, value of the firm increases by I \((1/Kd - 1/Ke)\). When \(E=0\) (100% debt financing), the value of the firm will be maximum because \(Kd\) and \(Ke\) remain constant throughout. In that situation,

\[ V = D = I/Kd \] (1.27)

(2) **Net Operating Income (NIO) Theory**

This theory assumes an entirely different approach by the investors. They are assumed to capitalize NOI at a constant rate \(Ka\). The value of the firm is given by

\[ V = \frac{X}{Ka} \] (1.28)

Constant value of \(Ka\) implies that \(Ke\) increases with leverage but this increase is completely offset by \(Kd\). So the value of a firm is independent of it’s capital structure.

**Effect of Corporate Taxes**

Durand examined the two theories under corporate taxes as well. Let \(T\) be the corporate tax rate. Then in NIO theory,

\[ V = \frac{NI}{Ke} + D = \frac{(X-I)(1-T)}{Ke} + D \]

Or \[ V = \frac{1}{Ke} X (1-T) - KdD(1-T) + KeD \]

\[ = \frac{1}{Ke} X (1-T) + D(Ke-Kd) + KdTD \] (1.29)

in NOI theory, \[ V = \frac{X(1-X)+KdT.D}{Ka} \] (1.30)

So in a world of corporate taxes, value of a firm increases with leverage under both theories but the increase is much greater in NIO theory.
1.8.3 Modigliani Miller Theory (1958)

The capital structure theories discussed so far were based on assertions about invertors behavior rather than a carefully constructed formal proof. In the paper considered to be most important ever published on financial research, Franco Modigliani and Merton Miller addressed the capital structure issue in a rigorous, scientific fashion and they set-off a chain of research that continues to this day.

M-M study is based on the following assumptions:

(i) Firms can be divided into “equivalent risk class”. All firms within a given risk class have same business risk.

(ii) Investors have homogeneous expectations about expected future corporate earnings and the riskiness of these earnings.

(iii) Stocks and bonds are traded in perfect capital markets. There are no information and transaction costs, investors are free to buy or sell securities and they act rationally. Investors and corporations can borrow at the same rate.

(iv) No corporate taxes (removed later).

(v) 100% dividend pay-out ratio.

(vi) Debt of firms and that of investors is risk-free.

Under these assumptions, they developed three propositions:

**Proposition I**

Market valued of firm j, $V_j$, is given by

$$V_j = E_j + D_j = X_j / P_k = \frac{EBIT}{K_a} \tag{1.31}$$

Where $X_j$ = Expected returns (EBIT) of firm j in class k

$P_k$ = Capitalization rate of class k (Ka)

That is, the market value of a firm is independent of it’s capital structure and is given by capitalizing it’s expected returns at the rate appropriate to it’s class.

This proposition can be stated in an equivalent way in terms of the firms weighted average cost of capital (WACC).
\[
WACC = Ka = \frac{X_j}{V_j} = \frac{X_j}{(E_j + D_j)} \quad \text{for any firm } j \text{ in class } k \quad (1.32)
\]

So WACC of any firm is also independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class. In equilibrium, the market values of any two firms in the same risk class will be equal. In case they differ, investors will switch to arbitrage process to make them equal.

**Proposition II**

This proposition defines the cost of equity, which follows from proposition I. For a levered firm

\[
Ke = \frac{X - KdD}{E}
\]

From proposition 1, \( X = Ka.V = Ka(E+D) \)

Substituting this value in the above eq. we get

\[
Ke = \frac{Ka(E + D) - Kd.D}{E} = \frac{Ka.E + (Ka - Kd)D}{E}
\]

or

\[
Ke = Ka + \frac{(Ka - Kd).D}{E} \quad (1.33)
\]

That is the cost of equity (or expected yield of a share) is equal to WACC plus financial risk premium (the debt/equity ratio times the spread between Kd and Ka). Thus cost of equity is a linear function of D/E ratio. When leverage is increased, both EPS and Ke increase. The benefit of leverage is completely offset by the increased cost of equity and as a result, there will be no change in the value of the firm.

Even when Kd starts increasing with leverage, Ke also tends to rise but at a decreasing rate and beyond some high level of leverage, it may even start to fall. So there will be no change in the value of the firm.

**Proposition III**

This proposition defines the optimal investment policy of a firm. A firm, acting in the best interest of its shareholders will explore an investment opportunity only if the rate of return on investment, say Ko is as large as or larger than Ka. So cut off rate for investment is
Ka which is unaffected by the type of security used in financing the investment. Equivalently Marginal Cost of Capital (MCC) = Average Cost of Capital (ACC).

**Effect of Taxes**

Because of interest payments being tax exempted, the value of all firms in a given risk class will not be proportional to the expected returns. Rather the market value will be proportional to their expected net returns after the taxes ($X_t^{i}$). That is

$$X_t^{i} = (X - K_d D) (1 - T) + K_d D$$  \hspace{1cm} (1.34)

and

$$K_A = E'/V_j \quad \text{or} \quad V_j = X_t^{i}/K_A$$

In their subsequent article, M-M (1963) modified the effect of taxes on firm’s valuation. They showed that the value of a firm, after arbitrage process, within a risk class will be a function not only of expected after tax returns ($X_t^{i}$) but of the tax rate and leverage also. After tax returns ($X_t^{i}$) are given by

$$X_t^{i} = (X - I) (1 - T) + I$$

$$= X (1 - T) + TI$$  \hspace{1cm} (1.35)

Which consists of (1) an uncertain stream $X (1 - T)$ and (2) a sure stream $T.I$. In equilibrium, market value of a firm can be found by capitalizing each component separately.

For an unlevered firm of size $X$,

$$K_A = X (1 - T)/V_m \quad \text{or} \quad V_m = X (1 - T)/K_A$$  \hspace{1cm} (1.35)

For a levered firm,

$$V_1 = \frac{X (1 - T)}{K_d} + \frac{T.I}{K_d}$$

Or

$$V_1 = V_u + D.T$$  \hspace{1cm} (1.36)

If this equation does not hold good, investors will switch over to more efficient portfolio by shifting their holdings from overvalued to undervalued firms. This process will continue till an equilibrium is reached where this equation holds good.

Equation (1.36) clearly shows the tax advantage of debt. This gain is because of (i) tax deductibility of interest payments and (ii) more favourable capitalization of $T.D$ since it represents a sure income.

Rewriting e.q. (1.36)
\[ V = \frac{X (1 - T)}{Ket} + \frac{T.I}{Kd} \]

Dividing both sides by \( V (1 - T) \)

\[ \frac{1}{(1 - T)} = \frac{X}{V.Ket} + \frac{T.I}{(1 - T)kd.V} \]

Or

\[ \frac{X}{V.Ke} = \frac{1}{1 - T} - \frac{T.I}{(1 - T)Kd.V} \]

\[ \frac{1}{(1 - T)} = \frac{T.I}{Kd.V} \]

Or

\[ \frac{X}{V} = \frac{KeT}{(1 - T)[1 - T . D/V]} \]  \hspace{1cm} (1.37)

Here \( X/V \) represents before tax yield (EBIT/Value). The after tax yield (interest + NI) is given by

\[ X'/V = Ke^i - T (Ke^i - Kd) \cdot D/V \]  \hspace{1cm} (1.38)

So both before tax and after tax yields are affected by leverage and the after tax yield on equity is given by

\[ NI/E = Ke^i + (1 - T) (Ke^i - Kd) \cdot D/E \]  \hspace{1cm} (1.39)

Since the publication of these papers, majority of the work on capital structure has centred around them. On one point all these works have a common conclusion: “M-M irrelevancy theory is perfectly valid when the capital market is perfect”. But does the model still work when market is not perfect? This question still remains unanswered though a lot of researches and work has been undertaken during the last 35 years. But they have surely helped in identifying various market imperfections. The major ones among them which are relevant for this problem are:

(i) Corporate taxes
(ii) Personal taxes
(iii) Bankruptcy costs
(iv) Agency costs
1.9 Corporate Taxes

Corporate taxes represent one of the most important market imperfections. M-M also showed that when $T > 0$, then

$$V_1 = Vu + T.D$$

The value $T.D$ represents a tax shield that the Government provides to the levered company. When $T = 0$, $V_1$ becomes equal to $Vu$ which proves their irrelevancy theory. But when corporate taxes exist, value of a levered firm exceeds that of an unlevered firm (both firms have same EBIT). The difference in values increases as the permanent debt level in the capital structure $(d)$ increases. The reason is that interest payments are not taxed at corporate level whereas dividend payments are made after paying corporate taxes. M-M model suggests that for getting maximum tax advantage, a firm should be 100% debt financed but they did not take into account other market imperfections like bankruptcy costs and increased cost of capital.

A firm enjoys the tax advantage of debt only as long as it has taxable income. If a firm has no taxable income, the interest tax savings will cease because it has no income against which the interest payments may be offset. As a result, the near full or full cash flow burden of interest payments would be felt by the firm. Further the quantum of this tax shield depends upon existing debt level, business risk and dividend policy. Tax advantage of debt will be greater for (i) initial low debt than for a high debt, (ii) low business risk firm than for a high business risk firm and (iii) low dividend payout ratio than for a high dividend payout ratio.

1.10 Bankruptcy Costs

These costs represent the second major market imperfection affecting the capital structure decisions of a firm. Bankruptcy problem arises when the firm fails to meet the fixed obligations to its creditors. When the liabilities of a firm exceed its assets (negative net worth), it becomes insolvent. This insolvency will result in either liquidation or reorganization. Both these procedures involve certain costs thus implying that bankruptcy is not costless. Only the levered firms faced this problem because unlevered firms do not go bankrupt.
Initially, when debt is introduced in the capital structure, the value of a firm increase because of lesser cost of debt and tax exemption of interest payments. But this increase will occur only as long as the probability of bankruptcy is zero or negligible. The value will decline at higher debt level, because greater the degree of leverage, and larger the fixed interest charge, greater is the probability of bankruptcy related loss of value.

This probability is not a linear function of D/E ratio, but increases at an increasing rate after a certain level. As a result, the expected cost of bankruptcy increases and it would have a negative effect on the value of the firm and it’s cost of capital. The ex-post cost of bankruptcy is borne by the creditors who probably pass on the ex-ante cost to shareholders in the form of higher interest rates. So the shareholders required rate of return (Ke) increases which is given as:

\[
Ke = \text{Risk free rate} + \text{Business risk premium} + \text{Financial risk premium}.
\]

Initially, financial risk will be zero or insignificant because the probability is negligible. But after a certain debt level, this probability increases which in turn sharply increases the value of Ke and decreases the value of the firm.

**Corporate Taxes and Bankruptcy Costs**

Our earlier discussion on corporate taxes and capital structure suggests that introduction of debt increases the value of the firm because of it’s tax advantage. So the value of a firm can be expressed as

\[
\text{Value of firm} = \text{Value of unlevered firm} + \text{Present value of net tax shields of debt}.
\]

But when bankruptcy costs are also taken into account, the above relationship can be modified as

\[
\text{Value of Levered firm} = \text{Value of the unlevered Firm} + \text{Present value of tax shield on debt} + \text{Present value of bankruptcy costs}
\]

So in view of both the taxes and the bankruptcy costs, an optimal capital structure may be expected to exist which is a trade-off between tax advantage of debt and bankruptcy costs. The tax effect has a positive influence on the value, whereas the bankruptcy costs will have a negative impact on it.
1.11 Agency Costs

Agency problem arises when ownership and control of a firm are separated. The management acts as an agent for the owner, in exchange of an agreed fee schedules and other perks. In a widely held company, the stockholders are not in a position to exercise greater control or influence on the management are not in the best interest of the stockholders. To avoid this situation, the stockholders can establish appropriate incentives for the agent and create necessary mechanism to monitor the agent.

These monitoring costs are borne by stockholders only because the debtholders anticipating these costs, charge higher interest rates which will lower the value of the firm. Efficient monitoring in the form of imposition of more safeguards and enforcement procedures can help in reducing these interest rates. But beyond a certain level, this reduction is more than offset by escalating agency costs. So a trade-off has to be struck to reduce these costs. This trade-off level determines the optimal capital structure.

The combined effect of all the three can be shown as

\[ VL = Vu + T.D - \text{Present value of expected bankruptcy costs} - \text{Present value of agency costs} \]

Sometimes the sub-optimal decisions taken by a manager may result in wind-fall gains to stockholders at the expense of the bondholders. In such a situation, strict enforcement of protective covenants in the debt contract, in the form of me-first rules, saves the interests of the debt holders. The monitoring costs will again be borne by the stockholders.

1.12 Personal Taxation

Till seventies, the word ‘taxes’ as used in the studies on valuation aspect of capital structure, meant only the corporate taxes. Neither M-M nor any commentator after them took into account the personal taxes while discussing the problem.

Merton Miller(1977) was the first to show the effects of capital structure on the value of a firm when both corporate and personal taxes are taken into account. He criticised the two trade-off theories (Bankruptcy and Agency costs) by arguing that though these costs do exist
but by any sensible reckoning they seem disproportionally small relative to the tax savings they are supposedly balancing.

Miller’s model can be explained in the following way:

Let \( T = \) Corporate tax rate
\( Te = \) Personal tax rate on income from stocks
\( Td = \) Personal tax rate on income from bonds

\( Te \) is a weighted average of the tax rate on dividends and capital gains.

When adjusted for personal taxes, \( Vu \) is given by

\[
Vu = \frac{EBIT (1 - t) (1 - Te)}{Ke} \tag{1.40}
\]

This eq. gives the net value of an unlevered firm after payment of taxes at corporate and personal level.

The annual cash flows (CFL) of a levered firm are given by

\[
CFL = (EBIT - I) (1 - T) (1 - Te) + I (1 - Td)
\]

\[
= EBIT (1 - T) (1 - Te) - I (1 - T) (1 - Te) + I (1 - Td)
\]

Now

\[
VL = \frac{EBIT (1 - T)(1 - Te)}{Ke} - \frac{I (1 - T)(1 - Te)}{Kd} + \frac{I (1 - Td)}{Kd}
\]

\[
= Vu + \frac{I (1 - Td)}{Kd} \frac{\dot{C}}{\dot{C}} - \frac{(1 - T)(1 - Te)}{(1 - Td)} \frac{\ddot{C}}{\ddot{C}}
\]

Or

\[
VL = Vu + \frac{\dot{C}}{\dot{C}} \frac{(1 - T)(1 - Te)}{(1 - Td)} \frac{\ddot{D}}{\ddot{D}} \tag{1.41}
\]

This equation shows the gain from leverage (GL) for the shareholders.

\[
GL = \frac{\dot{C}}{\dot{C}} \frac{(1 - T)(1 - Te)}{(1 - Td)} \frac{\ddot{D}}{\ddot{D}}
\]

This model has the following implications:
(1) When the capital market is perfect, \( T = T_e = T_d = 0 \) and \( GL = 0 \). Thus \( VL = Vu \) which proves the original M-M theory.

(2) If personal taxes are ignored or are equal (\( T_e = TS_d \)), \( GL = tD \) and \( VL = Vu + T.D \) is identical to M-M version under corporate taxes.

(3) When \( Te < Td \) then \( GL < T.D \) implying that differential personal taxes reduce the tax advantage of debt financing.

(4) If \((1 - T)(1 - Te) = (1 - Td)\) then \( GL = 0 \), i.e., in this situation there will be no tax advantage of debt. This is what Miller concluded in his article. If \( Te \) is assumed to be zero then in equilibrium, the value of a firm will be independent of it’s capital structure because the tax advantage of the debt to the firm will be completely offset by the personal tax disadvantage of the investors.

This Miller showed that M-M irrelevancy theory is valid even in an imperfect market. When supply of capital is taken into account, an optimal capital structure may exist at industry level only.

Both M-M and Miller models recognized debt as the only tax saving instrument which established the importance of tax shield of debt. But this importance is reduced if non-debt tax shields like depreciation deductions and investment tax credits are used by the firms. Existence of these tax shields in the realistic tax code features imply a unique interior optimum leverage decision for each firm in market equilibrium even if bankruptcy, agency and other related costs are ignored. But when these costs are taken into account a firm will again have an optimal capital structure irrespective of whether non-debt tax shields are available or not.

When a company recapitalizes its capital structure by exchanging one type of security for another, the net tax shield, under the corporate and personal taxes, is less than corporate tax shields (T.D).

1.13 Current View on Financial Leverage

In perfect markets, validity of M-M irrelevancy theory is unchallenged. The main thrust in subsequent works has been on testing the validity when market imperfections exist. Some studies have proved its validity under less restrictive conditions, like relaxing the assumptions of risk-free debt and equivalent risk class and considering the positive probability of bankruptcy, using different equilibrium approaches.
Debt has benefits, the most significant being tax deductibility of interest payments. However, debt has costs like lower EBIT beyond some debt level and interest expenses. Their total effect on the value of a firm is shown by the following equation.

\[ VL = Vu + D.T - PV \text{ of Reduction} \]
\[ \text{expected in value} \]
\[ \text{bankruptcy costs} \]
\[ \text{from lower agency costs} \]
\[ \text{EBIT increased cost of debt} \]

As long as the tax benefits of debt are greater than the cost associated with it value of the firm increases. Up to a point, these costs are negligible as a result value increases linearly with leverage as the tax shelter effect totally dominates the relationship. Beyond this, these costs become more significant and offset some of the tax advantages. Thus, the value increases at a lower rate.

The marginal tax benefit of debt are exactly offset by the disadvantages of debt. At this debt level, the value of the firm reaches to maximum. This is the optimal debt level or to be more correct optimal capital structure. At this point the cost of capital is minimum. Any increase in debt beyond this level will reduce the value because the marginal costs of debt become greater than it’s marginal benefits.

### 1.14 A Recapitulation

On the basis of works done so far on the problem of capital structure, we can identify the three clearly defined models:

**Model I:** When the capital markets are perfect

\[ VL = Vu = \frac{EBIT}{Ka} = \frac{EBIT}{Keu} \]

i.e., the value of a firm is independent of it’s capital structure. Also the cost of capital is independent of it’s capital structure and equal to the capitalization rate of an unlevered firm in the same risk class. Thus there does not exist an optimal capital structure.

**Model II:** When only corporate taxes are taken into account then

\[ VL = Vu + T.D \]
This model assumes bankruptcy, agency and related costs to be too insignificant to affect the value of a firm. Thus the value of a firm increases with the increase in debt level. But this model fails to answer the question, “How long the value will increase with the increase in debt level?”

Model III: When bankruptcy agency and other related costs are taken into account then

\[
VL = Vu + T.D - \text{PV of expected \& reduction in value of bankruptcy costs} - \text{PV of reduction in value of agency costs from lower EBIT} - \text{PV of reduction in value of increased cost of debt}
\]

This model clearly advocates the existence of an optimal capital structure which is a trade-off between tax advantages and disadvantages of leverage. The bankruptcy problem arises when a firm fails to meet its fixed contractual obligations continuously for a number of years. So as long as a firm remains liquid, there is no bankruptcy problem.

Though theoretically this model seems to be quite sound and agreed to by most of the authorities on finance, but it is not possible to empirically test this model in practice, because of the following practical problems:

1. Whether or not arbitrage can work exactly, as MM has suggested to produce the tax shelter benefit specified by the term, TD;
2. The significance of bankruptcy costs;
3. The extent to which agency costs and other factors lower EBIT as leverage increases;
4. The exact relationship between interest rates and leverage;
5. The precise effect of personal taxes.

Agency problem arises when the ownership and management are separated. Managers act as agents appointed by the owners for running the business. If both are utility maximizers, a potential conflict of interests will arise. This conflict is shareholders will have to incur agency cost, if they went to ensure that the managers act in the best interest of them. These agency costs may be in the following forms:

(i) Expenditure to monitor managerial actions,
(ii) Expenditure to bond the Managers,
(iii) Expenditure to structure the organization so as to limit the undesirable managerial behavior.

(iv) Opportunity costs associated with profit opportunities foregone by not taking timely action.

The agency costs, incurred are advantageous as long as the benefits exceed the costs, because during this stage the value of the firm will increase. Excessive agency costs will have a negative effect on the value of the firm. So to maximize the value a trade off has to be struck between the benefits and costs of agency problem mechanism.

So in the absence of a prefect capital market, none of the above models can be practically applied, because of the problems mentioned above.

1.15 Need of the Present Study

The field of corporate finance, over the years, has come a long way from an institutional in character to an economic orientation. The contribution made by M-M has been on the centre stage all along these years. A whole lot of literature has been written during the last decades or so in favors of and against the path breaking papers of M-M. There are no errors in the logical structure of their models. The major area of disagreement has been the non-existence of perfect capital markets. Hence there is the need to conduct models which entail in their assumptions real world situations and are inconsistent with MM models.

Considering the fact that capital structure decisions are one of the most important decisions to be taken by a finance manager but the lack of empirical evidences in our country today to show the effects of market imperfections on the relationship between capital structure and value of a firm, made me to work on this present problem.

The problem of optimal capital structure is as relevant and critical as it was at the time of publication of MM works. During the years, it has been the most debated and talked about topic in finance. But till date, there has been no consensus on it.

So keeping in view the above facts, this study was undertaken as an humble attempt to determine an optimal capital structure in Indian market.