Chapter 2: Dividend and Value of the Firm - Conceptual Framework

2.1 Introduction

In 1976 Black described dividend as a "puzzle" and since then an enormous amount of research has occurred trying to solve the dividend puzzle. Allen et al. (2000) summarised the current consensus view when they concluded “Although a number of theories have been put forward in the literature to explain their pervasive presence, dividends remain one of the thorniest puzzles in corporate finance”.

Thus dividend puzzle both as a share valuing enhancing feature and as a matter of policy is one of the most controversial topics of corporate finance. In this chapter highlights will be given regarding the different theories emerged in relation to dividend and value of firm.

We have divided the chapter into two parts:

- Theoretical framework of dividend
- Theoretical framework of value of firm

2.2 Theoretical Framework of Dividend

The term 'dividend policy' refers to “the practice that management follows in making dividend payout decisions or in other words, the size and pattern of cash distributions over time to shareholders”(Lease et al. 2000). Finance scholars attempted to solve several issues pertaining to dividend and formulate theories and models to explain corporate dividend
Conflicting theories have emerged explaining the impact of dividends on the value of the firm. According to one school of thought, dividend decisions do not affect shareholders' wealth and also the valuation of the firm. According to another school of thought, dividend decisions materially affect shareholders' wealth and also the valuation of the firm.

Thus, dividend theories are grouped as:

- Dividend Irrelevance Theories
- Dividend Relevance Theories

Above theories are explained in detail in following sections.

### 2.3 Dividend Irrelevance Theory

It implies that dividend policy has no effect on the share price of the firm and therefore does not have impact on the value of the firm. These theories, which argue that dividends are not relevant in determining the value of the firm, are:

- Residual Theory
- Miller and Modigliani (MM) Model
- Dividend Clientele Effect
- Rational Expectations Model

#### 2.3.1 Residual Theory of Dividend Policy

Dividend, investment, and financing decisions are interdependent and in the long run, a trade-off must be made. Because a firm cannot afford to:
• Forego profitable investment;
• Operate with non-optimal capital structure;
• Finance dividends by issuing new shares.

The only policy that avoids one of the above choices is to treat dividends as a residual.

The residual theory of dividend assumes that if the firm has retained earnings "left over" after financing all acceptable investment opportunities, these earnings would then be distributed to shareholders in the form of cash dividends. If no fund is left, no dividend will be paid. In such a case the dividend policy that results is strictly a financing decision. When dividend policy is treated as a financing decision, the payment of cash dividends is a passive residual. The treatment of dividend policy as a passive residual determined strictly by the availability of acceptable investment proposals implies that dividends are irrelevant; the shareholders are indifferent between dividends and retentions.

Following residual theory of dividend means fluctuations in the dividend payout from period to period in keeping with fluctuations in the amount of acceptable investment opportunities available to the firm. If these opportunities are plenty, the percentage of dividend payout is likely to be zero. On the other hand, if the firm is unable to find profitable investment opportunities, dividend payout ratio is likely to be one. For situations between these two extremes, the payout ratio will be a lying between zero and one.

The residual theory of dividend policy does not mean that dividends need fluctuate from period in keeping with fluctuations in investment opportunities. A firm may smooth out actual payments by saving some funds in surplus years in anticipation of deficit ones.
Regarding the acceptability of investment opportunities, it may be stated that the firm would retain earnings for investment in new projects up to the point where the marginal return on new investment equals the marginal cost of capital. Thus, the amount of opportunities. If the expected returns on the available investment opportunities are more than the firm’s marginal cost of capital, the firm will undertake as many of these investments as are within its financial capability and thus no dividend will be paid to the shareholders. Conversely, if the expected returns are less than the firm’s marginal cost of capital, the firm will not accept the investment opportunities the entire earnings may be distributed by way of dividend. The position is graphically shown in Figure 2.1 below.

**Figure 2.1: Relationship between cost of capital and new investment**

Investment schedule A shows that there are good investment opportunities in a year when the firm can invest from its retained earnings up to Rs. 66 lakh, since up to this level of investment, the return on the
investments exceeds the marginal cost of capital. In a year in which there are fewer investment opportunities, denoted by schedule B, the firm will be able to invest only up to Rs. 50 lakh before the marginal cost of capital begins to exceed the return obtainable on new investments. Schedule C represents a far less investment opportunities when the firm can invest only up to Rs. 30 lakh.

2.3.2 **Miller and Modigliani Position**

Miller and Modigliani (1961), (MM hereafter) have advanced the view that the value of a firm depends solely on its earning power and is not influenced by the manner in which its earnings are split between dividends and retained earnings. This view, referred to as MM “Dividend irrelevance” theorem is presented in their celebrated 1961 Article.

MM’s hypothesis of irrelevance is based on the following assumptions:

a. The firm operates in perfect capital markets where investors behave rationally, information is freely available to all transactions and flotation costs do not exist. Perfect capital markets also imply that no investor is large enough to affect the market price of a share.

b. Taxes do not exist; or there are no differences in the tax rates applicable to capital gains and dividends. This means that investors value a rupee of dividend as much as a rupee of capital gains.

c. The firm has a fixed investment policy.
d. Risk of uncertainty does not exist. That is, investors are able to forecast future prices and dividends with certainty, and one discount rate is appropriate for all securities and all time periods. Thus, \( r = k \) (where \( r \) is rate of return and \( k \) is discount rate)

Under the MM assumptions, \( r \) will be equal to the discount rate, \( k \) and identical for all shares. As a result, the price of each share must adjust so that the rate of return, which is composed of the rate of dividends and capital gains, on every share will be equal to the discount rate and be identical for all shares. Thus, the rate of return for a share held for one year may be calculated as follows:

\[
\frac{\text{Dividends} + \text{Capital gains (or loss)}}{\text{Share price}}
\]

\[
r = \frac{\text{DIV}_t + (P_t - P_0)}{P_0}
\]

(2.1)

Where,

\( P_0 = \) Market or purchase price per share at time 0;
\( P_t = \) Market price per share at time 1;
\( \text{DIV}_t = \) Dividend per share at time 1.

As hypothesized by MM, \( r \) should be equal for all shares. If it is not so, the low-return yielding shares will be sold by investors who will purchase the high-return yielding shares. This process will tend to reduce the price of the low-return yielding shares and increase the prices of the high-return shares. This switching or arbitrage will continue until the differentials in rates of return are eliminated. The discount rate will also be equal for all firms under the MM assumptions since there are no risk differences.
From MM's fundamental principle of valuation described by Equation (2.1), we can derive their valuation model as follows:

\[ r = \frac{DIV_1 + (P_1 - P_0)}{P_0} \]

\[ P_0 = \frac{DIV_1 + P_1}{1 + r} = \frac{DIV_1 + P_1}{1 + k} \]  
(2.2)

since \( r = k \) in perfect capital markets. Multiplying both sides of Equation (2.2) by the number of shares outstanding, \( n \), we obtain the total value of the firm if no new financing exists:

\[ V = nP_0 = \frac{n(DIV_1 + P_1)}{1 + k} \]  
(2.3)

If the firm sells \( m \) number of new shares at time 1 at a price of \( P_1 \), the value of the firm at time 0 will be:

\[ nP_0 = \frac{n(DIV_1 + P_1 + mP_1 - mP_1)}{1 + k} \]

\[ = \frac{nDIV_1 +nP_1+ mP_1 - mP_1}{1 + k} = \frac{nDIV_1 + (n + m)P_1 - mP_1}{1 + k} \]  
(2.4)

MM's valuation Equation (2.4) allows the issue of new shares, unlike Walter's and Gordon's models. Consequently, a firm can pay dividends and raise funds to undertake the optimum investment policy. Thus, dividend and investment policies are not confounded in the MM
model, like Walter’s and Gordon’s models. As such, MM’s model yields more general conclusions.

The investment programmes of a firm, in a given period of time, can be financed either by retained earnings or the issue of new shares or both. Thus, the amount of new shares issued will be:

\[ mP_1 = l_1 - (X_1 - nDIV_1) = l_1 - X_1 + nDIV_1 \]  \hspace{1cm} (2.5)

Where,

\[ l_1 = \text{Total amount of investment during first period}; \]
\[ X_1 = \text{Total net profit of the firm during first period}. \]

By substituting Equation (2.5) into Equation (2.4), MM showed that the value of the firm is unaffected by its dividend policy, thus,

\[ nP_0 = \frac{nDIV_1 + (n+m)P_1 - mP_1}{(1+k)} \]

\[ = \frac{nDIV_1 + (n+m)P_2 - l_1 - X_1 + nDIV_1}{(1+k)} \]

\[ = \frac{(n+m)P_1 - l_1 + X_1}{(1+k)} \]  \hspace{1cm} (2.6)

A firm which pays dividends will have to raise funds externally to finance its investment plans. MM’s argument, that dividend policy does not affect the wealth of the shareholders, implies that when the firm pays
dividends, its advantage is offset by external financing. This means that the terminal value of the share (say, price of the share at first period if the holding period is one year) declines when dividends are paid. Thus, the wealth of the shareholders - dividends plus terminal price - remains unchanged. As a result, the present value per share after dividends and external financing is equal to the present value per share before the payment of dividends. Thus, the shareholders are indifferent between payment of dividends and retention of earning.

**Criticism of MM's hypothesis:**

MM argue that the dividend decision of the firm is irrelevant in the sense that the value of the firm is independent of it. The crux of their argument is that the investors are indifferent between dividend and retention of earnings. This is mainly because of the balancing nature of internal financing (retained earnings) and external financing (raising of funds externally) consequent upon distribution of earnings to finance investment programmes. Whether the MM hypothesis provides a satisfactory framework for the theoretical relationship between dividend decision and valuation will depend on the ultimate analysis, or whether external and internal financing really balance each other. This in turn, depends upon the critical assumptions, are logically consistent and intuitively appealing. But these assumptions are unrealistic and untenable in practice. As a result, the conclusion that dividend payments and other methods of financing exactly offset each other and hence, the irrelevance of dividends, is not a practical proposition; it is of merely theoretical relevance. The validity of the MM
approach is open to question on two counts (a) imperfection of capital market and (b) resolution of uncertainty.

(a) Market Imperfection: MM assumes that capital markets are perfect. This implies that there are no taxes; floatation costs do not exist and there is absence of transaction costs. These assumptions are untenable in real world situations.

• Tax Effect: An assumption that MM hypothesis suggests is that there are no taxes. It implies that retention of earnings (internal financing) and payment of dividends (external financing) are, from the viewpoint of tax treatment, on an equal footing. The investors would find both the forms of financing equally desirable. But the assumption of absence of taxes is unrealistic as the income of the investors with few exceptions, is liable to tax.

• Two Types of Tax Liabilities: The first type of tax liability is tax on dividend income and the other is capital gains and the first type of tax is deducted when dividend is paid off and the question of capital gains arises only when the shares are sold in the market i.e., it is a deferred tax till the actual sale of shares takes place. The type of taxes corresponding to the forms of financing, are different, although the MM position would imply otherwise. The different tax treatment of dividend and capital gains means that with retention of earnings, the shareholder’s tax liability would be lower or there would be tax savings to shareholders. For example, a firm pays dividends to the shareholder out of retained earnings. To finance its investment programs, it issue rights share. The shareholders would have to pay tax on the dividend income at rates appropriate to their income bracket. Subsequently they would purchase
the shares of the firm. Clearly, the tax could have been avoided if instead of paying the dividend, the earnings were retained. If, however, the investors required funds, they could sell a part of their investments, in which case they will pay tax (capital gains) at a lower rate. There is a definite advantage to the investors owing to the tax differential in dividend and capital gains tax, and, therefore, they can be expected to prefer retention of earnings. This line of reasoning is also supported by empirical evidence. Elton and Gruber have shown that investors in high income brackets have a preference for capital gains over dividends while those in low tax income brackets prefer dividends. In a more comprehensive study Britain, J.A. found an inverse relationship between dividend payout ratios and the differential between tax rates, dividend income and capital gains. That is, rising tax rates tend to depress dividends. The MM assumption is, therefore, untenable.

- **Flotation Costs**: Another assumption of MM hypothesis is the absence of flotation costs. Flotation costs refer to the cost involved in raising capital from the market. The term flotation cost refers to brokerage, underwriting commission and other expenses. MM position, it may be recalled, argues that given the investment decision of the firm, external funds would have to be raised equal to the amount of dividend through the sale of new shares to finance the investment programme. The two methods of financing are not perfect substitutes because of flotation costs. The introduction of such costs implies that the net proceeds from the sale of new shares would be less than the face value of the shares, depending on their size. It means that to be able to make use of external funds, equivalent to the dividend payments the firm would have to sell shares for an amount in excess of the retained earnings. In other words, external
financing through sale of shares would be costlier than internal financing via retained earnings. The smaller the size of the issue the greater the percentage flotation cost. For example, if the flotation cost is 10% and the retained earnings are Rs. 1,000/-; in case dividends are paid, the firm will have to sell shares worth Rs. 1,100/- to raise funds equivalent to the retained earnings. The external financing is another way of saying that firms would prefer to retain earnings rather than pay dividends and then raise funds externally.

- **Transaction and Inconvenience Cost:** Yet another assumption which is open to question is that there are no transaction costs in the capital market. Transaction cost refers to cost associated with the sale of securities by the shareholder-investors. The no-transaction cost postulate implies that if dividends are not paid (or earnings are retained) the investors, desirous of current income to meet consumption needs, can sell a part of their holdings without incurring any cost, like brokerage and so on. This is obviously an unrealistic assumption. Since the sale of securities involves cost, to get current income equivalent to the dividend, if paid, the investors would have to sell securities in excess of the income that they will receive. Apart from the transaction cost, the sale of securities as an alternative to current income, is convenient to the investors. Moreover, uncertainty is associated with the sale of securities. For all these reasons, an investor cannot be expected as MM assume, to be indifferent between dividend and retained earnings. The investors interested, to be indifferent between dividend and retained earnings. The investors interested in current income would certainly prefer dividend payment over ploughing back of profits by them.
• **Institutional Restrictions**: The dividend alternative is also supported by legal restrictions as to the type of ordinary shares in which certain institutional investors can invest. For instance, the LIC of India is permitted in terms of clause 1(a) to 1(g) of Section 27A of the Insurance Act 1930, to invest in only such equity shares on which a dividend of not less than 4% including bonus has been paid for 5 years or for at least 5 out of 7 years immediately preceding. To be eligible for institutional investment the company should pay dividends. These legal impediments, therefore, favour dividends to retention of earnings. A variation of the legal requirement to pay dividends is to be found in the case of the UTI (Unit Trust of India). The UTI is required in terms of the stipulations governing its operations, to distribute at least 90% of its net income to unit holders. It cannot invest more than 5% of its investible funds under the unit schemes 1964 and 1971, in the shares of new industrial undertakings. The point is that eligible securities for investment by the UTI are assumed to be those that are on dividend paying list.

To conclude the discussion of market imperfections, there are four factors which dilute the indifference of investors between dividends and retained earnings. Of these, two, i.e., tax differential and flotation costs, seem to favour retention of earnings. On the other hand, the desire for current income and, the related transaction and inconvenience costs, and legal restrictions as applicable to the eligible securities for institutional investment, lead to a preference for payment of dividends. The tax differential between dividend and capital gains is by far the strongest factor. In sum, therefore, market imperfections imply
that investors would like the company to retain earnings to finance investment programmes. The dividend policy is not irrelevant.

(b) Resolution of Uncertainty: Apart from market imperfections, the validity of MM hypothesis, in so far as it argues that dividends are irrelevant is questionable under conditions of uncertainty. MM holds, it would be recalled that dividend policy is as relevant under conditions of uncertainty as it is when perfect certainty is assumed. The MM hypothesis is, however, not tenable as investors cannot be indifferent between dividends and retained earnings under conditions of uncertainty. This can be illustrated with reference to four aspects: (i) Near vs. distant dividends; (ii) informational content of dividends; (iii) preference for current income; and (iv) Sale of stock at uncertain price.

• Near Vs Distant Dividend: One aspect of the uncertainty situation is the payment of dividend now or at a later date. If the earnings are used to pay dividends to the investors, they got “immediate” or “near” dividend. If, however, the net earnings are retained the shareholders would be entitled to receive a return after sometime in the form of an increase in the price of shares (capital gains) or bonus shares and so on. The dividends may, then, be referred to as “distant” or “future” dividends. The crux of the problem is are the investors indifferent between immediate and future dividends? Or would they prefer one over the other? According to Gordon, investors are not indifferent; rather, they would prefer near dividend to distant dividend. The payment of dividend is uncertain; how much dividend and when it would be paid by the firm to the investors cannot be precisely forecast. The longer the distance in future dividend
payment, the highest the uncertainty to the share-holders. The uncertainty increases the risk of the investors. The payment of dividend is not associated with any such uncertainty. In other words, payment of immediate dividend resolve uncertainty. The argument that near dividend implies resolution of uncertainty is referred to as the “bird-in-hand” argument. Since current dividends are less risky than future/distant dividends, shareholders would favour dividends to retained earnings.

**Informational Content of Dividends:** Another aspect of uncertainty, very closely related to the first (i.e. resolution of uncertainty or the “bird-in-hand” argument) is the informational content of “dividend” argument. According to the latter argument, as the name suggests, the dividend contains some information vital to the investors. The payment of dividend conveys to the shareholders information relating to the profitability of the firm. If for instance, a firm has been following a stable dividend policy, in the sense of a fixed dividend/Payout ratio (say, 50% of the net earnings), an increase in the ratio will signify that the firm, expects its profitability to improve in future or vice-versa. The dividend policy is likely to cause a change in the market price of the shares. The significance of this aspect of the current dividend payments is expressed by Ezra Solomon in the following words: “In an uncertain world in which verbal statements can be ignored or misinterpreted, dividend action does not provide a clear-cut means of ‘market a statement’ that speaks louder than a thousand words”.

MM also concede the possibility of the effect of informational content. But, they still maintain that dividend policy is irrelevant as dividends do not determine the market price of shares. They
contend that the value is determined by the investment decision of the firm. All that the informational content of dividends implies is that dividends reflect the profitability of the firm. They cannot by themselves determine the market price of shares. The basic factor, therefore, is not dividend, but, expectation of future profitability.

The informational content argument finds support in some empirical evidence. It is contended that changes in dividends convey more significant information than what earnings announcements do. Further, the market reacts to dividend change – prices rise in response to a significant increase in dividends and fall when there is a significant decrease or omission.

- **Preference for Current Income**: The third aspect relating to dividends is based on the desire of investors for current income to meet consumption requirements. The MM hypothesis of irrelevance of dividends implies that in case dividends are not paid, investors who prefer current income can sell a part of their holdings in the firm for the purpose. But, under uncertainty conditions, the two alternatives are not on the same footing because (i) The prices of shares fluctuate so that the selling price is uncertain, and (ii) Selling a small fraction of holdings periodically is inconvenient. That selling shares to obtain income, as an alternative to dividend, involves uncertain price an inconvenience, implies that investors are likely to prefer current dividend. The MM proposition would, therefore, not be valid because investors are not indifferent.
• **Under-pricing:** Finally, MM hypothesis would also not be valid when conditions are assumed to be uncertain because of the prices at which the firms can sell shares to raise funds to finance investment programme consequent upon distribution of earnings to the shareholders. The irrelevance argument would be valid provided the firm is able to sell shares to replace dividends at the current price. Since the shares would have to be offered to new investors, the firm can sell the shares to replace dividends at the current price. Since the shares would have to be offered to new investors, the firm can sell the shares only at a price below the prevailing price. It is rightly contended by Lintner (1956) that the equilibrium price of a share will decline as the firm sells additional stock to replace dividends. The under pricing or sale of shares at prices lower than the current market price implies that the firm will have to sell more shares to replace the dividend. The firm would be better-off by retaining profits as opposed to paying dividends.

Under conditions of uncertainty, therefore, the MM doctrine of irrelevance does not hold good. To recapitulate the preceding discussion, in the context of market imperfections and uncertainty situations, shareholders are not indifferent between retained earnings and current dividends. The considerations that support the proposition that investors have a systematic preference for current dividend relative to retained earnings are (i) Desire for current income, (ii) Resolution of uncertainty and the allied aspect of informational content of dividends, (iii) Transaction and inconvenience costs and (iv) Under-pricing of new shares. On the other hand, the more favourable tax treatment of capital gains relative to dividend income favours retention of earnings. These
two sets of factors partly offset each other. Whether investors have a net preference for dividends or retained earnings would depend upon their relative strength. The empirical evidence regarding the effect of dividends, on the market price of shares is only suggestive. Yet, it indicates of the fact that companies behave as if dividends are relevant. The MM hypothesis, therefore, is untenable.

2.3.3 Dividend Cliente Effect

In their seminal paper MM (1961) noted that the pre-existing dividend clientele effect hypothesis (hereafter DCH) might play a role in dividend policy under certain conditions. They pointed out that the portfolio choices of individual investors might be influenced by certain market imperfections such as transaction costs and differential tax rates to prefer different mixes of capital gains and dividends. MM argued that these imperfections might cause investors to choose securities that reduce these costs. MM termed the tendency of investors to be attracted to a certain type of dividend-paying stocks a “dividend clientele effect”. Nonetheless, MM maintained that even though the clientele effect might change a firm’s dividend policy to attract certain clienteles, in a perfect market each clientele is “as good as another”; hence the firm valuation is not affected; that is, dividend policy remains irrelevant.

In practice, investors often face different tax treatments for dividend income and capital gains, and incur costs when they trade securities in the form of transaction costs and inconvenience (changing portfolios). For these reasons and based on different investors’ situations, taxes and
transaction costs may create investor clienteles, such as tax minimisation induced clientele and transaction cost minimisation induced clientele respectively. These clienteles will be attracted to firms that follow dividend policies that best suit their particular situations. Similarly, firms may tend to attract different clienteles by their dividend policies. For example, firms operating in high growth industries that usually pay low (or no) dividends attract a clientele that prefers price appreciation (in the form of capital gains) to dividends. On the other hand, firms that pay a large amount of their earnings as dividends attract a clientele that prefers high dividends.

Allen et al. (2000) suggest that clienteles such as institutional investors tend to be attracted to invest in dividend-paying stocks because they have relative tax advantages over individual investors. These institutions are also often subject to restrictions in institutional charters(such as the "prudent man rule"), which, to some extent, prevent them from investing in non-paying or low-dividend stocks. Similarly, good quality firms prefer to attract institutional clienteles (by paying dividends) because institutions are better informed than retail investors and have more ability to monitor or detect firm quality. Allen et al. (2000) concluded with the proposition that, "...these clientele effects are the very reason for the presence of dividends...".

- Tax-Induced Clientele-Effects: Since most of the investors are interested in after-tax returns, the different tax treatment of dividends and capital gains might influence their preference for dividends versus capital gains. This is the essence of the tax-induced DCH. For example, ceteris paribus, investors in low tax brackets who rely on regular and steady
income will tend to be attracted to firms that pay high and stable dividends. In addition, some corporate or institutional investors tend to be attracted to high-dividend stocks (see, for example, Han et al. 1999, Dhaliwal et al. 1999, and Short et al. 2002) On the other hand, investors in relatively high tax brackets might find it advantageous to invest in companies that retain most of their income to obtain potential capital gains, all else being equal. Some clienteles, however, are indifferent between dividends and capital gains such as tax exempt and tax deferred entities (see Elton and Gruber, 1970).

- **Transaction Cost-Induced Clientele:** Another argument of the DCH is based on the proposition that dividend policy may influence different clienteles to shift their portfolio allocation, resulting in transaction costs. For example, small investors (such as retirees, income-oriented investors, and so on) who rely on dividend income for their consumption needs, might be attracted to (and even may pay a premium for) high and stable-dividend stocks, because the transaction costs associated with selling stocks might be significant for such investors. On the other hand, some investors (e.g., wealthy investors), who do not rely on their share portfolios to satisfy their liquidity needs, prefer low payouts to avoid the transaction costs associated with reinvesting the proceeds of dividend, which they actually do not need for their current consumption (Bishop et al., 2000). Note that for both groups of investors, transforming one financial asset to another, transaction costs need to be incurred. That is, MM’s notion of homemade dividends is not costless and the existence of such costs may make dividend policy not irrelevant.
The other effect of transaction costs on dividend policy is related to the fact that firms may need to restore cash paid out as dividends with new equity issues (or debt financing) to take advantage of new investment opportunities. If issuing costs are significant, then firms are most likely to rely on retained earnings rather than external financing. This is reinforced by the empirical fact that retained earnings constitute the major source of firm finance not just in developing but also even in developed capital markets. Fazzari et al. (1988) reported that, over the period of 1970 to 1984, the retained earnings amounted to 71.1 percent of the total source of funds of US manufacturing firms with an average retention ratio of 60 percent. In these cases, there should be a negative relationship between transaction costs and dividend payments. Firms can reduce or avoid such expenses by lowering dividend payments or not paying them at all. However, in practice, many firms continue to pay cash dividends, while at the same time issuing new equity and debt, suggesting that other factors may also be at work in influencing dividend policy.

An important implication of the DCH is that, by changing its dividend policy, a firm’s ownership structure might also change. Another implication of clientele theory is that firms should attempt to adopt a stable dividend policy to avoid inducing shareholders to modify their portfolios, entailing transaction costs (see for example Scholz, 1992).

The theoretical plausibility of dividend clientele hypothesis is relatively ambiguous. On the one hand, transaction costs and taxes may influence demands for dividends. But the mere existence of transaction costs
or differential taxes is not on its own a rationale for a general theoretical explanation of the determination of dividend policy. Not surprisingly, therefore, most of the literature that has tested the DCH has produced mixed results.

2.3.4 Rational Expectations Hypothesis

John F. Muth wrote a paper entitled “Rational Expectations and the Theory of Price Movements”, which was published 1961. This has been recognized as one of the most influenced contributions to economics in the last few decades as it challenges the intellectual foundations of the traditional macroeconomic theories propounded by Keynesians as well monetarists.

What is the central argument of the rational expectations hypothesis? In very simple terms, if says that what matters in economics is not what actually happens but the difference between what actually happens and what was supposed or expected to happen. Hence only the surprises in policy would have the kind of effects the policy maker is striving to achieve.

Let us look at the implications of the rational expectations hypothesis for the dividend policy of a firm. If the dividend announced is equal to what the market expected there would be no change in the market price of the share, even if the dividend were higher (or for that matter lower) than the previous dividend. The market, expecting the dividend to be higher, had discounted it. Put differently, the higher expectation was reflected in the market price.
What happens if the dividend announced is higher than what was expected by the market? In such a case the market begins to revise its assessment. Realising that the dividend announcement of the firm conveys important signals about the earnings prospects of the firm the market may revise favourably its assessment of future earnings. This reappraisal would lead to an upward price movement in the share. Likewise, when the dividend announced is lower than what was expected the market may revise unfavourably its appraisal of future earnings. This would mean a downward price movement in the share.

To sum up, in world rational expectations, unexpected dividend announcements would transmit messages about changes in earnings potential which were not incorporated in the market price earlier. The reappraisal that occurs as a result of these signals leads to price movements which look like responses to the dividends themselves, though they are actually caused by an underlying revision of the estimate of earnings potential.

The above analysis is helpful in reconciling the practitioner's view that dividends matter very much and the academic view that dividends do not matter. As Merton H. Miller said “Both views are correct in their own ways. The academic is thinking of the expected dividend the practitioner of the unexpected.”
2.4 Dividend Relevance Theory

It implies that there exists an optimal dividend policy, which the managers should seek to determine, that maximises the value of the firm. These theories, which argue that dividends are relevant in determining the value of the firm, are:

- Traditional position
- Walter Model
- Gordon Model
- Bird-in-hand Theory
- Dividend Signalling Theory
- Agency Cost Theory
- Lintner theory
- Tax Preference Theory

2.4.1 Traditional position

According to the traditional position expounded eloquently by Graham and Dodd (1951), the stock market places considerably more weight on dividends than on retained earnings. According to them:

"...... the stock market is overwhelmingly in favour of liberal dividends as against niggardly dividends."

Their view is expressed quantitatively in the following valuation model advanced by them:

\[ P = m(D+E/3) \]  

(2.7)
Where,

\[ P = \text{Market price per share}; \]
\[ D = \text{Dividend per share}; \]
\[ E = \text{Earnings per share}; \]
\[ m = \text{Multiplier}. \]

According to this model, in the valuation of shares the weight attached to dividends is equal to four times the weight attached to retained earnings. This is clear from the following version of equation in which \( E \) is replaced by \( (D + R) \).

\[
P = m \left( D + \frac{D+R}{3} \right) = m \left( \frac{4D}{3} + \frac{3R}{3} \right)
\]  
(2.8)

The weights provided by Graham and Dodd are based on their subjective judgments and not derived from objective, empirical analysis. Notwithstanding the subjectivity of these weights, the major contention of the traditional position is that a liberal payout policy has a favourable impact on stock price.

**Evidence:** The supporters of the traditional position cite the evidence that high payout ratios go hand-in-hand with high price-earnings ratios and low payout ratios go hand-in-hand with low price-earnings ratio. The following Table 2.1 shows such evidence. The sample of companies shown here has been drawn from the table “Guide to Investors” published in the Economic Times, June 3, 1981.
Table 2.1: Dividend Payout Ratio and Price Earnings Ratio for a Sample of Companies

<table>
<thead>
<tr>
<th>Name of the Company</th>
<th>Dividend per Share (D) Rs.</th>
<th>Earnings per Share (E) Rs.</th>
<th>Market Value per Share (P) Rs.</th>
<th>Dividend Payout Ratio (D/E)</th>
<th>Price Earnings Ratio (P/E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alageshwara Estates</td>
<td>0.20</td>
<td>0.03</td>
<td>4.75</td>
<td>6.67</td>
<td>158.30</td>
</tr>
<tr>
<td>Albright Morarjee</td>
<td>4.00</td>
<td>7.71</td>
<td>85.00</td>
<td>0.52</td>
<td>11.02</td>
</tr>
<tr>
<td>Amar Dye Chemical</td>
<td>12.00</td>
<td>17.20</td>
<td>190.00</td>
<td>0.71</td>
<td>11.05</td>
</tr>
<tr>
<td>Amines and Plastics</td>
<td>0.80</td>
<td>5.58</td>
<td>16.00</td>
<td>0.14</td>
<td>2.87</td>
</tr>
<tr>
<td>Asian Electronics</td>
<td>0.00</td>
<td>20.82</td>
<td>90.00</td>
<td>0.00</td>
<td>4.32</td>
</tr>
<tr>
<td>Asoka Mills</td>
<td>22.00</td>
<td>92.66</td>
<td>217.50</td>
<td>0.24</td>
<td>2.35</td>
</tr>
<tr>
<td>Atul Products</td>
<td>20.00</td>
<td>49.53</td>
<td>302.50</td>
<td>0.40</td>
<td>6.11</td>
</tr>
<tr>
<td>Avery India</td>
<td>2.00</td>
<td>2.08</td>
<td>31.15</td>
<td>0.96</td>
<td>14.98</td>
</tr>
<tr>
<td>BajajElectricals</td>
<td>12.00</td>
<td>43.70</td>
<td>162.50</td>
<td>0.27</td>
<td>3.72</td>
</tr>
<tr>
<td>BasmatraTea</td>
<td>3.00</td>
<td>7.79</td>
<td>26.25</td>
<td>0.39</td>
<td>3.37</td>
</tr>
<tr>
<td>Bata India</td>
<td>1.60</td>
<td>1.51</td>
<td>16.80</td>
<td>1.06</td>
<td>11.19</td>
</tr>
<tr>
<td>Bayer India</td>
<td>8.00</td>
<td>8.90</td>
<td>245.00</td>
<td>0.90</td>
<td>27.53</td>
</tr>
<tr>
<td>Best and Crompton</td>
<td>1.75</td>
<td>7.76</td>
<td>38.50</td>
<td>0.23</td>
<td>4.96</td>
</tr>
<tr>
<td>Bharat Gears</td>
<td>1.20</td>
<td>5.10</td>
<td>41.00</td>
<td>0.24</td>
<td>80.4</td>
</tr>
<tr>
<td>Bishnauth Tea</td>
<td>1.70</td>
<td>2.09</td>
<td>18.37</td>
<td>0.81</td>
<td>8.79</td>
</tr>
<tr>
<td>Blue Star</td>
<td>1.70</td>
<td>5.01</td>
<td>23.50</td>
<td>0.34</td>
<td>4.69</td>
</tr>
<tr>
<td>Bombay Burmah</td>
<td>4.50</td>
<td>4.20</td>
<td>47.04</td>
<td>1.07</td>
<td>11.20</td>
</tr>
</tbody>
</table>
All companies beginning with alphabets A and B and having a positive dividends/earnings ratio have been included.

How reliable the evidence of the kind shown in Table 2.1. Careful scrutiny indicates that it is seriously flawed. Consider one source of this flaw. When earnings are temporarily depressed, there are two very likely effects.

a. The dividend payout ratio tends to be high because firms normally maintain or reduce only slightly the dividend per share when earnings are temporarily depressed.

b. The price-earnings ratio is high because a temporarily decline in earnings does not have a significant impact on market price per share.

These two effects may induce one to jump to the conclusions that a high dividend payout ratio leads to a high; price-earnings ratio. Such an inference, however, is unwarranted.

Another source of this flaw may be mentioned. When the operations of the firm are highly risky, the dividend payout ratio tends to be low. Why? In the face of risk, the management tends to be conservative. Further, highly risky operations lead to low price-earnings ratio because investors are, in general, risk-averse. Now these two effects – low payout ratio and low price-earnings ratio – of risky operations may lead one to believe that a low payout ratio causes a low price-earnings ratio. Needless to say, such an inference is unjustified.
2.4.2 Walter Model

Professor James E Walter (1963) has proposed a model for share valuation which supports the view that the dividend policy of the firm has a bearing on share valuation. His model, one of the earlier theoretical works, clearly shows the importance of the relationship between the firm’s rate of return, \( r \), and its cost of capital, \( k \), in determining the dividend policy that will maximize the wealth of the shareholders. Walter’s model is based on the following assumptions:

a. The firm finances all investment through retained earnings; that is, debt or new equity is not issued.
b. The firm’s rate of return, \( r \), and its cost of capital, \( k \), are constant.
c. All earnings are either distributed as dividends or reinvested internally immediately.
d. Beginning earnings and dividends never change. The value of the earnings per share, \( \text{EPS} \) and Dividend per share, \( \text{DIV} \) Dividend, may be changed in the model to determine results, but any given values of EPS or DIV are assumed to remain constant forever in determining a given value.
e. The firm has a very long or infinite life valuation formula.

Based on the above assumptions, Walter’s formula to determine the market price per share is as follows:

\[
P = \frac{\text{DIV}}{k} + \frac{r(\text{EPS} - \text{DIV})/k}{k}
\]

(2.9)

Where,

\( P = \text{Market price per share} \);
DIV = Dividend per share;

EPS = Earnings per share;

\[ r = \text{Firm's rate of return (average)}; \]

\[ k = \text{Firm's cost of capital or capitalisation rate.} \]

Equation (2.9) reveals that the market price per share is the sum of the present value of two sources of income: (i) The Present value of the infinite stream of constant dividends, \( \frac{DIV}{k} \) and (ii) The Present value of the infinite stream of capital gains, \( \frac{[r \cdot (EPS - DIV)]}{k} \), when the firm retains a perpetual sum of \( EPS - DIV \) at \( r \), rate of return, its present value will be: \( r \cdot \frac{EPS - DIV}{k} \). This quantity can be known as a capital gain which occurs when earnings are retained within the firm. If this retained earnings occur every year, the present value of an infinite number of capital gains, \( r \cdot \frac{EPS - DIV}{k} \), will be equal to \( \frac{[r \cdot (EPS - DIV)]}{k} \). Thus, the value of a share is the present value of all dividends plus the present value of all capital gains as shown in Equation (2.9) which can be rewritten as follows:

\[
P = \frac{DIV + (EPS - DIV)(r/k)}{k} \quad (2.10)
\]

To show the effect of dividend or retention policy on the market value of share, we shall use Equation (2.10).
His views on optimal dividend payout ratio may be summed up in following situations:

Above, Table 2.2 shows that, in Walter’s Model, the optimum dividend policy depends on the relationship between the firm’s rate of return, $r$ and its cost of capital, $k$. Walter’s view on the optimum dividend payout ratio can be summarized as follows:
**Growth Firm** ($r > k$):

Growth Firms are those firms which have ample of investment opportunities yielding returns higher than the opportunity cost of capital. These firms will maximize the value per share if they follow a policy of retaining all earnings for internal investment. Thus the optimum payout ratio for a growth firm is zero. The market value per share $P$, increases as payout declines, when $r > k$.

**Normal Firm** ($r = k$):

Most of the firms do not have unlimited surplus - generating investment opportunities, yielding returns higher than the opportunity cost of capital. After exhausting super profitable opportunities these firms earn on their investments rate of return equal to the cost of capital, $r = k$. For, the normal firms with $r = k$, the dividend policy has no effect on the market value per share. Thus, there is no unique optimum payout ratio for normal firm. One dividend policy is as good as the other. The market value per share is not affected by the payout ratio when $r = k$.

**Declining Firm** ($r < k$):

Some firms do not have any profitable investment opportunities to invest the earnings. Such firms would earn on their investments rates of return less than the minimum rate required by investors. Investors of such firm would like earning to be distributed to them so that they may either spend it or invest elsewhere to get a rate higher than earned by the declining firms. The market value per share of a declining firm with $r < k$ will be maximum when it does not retain earnings at all. Thus, the optimum payout
ratio for a declining firm is 100 percent. The market value per share, \( P \), increases as payout ratio increases when \( r < k \).

Thus, James Walter (1963) model implies that:

a. The optimal payout ratio for a growth firm \((r > k)\) is nil.
b. The payout for a normal firm \((r = k)\) is irrelevant
c. The optimal payout ratio for a declining firm \((r < k)\) is one hundred percent.

Clearly, these policy implications lead to very extreme courses of action, which make limited sense in the real world. Despite this simplicity, the Walter model is a useful tool to show the effects of dividend policy under varying profitability assumptions.

**Criticism of Walter’s model**

- **No External Financing:** Walter’s model of share valuation mixes divided policy with investment policy of the firm. The model assumes that the investment opportunities of the firm are financed by retained earnings only and no external the firm’s investment or its dividend policy or both will be sub-optimum. This is shown here in the Figure 2.2.
Figure 2.2: Relationship between Return and Cost with earning investment and new financing.

The horizontal axis represents the amount of earning, investment and new financing in rupees. The vertical axis shows the rates of return and the cost of capital. It is assumed that the cost of capital, $k$, remains constant, regardless of the amount of new capital raised. Thus, the average cost of capital $k_a$ is equal to the marginal cost of capital, $k_m$. The rates of return on investment opportunities available to the firm are assumed to be decreasing. This implies that the most profitable investments will be made first and the poorer investments made last. In the above figure, $I^*$ rupees of investment occurs where $r = k$. $I^*$ is the optimum investment regardless of whether the capital to finance this investment is raised by selling shares, debentures, retaining earnings or obtaining loan. If the firm’s earnings are $E_1$, then $I^* - E_1$ and paying no dividends. In a more comprehensive model allowing for outside financing, the firm should raise new funds to finance $I^*$ investment. The wealth of the owners will maximize only when this optimum investment is made.
• **Constant ‘r’:** Walter’s method is based on the assumption that \( r \) is constant. In fact, \( r \) decreases as more investment occurs. This reflects the assumption that the most profitable investments are made first and then the poorer investments are made. The firm should stop at a point where \( r = k \). In the foregoing figure, the optimum point of investment occurs at \( I^* \) where \( r = k \). If the firm’s earnings are \( E_2 \), it should pay dividend equal to \( E_2 - I^* \). On the other hand, Walter’s model indicates that, if the firm’s earnings are \( E_2 \), they should be distributed because \( r < k \) at \( E_2 \). This is clearly an erroneous policy and will fail to optimum wealth of the owners.

• **Constant ‘k’:** A firm’s cost of capital or discount rate, \( k \), does not remain constant; it changes directly with the firm’s risk. Thus, the present value of the firm’s income moves inversely with the cost of capital. By assuming that the discount rate, \( k \), is constant, Walter’s model abstracts from the effect of risk on the value of the firm.

### 2.4.3 Gordon Model

One very popular model relating the market value of the firm to dividend policy is developed by Myron Gordon (1962). Gordon’s model is based on the following assumptions.

a. The firm is an all-equity firm, and it has no debt.
b. No external financing is available. Consequently retained earnings would be used to finance any expansion. Thus, just as Walter’s model Gordon’s model too confounds dividend and investment policies.

c. The internal rate of return, $r$, of the firm is constant. This ignores the diminishing marginal efficiency of investment as represented in Figure 2.2

d. The appropriate discount rate, $k$, for the firm remains constant. Thus, Gordon’s model also ignores the effect of a change in the firm’s risk-class and its effect on $k$.

e. The firm and its stream of earnings are perpetual.

f. Corporate taxes do not exist.

g. The retention ratio, $b$, once decided upon, is constant. Thus, the growth rate, $g = br$, is constant forever.

h. The discount rate is greater than growth rate, $k > br = g$. If this condition is not fulfilled, we cannot get a meaningful value for the share.

According to Gordon’s dividend-capitalisation model, the market value of a share is equal to the present value of an infinite stream of dividends to be received by the shareholders. Thus:
However, the dividend per share is expected to grow when earnings are retained. The dividend per share is equal to the payout ratio, \((1 - b)\), times earnings, i.e., \(D_{IV_t} = (1 - b) \times EPS_t\), where \(b\) is the fraction of retained earnings. The retained earnings are assumed to be reinvested within the all-equity firm at a rate of return, \(r\). This allows earnings to grow at \(g = br\) per period. When we incorporate growth in earnings and dividend, resulting from the retained earnings, in the dividend-capitalisation model, the present value of a share is determined by the following formula.

\[
P_0 = \frac{DIV_1}{(1+k)} + \frac{DIV_2}{(1+k)^2} + \cdots + \frac{DIV_\infty}{(1+k)^\infty} = \sum_{t=1}^{\infty} \frac{DIV_t}{(1+k)^t}
\]

(2.11)

When Equation (2.12) is solved it become:

\[
P_0 = \frac{DIV_1}{k-g}
\]

(2.13)

Substituting \(EPS_t (1 - b)\) for \(DIV_1\) and \(br\) for \(g\). Equation (2.13) can be rewritten as

\[
P_0 = \frac{EPS_1 (1-b)}{k-br}
\]

(2.14)

Equation (2.14) explicitly shows the relationship of expected earnings. \(EPS_1\), dividend policy, \(b\), internal profitability, \(r\), and the all-equity
firm's cost of capital, k, in the determination of the value of the share. Equation (2.14) is particularly useful for studying the effects of dividend policy (as represented by b) on the value of the share.

Lest us consider the case of a normal firm where the internal rate of return of the firm equals its cost of capital, i.e., \( r = k \). Under such a situation Equation (2.14) may be expressed as follows:

\[
P_0 = \frac{EPS_1(1-b)}{k-br} = \frac{rA(1-b)}{k-br} \quad \text{(Since EPS} = rA, A = \text{total assets per share)}
\]

If \( r = k \), then

\[
P_0 = \frac{EPS_1(1-b)}{k(1-b)} = \frac{rA(1-b)}{k(1-b)} = \frac{EPS_1}{k} = \frac{rA}{r} = A
\]

Equation (2.16) shows that regardless of the firm's earnings, EPS, or riskiness (which determine k), the firm's value is not affected by dividend policy and is equal to the book value of assets per share. That is, when \( r = k \), dividend policy is irrelevant since b, which represents the firm's dividend policy, completely cancels out of Equation (2.16). Interpreted in economic sense, this finding implies that, under competitive conditions, the opportunity cost of capital, k, must be equal to the rate of return generally available to investors in comparable shares. This means that any funds distributed as dividends may be invested in the market at the rate equal to the firm's internal rate of return. Consequently, shareholders can neither lose nor gain by any change in the company's dividend policy, and the market value of their shares must remain unchanged.
Considering the case of the declining firm where \( r < k \), Equation (2.16) indicates that, if the retention ratio, \( b \), is zero or payout ratio, \( 1 - b \), is 100 per cent the value of the share is equal to:

\[
P_o = \frac{rA}{k} \quad \text{(if } b = 0) \tag{2.17}
\]

If \( r < k \) then \( r/k < 1 \) and from Equation (2.17) it follows that \( P_o \) is smaller than the firm's investment per share in assets, \( A \). It can be shown that if the value of \( b \) increases, the value of the share continuously falls. These results may be interpreted as follows:

If the internal rate of return is smaller than \( k \), which is equal to the rate available in the market, profit retention clearly becomes undesirable from the shareholders' standpoint. Each additional rupee retained reduces the amount of funds that shareholders could invest at a higher rate elsewhere and thus further depresses the value of the company's share. Under such conditions, the company should adopt a policy of contraction and disinvestment, which would allow the owner to transfer not only the net profit but also paid in capital (or a part of it) to some other, more remunerative enterprise.

Finally, let us consider the case of a growth firm where \( r > k \). The value of a share will increase as the retention ratio, \( b \), increases under the condition of \( r > k \). However, it is not clear as to what the value of \( b \) should be to maximise the value of the share, \( P_o \). For example, if \( b = k/r \), Equation (2.15) reveals that denominator, \( k - br = 0 \), thus making \( P_o \) negative. These absurd results are obtained because of the assumption that \( r \) and \( k \) are constant, which underlie the model. Thus, to get the meaningful
value of the share, according to Equation (2.15) the value of b should be less than \( k/r \). Gordon’s model is explained in the following illustration.

Table 2.3: Numerical Solution for Gordon Model

<table>
<thead>
<tr>
<th>Growth Firm, ( r &gt; k )</th>
<th>Normal Firm, ( r = k )</th>
<th>Declining Firm, ( r &lt; k )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( r = 0.15 )</td>
<td>( r = 0.10 )</td>
<td>( r = 0.08 )</td>
</tr>
<tr>
<td>( k = 0.10 )</td>
<td>( k = 0.10 )</td>
<td>( k = 0.10 )</td>
</tr>
<tr>
<td>( \text{EPS}_0 = \text{Rs. 10} )</td>
<td>( \text{EPS}_0 = \text{Rs. 10} )</td>
<td>( \text{EPS}_0 = \text{Rs. 10} )</td>
</tr>
<tr>
<td>Payout Ratio, ((1-b) = 40%)</td>
<td>Retention Ratio, ( b = 60% ),</td>
<td>Retention Ratio, ( b = 60% ),</td>
</tr>
<tr>
<td>( g = br = 0.6 \times 0.15 = 0.09 )</td>
<td>( g = br = 0.6 \times 0.10 = 0.06 )</td>
<td>( g = br = 0.6 \times 0.08 = 0.048 )</td>
</tr>
<tr>
<td>( P = \frac{10 (1 - 0.6)}{0.10 - 0.09} )</td>
<td>( P = \frac{10 (1 - 0.6)}{0.10 - 0.06} )</td>
<td>( P = \frac{10 (1 - 0.6)}{0.10 - 0.048} )</td>
</tr>
<tr>
<td>( = \frac{4}{0.01} = \text{Rs. 400} )</td>
<td>( = \frac{4}{0.04} = \text{Rs. 100} )</td>
<td>( = \frac{4}{0.052} = \text{Rs. 77} )</td>
</tr>
<tr>
<td>Payout Ratio, ((1-b) = 60%)</td>
<td>Retention Ratio, ( b = 40% ),</td>
<td>Retention Ratio, ( b = 40% ),</td>
</tr>
<tr>
<td>( g = br = 0.4 \times 0.15 = 0.06 )</td>
<td>( g = br = 0.4 \times 0.10 = 0.04 )</td>
<td>( g = br = 0.4 \times 0.08 = 0.032 )</td>
</tr>
<tr>
<td>( P = \frac{10 (1 - 0.4)}{0.10 - 0.06} )</td>
<td>( P = \frac{10 (1 - 0.4)}{0.10 - 0.04} )</td>
<td>( P = \frac{10 (1 - 0.4)}{0.10 - 0.32} )</td>
</tr>
<tr>
<td>( = \frac{6}{0.04} = \text{Rs. 150} )</td>
<td>( = \frac{6}{0.06} = \text{Rs. 100} )</td>
<td>( = \frac{6}{0.068} = \text{Rs. 88} )</td>
</tr>
<tr>
<td>Payout Ratio, ((1-b) = 90%)</td>
<td>Retention Ratio, ( b = 10% ),</td>
<td>Retention Ratio, ( b = 10% ),</td>
</tr>
<tr>
<td>( g = br = 0.10 \times 0.15 = 0.015 )</td>
<td>( g = br = 0.4 \times 0.10 = 0.01 )</td>
<td>( g = br = 0.10 \times 0.08 = 0.008 )</td>
</tr>
<tr>
<td>( P = \frac{10 (1 - 0.1)}{0.10 - 0.015} )</td>
<td>( P = \frac{10 (1 - 0.1)}{0.10 - 0.01} )</td>
<td>( P = \frac{10 (1 - 0.1)}{0.10 - 0.008} )</td>
</tr>
<tr>
<td>( = \frac{9}{0.085} = \text{Rs. 106} )</td>
<td>( = \frac{9}{0.09} = \text{Rs. 100} )</td>
<td>( = \frac{9}{0.092} = \text{Rs. 98} )</td>
</tr>
</tbody>
</table>

It is revealed that under Gordon’s model:

a. The market value of the share, \( P_0 \) increases with the retention ratio, \( b \), for firms with growth opportunities, i.e. when \( r > k \).
b. The market value of the share, $P_0$, increases with the payout ratio, $(1 - b)$, for declining firms with $r < k$.

c. The market value of the share is not affected by dividend policy when $r < k$.

Gordon's model's conclusion about dividend policy are similar to that of Walter's model. This similarly is due to the similarities of assumptions which underline both the models. Thus the Gordon model suffers from the same limitations as the Walter model.

2.4.4 The Bird-in-hand Argument

It is clearly revealed that conclusion of Gordon’s model and Walter’s models are similar. This is due to the similarities of assumptions which underlie both the model. ‘The bird-in-hand’ argument was put forward, first of all, by John E Kirshman as follows: “Of two stocks, with identical earnings, records and prospects, but one paying a larger dividend than the other, the former will undoubtedly command a higher price merely because stockholders prefer present to future values. Myopic vision plays a part in the price-making process. Stockholders often act upon the principle that a bird-in the-hand is worth two in the bush and for this reason are willing to pay a premium for the stock with the higher dividend rate, just as they discount the one with the lower rate”. Graham and Dodd (1951) also hold a similar view when they state: “The typical investor would most certainly prefer to have his dividend today and let tomorrow take care of itself. No instances are on record in which the withholding of dividends for the sake of future profits has been hailed with such enthusiasm as to advance
the price of the stock. The direct opposite has invariably been true. Give two companies in the same general position and with same earning power, the one paying the larger dividend will always sell at the higher prices”.

The ‘bird-in-hand’ argument has been expressed more convincingly and in formal terms by Myron Gordon (1963). According to him, uncertainty increases with futurity; that is, the further one looks into the future, the more uncertain dividends become. Accordingly, when dividend policy is considered in context of uncertainty, the appropriate discount rate ‘k’ cannot be assumed to be constant. In fact, it increases with uncertainty; investors prefer to avoid uncertainty and would be willing to pay higher price for the share that pays the greater current dividend, all other things held constant. In other words, the appropriate discount rate would increase with the retention rate as shown in the Figure 2.3

Thus, distant dividends would be discounted at a higher rate than near dividends. Symbolically, \( k_t > k_{t+1} \) for \( t = 1, 2, 3, \ldots \), because of increasing uncertainty in the future. As the discount rate increases with the length of time in future, a low dividend payment in the beginning will tend to lower the value of the share.
When the discount rate is assumed to be increasing, the equation is as follows:

\[
P_0 = \frac{DIV_1}{(1+k_1)} + \frac{DIV_2}{(1+k_2)^2} + \frac{DIV_3}{(1+k_3)^3} + \cdots + \frac{DIV_n}{(1+k_n)^n} = \sum_{t=1}^{n} \frac{DIV_t}{(1+k_t)^t}
\]

(2.18)

Where, \(P_0\) is price of the share when the retention rate, \(b\) is zero and \(k_t > k_{t-1}\). If the firm is assumed to retain a fraction \(b\) of earnings, dividend per share will equal to \((1-b)\) EPS\(_1\) in the first year. Thus, the dividend per share is expected to grow at rate \(g = br\) when retained earnings are reinvested at \(r\) rate of return. The dividends in the second year will be \(D_0 (1+g)^2 = (1-b)\) EPS\(_1\) \((1 + br)^2\), in the third year \(D_0 (1+g)^3 = (1-b)\) EPS\(_2\) \((1+br)^3\) and so on.

Discounting this stream of dividends, at the corresponding rates of \(k_1, k_2, \ldots\) we obtain the following equations:
Where, \( P_b \) is the price of the share when the retention rate \( b \) is positive i.e., \( b > 0 \). The value of \( P_b \) calculated in his way can be determined by discounting this dividend stream at the uniform rate \( k' \) which is the weighted average of \( k^* \).

\[
P_b = \frac{\text{DIV}_0 (1+g)^1}{1+k_1} + \frac{\text{DIV}_0 (1+g)^2}{(1+k_2)^2} + \cdots + \frac{\text{DIV}_0 (1+g)^n}{(1+k_n)^n}
\] (2.19)

Assuming the internal rate of return equal to the discount rate, will \( P_b \) be higher or lower than \( P_0 \)?

Gordon's view as explained above, is that the increase in earnings retention will result in a lower value of share. To re-emphasize, he reaches this conclusion through two assumption regarding investors' behaviour: (i) investors are risk averters, and (ii) they consider distant dividends as less certain than near dividends.

On the basis of these assumptions, Gordon concludes that the rate at which an investor discounts his dividend stream, from a given firm, increases with the futurity of this dividend stream. If investors discount dividend at a higher rate than near dividends, increasing the retention ratio has the effect of raising the average discount rate, \( k' \), or equivalently lowering share prices.
This, incorporating uncertainty into his model, Gordon concludes that dividend policy affects the value of the share. His reformation of the model justifies the behaviour of investors who value a rupee of dividend income more than a rupee of capital gains income. Thus, investors prefer dividend above capital gains because dividends are easier to predict, less uncertain and less risky, and are therefore discounted with a lower rate.

2.4.5 Dividend Signalling Theory

Another hypothesis for why MM's DCH is inadequate as an explanation of financial market practice is the existence of asymmetric information between insiders (managers and directors) and outsiders (shareholders). MM assumed that managers and outside investors have free, equal and instantaneous access to the same information regarding a firm's prospects and performance. But managers who look after the firm usually possess information about its current and future prospects that is not available to outsiders. This informational gap between insiders and outsiders may cause the true intrinsic value of the firm to be unavailable to the market. If so, share price may not always be an accurate measure of the firm's value. In an attempt to close this gap, managers may need to share their knowledge with outsiders so they can more accurately understand the real value of the firm. Historically, due to a lack of complete and accurate information available to shareholders, the cash flow provided by a security to an investor often formed the basis for its market valuation (Baskin and Miranti, 1997). In this way dividends came to provide a useful tool for managers in which to convey their private information to the market because investors used visible (or actual) cash flows to equity as a way of valuing a firm. Many academics and financial practitioners also suggest that dividends might have implicit
information about a firm’s prospects. Even MM (1961) suggest that when markets are imperfect share prices may respond to changes in dividends. In other words, dividend announcements may be seen to convey implicit information about the firm’s future earnings potential. This proposition has since become known as the “information content of dividends” or signalling hypothesis. However, MM dismissed the possibility that this occurred by suggesting that the empirical evidence does not support the notion that investors prefer dividends to retained earnings.

According to the signalling hypothesis, investors can infer information about a firm’s future earnings through the signal coming from dividend announcements, both in terms of the stability of, and changes in, dividends. However, for this hypothesis to hold, managers should firstly possess private information about a firm’s prospects, and have incentives to convey this information to the market. Secondly, a signal should be true; that is, a firm with poor future prospects should not be able to mimic and send false signals to the market by increasing dividend payments. Thus the market must be able to rely on the signal to differentiate among firms. If these conditions are fulfilled, the market should react favourably to the announcements of dividend increase and unfavourably otherwise (Ang, 1987, and Koch & Shenoy, 1999).

As managers are likely to have more information about the firm’s future prospects than outside investors, they may be able to use changes in dividends as a vehicle to communicate information to the financial market about a firm’s future earnings and growth. Outside investors may perceive dividend announcements as a reflection of the
managers' assessment of a firm's performance and prospects. An increase in dividend payout may be interpreted as the firm having good future profitability (good news), and therefore its share price will react positively. Similarly, dividend cuts may be considered as a signal that the firm has poor future prospects (bad news), and the share price may then react unfavourably. Accordingly, it would not be surprising to find that managers are reluctant to announce a reduction in dividends. Lintner (1956) argued that firms tend to increase dividends when managers believe that earnings have permanently increased. This suggests that dividend increases imply long-run sustainable earnings. This prediction is also consistent with what is known as the “dividend-smoothing hypothesis”. That is, managers will endeavour to smooth dividends over time and not make substantial increases in dividends unless they can maintain the increased dividends in the foreseeable future. Lipson et al. (1998) observed that, “managers do not initiate dividends until they believe those dividends can be sustained by future earnings”.

It is worth noting that, although management can use changes in dividends as a signal to convey information to the market, in some cases dividend changes may be an ambiguous signal. This can be illustrated through the case of FPL Group, the parent company of Florida Power & Light Company (see, Soter et al. 1996). On May 9, 1994 FPL announced a 32 percent cut in its quarterly dividends. The market responded negatively to the announcement and FPL’s stock price dropped by about 20 percent, because the market perceived it as a signal of bad future prospects. However, the FPL board had in fact decided to retain funds for new investments to improve the company’s future performance. After realizing
the reason for the dividend reduction, financial analysts concluded that the action was not a signal of financial distress. Thereafter, FPL’s stock price recovered. The market was initially mistaken but the case is a good example of the possible (and sometimes contradictory) signalling effects of dividend announcements.

Although the information content of dividends (signalling) has been noted earlier, it was not modelled until the late 1970s and early 1980s. The most cited dividend signalling models can be found in Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985). In general, these models are based on several assumptions. There is asymmetric information between corporate insiders (managers) and outside investors (shareholders). Dividends contain information about the firm’s current and future cash flows, and managers have incentives to convey their private information to the market through dividend payments in order to close the information gap. The announcement of a dividend increase will be taken as good news and the market will bid up share prices accordingly.

Similarly, an announcement that a dividend will be cut suggests unfavourable prospects and will tend to see the firm’s share price fall. Dividends are considered a credible signalling device because of the dissipative costs involved. For example, in Bhattacharya’s (1979) model the cost of signalling is the transaction cost associated with external financing. In Miller and Rock’s (1985) model the dissipative cost is the distortion in the optimal investment decision, whereas in John and William’s (1985) model the dissipative signalling cost is the tax penalty on dividends relative to capital gains. Therefore, only good-quality firms (undervalued) can use
dividends to signal their prospects, and poor-quality firms cannot mimic by sending a false signal to the market because of the costs involved in that action. A major criticism addressed to these models is why firms choose dividends to signal their prospects while other less costly means are available such as share repurchases (Allen and Michaely, 2002).

2.4.6 Agency Cost Theory

One of the assumptions of MM’s perfect capital market is that there are no conflicts of interests between managers and shareholders. In practice, however, this assumption is questionable where the owners of the firm are distinct from its management. In these cases managers are always imperfect agents of shareholders (principals). This is because managers’ interests are not necessarily the same as shareholders’ interests, and they might conduct actions that are costly to shareholders, such as consuming excessive perquisites or over-investing in managerially rewarding but unprofitable activities. Shareholders therefore incur (agency) costs associated with monitoring managers’ behaviour, and these agency costs are an implicit cost resulting from the potential conflict of interest among shareholders and corporate managers. The payment of dividends might serve to align the interests and mitigate the agency problems between managers and shareholders, by reducing the discretionary funds available to managers (Rozeff, 1982, Easterbrook, 1984, Jensen, 1986, and Alli Khan & Ramirez, 1993).

Another source of the agency costs problem that may be influenced by dividend policy is the potential conflict between shareholders
and bondholders. Shareholders are considered as the agents of bondholders’ funds. In this case, excess dividend payments to shareholders may be taken as shareholders expropriating wealth from bondholders (Jensen and Meckling, 1976). Shareholders have limited liability and they can access the company’s cash flow before bondholders; consequently, bondholders prefer to put constraints on dividend payments to secure their claims. Conversely, for the same reasons, shareholders prefer to have large dividend payments (Ang 1987).

In an often-cited article, Easterbrook (1984) argued that dividends could be used to reduce the free cash flow in the hands of managers. In addition, Eastbrook hypothesised that dividend payments will oblige managers to approach the capital market to raise funds. In this case investment professionals such as bankers and financial analysts will also be able to monitor managers’ behaviour. Therefore, shareholders are able to monitor managers at lower cost (and minimise any collective action problems). This suggests that dividend payments increase management scrutiny by outsiders and reduce the chances for managers to act in their own self-interest. However, Easterbrook suggested that increasing dividend payments might force managers to take undesirable actions like increasing firm leverage, which may sometimes increase the riskiness of the firm.

Along the lines of Easterbrook’s argument, Jensen (1986) provided another explanation for paying dividends based on the agency costs hypothesis. Jensen contended that firms with excess (free) cash flow give managers more flexibility for using the funds in a way that benefit themselves but not shareholders’ best interests. He argued that managers
have incentives to enlarge the size of their firms beyond the optimal size to amplify the resources under their control and moreover to increase their compensation, which is often related to firm size (see also Gaver and Gaver, 1993). Thus, if a firm has a substantial surplus of cash the overinvestment problem will be more pronounced, and managers may undertake negative NPV (net present value) projects. Extracting the excess funds of free cash flow that management controls can reduce this overinvestment problem. Increasing dividend payouts may help to mitigate the free cash flow under managers’ control, thereby preventing them from investing in negative NPV or poor projects. As a result, paying more dividends will reduce the agency costs between managers and shareholders. Moreover, Jensen has pointed out that debt might play a similar role to dividends in reducing the agency costs of free cash flow by reducing the funds under management control.

As noted earlier, MM suggested that a firm’s dividend policy is independent of its investment policy. By contrast, the free cash flow hypothesis implies that dividend policy and the investment decision are interrelated. It is argued that an increase in dividend payments will reduce the “overinvestment” problem, which will have a positive impact on the market value of the firm, ceteris paribus (Lang and Litzenberger, 1989).

However, accepting the notion that increasing dividends will reduce the funds available to managers and force them to be in the market to acquire funds means that shareholders should be willing to tolerate the risk of the firm being more indebted and also accept paying higher personal tax rates on dividends. In other words, shareholders have to trade off between the costs and benefits of acquiring more dividends.
2.4.7 Lintner Model

According to John Lintner (1956) dividends are "sticky", in the sense that they are slow to change and lag behind shifts in earnings by one or more periods. Most firms, in addition to maintaining a stable rupee amount of dividend, also have target payout ratios (long-run payout ratio) which they aim at. The firms may plan a high or low long-run target payout ratio regardless of their policy towards period-to-period dividend stability. The desire to maintain the present dividend level may conflict with strict adherence to any particular target payout ratio especially when earnings-per share drop off, even temporarily. To avoid the necessary of reducing the dividend because of a lean year and to maintain progress towards the target payout ratio, firms raise their dividends per share gradually, as the earnings per share rise. Thus be concludes that dividends represent the primary active decision variable in most situations. Savings or retained earnings in a given period generally are largely a by-product of dividend action, taken in terms of well-established practices and policies. Dividends are seldom the residential decision.

According to John Lintner, dividend is a function of earnings of that year, existing dividend rate, target payout ratio and speed of adjustment. In symbolic terms:

\[ D_t - D_{t-1} = a_0 + C (D_t^* - D_{t-1}) \]  \hspace{1cm} (2.21)

Where,

\( D_t \) = Dividend amount under consideration;
\( D_{t-1} \) = Dividend paid in the previous year;
$a_0$ = Constant which may have value of zero, but never negative and generally has a positive value to reflect the greater reluctance to reduce than to raise dividends;

$C$ = Speed of adjustment;

$D_t^*$ = Target payout ratio ($r$) multiplied by profit after the taxes ($P_t$) = $rP_t$;

$D_t - D_{t-1}$ = change in the dividend payout.

The above equation can be re-written as follows:

\[ = a_0 + C(rP_t - D_{t-1}) \]
\[ = a_0 + CrP_t - CD_{t-1} \]  \hspace{1cm} (2.22)

Therefore, Adding $D_{t-1}$ to both the sides of the above equation.

$D_t = a_0 + CrP_t - CD_{t-1} + D_{t-1}$

$D_t = a_0 + CrP_t + D_{t-1} (1 - C)$  \hspace{1cm} (2.23)

Let $Cr$ be represented by $b_1$ (short-run propensity to pay dividends) and $(1 - C)$ be represented by $b_2$ (long-run propensity to pay dividends)

Then we have:

$D_t = a_0 + b_1 P_t + b_2 D_{t-1}$  \hspace{1cm} (2.24)

Thus, dividends paid by an individual company are a function of $a_0$ (constant), short-run propensity to pay dividends ($b_1$) and a long-run propensity to pay dividends ($b_2$). Bolten (1976) has also formulated a formula based on key variable suggested by Lintner.

$D_{t+1} = D_t + a \left( P^* - \frac{D_t}{E_t} \right) E_t$  \hspace{1cm} (2.25)
Where,

- \( D_{t+1} \) = Dividend amount under consideration;
- \( D_t \) = Prevailing dividend;
- \( E_t \) = Latest earnings per share;
- \( \frac{D_t}{E_t} \) = Prevailing payout ratio;
- \( P^* \) = Target payout ratio;
- \( a \) = Adjustment check.

The above equation suggests that the increase in dividends would be less than the increase in earnings owing to the speed of adjustment.

Above theory can be explained with the following illustration. Supposed the target payout ratio of a company is 50% and the present dividend is Rs. 2/- per share. The firm would not immediately pay a dividend of Rs. 3/- per share, if the earnings per share rise from Rs. 5/- per share to Rs. 6/- per share, since that would expose the firm to the necessary of reducing the dividend in the following year, if the earnings per share fell below Rs. 6/-. Rather, the firm might decide to gradually move towards the 50% target payout by declaring a Rs. 2.50 per share dividend. With Rs. 2.50 dividend, the firm’s earnings per share could drop to Rs. 5/- in the following year and still be at the 50% target ratio avoiding the necessity of reducing the dividend. In terms of the formula:

\[
D_{t+1} = Rs \ 2.00 + 0.50 \left( 0.50 \frac{0.00}{6.00} \right) (Rs. \ 6) \\
= Rs. \ 2.00 + 0.50 \left( \frac{1}{6} \times 6 \right) = Rs. \ 2.50
\]
Lintner (1956) expressed corporate dividend behaviour in the form of the following model.

\[ D_t = Cr\epsilon S_t + (1 - C)D_{t-1} \]  

(2.26)

Where,
- \( D_t \) = Dividends per share for the year \( t \);
- \( C \) = Adjustment rate;
- \( r \) = Target payout rate;
- \( \epsilon S_t \) = Earnings per share for the year \( t \);
- \( D_{t-1} \) = Dividends per share for the year \( t - 1 \).

Above theory can be explained with the help of following illustration. Kinematics Ltd., has earnings per share of Rs. 4.00 for the year \( t \). Its dividend per share for the year \( t-1 \) was Rs. 1.50. Assume that the target payout ratio and the adjustment rate for this firm are 0.6 and 0.5 respectively. Assuming Lintner’s model is applicable

Kinematics dividend per share for the year \( t \) would be,

\[ 0.5 \times 0.6 \times Rs. \ 4.00 + 0.5 \times Rs. \ 1.50 = Rs. \ 1.95 \]

2.4.8 Tax Preference Theory

The MM assumptions of a perfect capital market exclude any possible tax effect. It has been assumed that there is no difference in tax treatment between dividends and capital gains. However, in the real world taxes exist and may have significant influence on dividend policy and the
value of the firm. In general, there is often a differential in tax treatment between dividends and capital gains, and, because most investors are interested in after-tax return, the influence of taxes might affect their demand for dividends. Taxes may also affect the supply of dividends, when managers respond to this tax preference in seeking to maximize shareholder wealth (firm value) by increasing the retention ratio of earnings.

The tax-effect hypothesis suggests that low dividend payout ratios lower the cost of capital and increase the stock price. In other words low dividend payout ratios contribute to maximise the firm’s value. This argument is based on the assumption that dividends are taxed at higher rates than capital gains. In addition, dividends are taxed immediately, while taxes on capital gains are deferred until the stock is actually sold. These tax advantages of capital gains over dividends tend to predispose investors, who have favourable tax treatment on capital gains, to prefer companies that retain most of their earnings rather than pay them out as dividends, and are willing to pay a premium for low-payout companies. Therefore, a low dividend payout ratio will lower the cost of equity and increases the stock price.

In many countries a higher tax rate is applied to dividends as compared to capital gains taxes. Therefore, investors in high tax brackets might require higher pre-tax risk-adjusted returns to hold stocks with higher dividend yield. This relationship between pre-tax returns on stocks and dividend yields is the basis of a post tax-effect hypothesis.
Brennan (1970) developed an after-tax version of the capital asset pricing model (CAPM) to test the relationship between tax risk-adjusted returns and dividend yield. Brennan's model maintains that a stock's pre-tax returns should be positively and linearly related to its dividend yield and to its systematic risk. Higher pre-tax risk adjusted returns are associated with higher dividend yield stocks to compensate investors for the tax disadvantages of these returns. This suggests that a stock with higher dividend yield will sell at lower prices because of the disadvantage of higher taxes associated with dividend income. The Brennan model can be described as:

\[ E(R_{it} - R_{ft}) = \gamma_0 + \gamma_1 \beta_{it} + \gamma_2 (D_{it} - R_{ft}) \]  

(2.27)

Where,

- \( R_{it} \) =Return on stock i in period t;
- \( R_{ft} \) =Riskless rate of interest;
- \( \beta_{it} \) =Beta coefficient for stock i in period t (systematic risk);
- \( D_{it} \) =Dividend yield of stock i in period t.

\( \gamma_0, \gamma_1, \gamma_2 \) are constant

It is assumed that the coefficient \( \gamma_2 \) is interpreted as an implicit tax bracket and is independent of the level of the dividend yield \( D \). If the coefficient of dividend yield (\( \gamma_2 \)) is statistically different from zero and positive, the results are interpreted as evidence of a tax effect. That is, higher pre-tax risk-adjusted returns are necessary to compensate investors for holding high-dividend-paying stocks because of the disadvantage associated with dividend income.
2.5 Theoretical framework of value of the firm

As the objective of a firm should be directed towards the maximization of the value of the firm, the capital structure, or leverage, decision should be examined from the point of its impact on the value of the firm. If the value of the firm can be affected by capital structure a financing decision, a firm would like to have a capital structure which maximize the market value of the firm. There exist conflicting theories on the relationship between capital structure and value of firm.

Thus Capital Structure theories are grouped as

- Capital Structure Irrelevance Theories
- Capital Structure Relevance Theories

Above theories are discussed in detail in following sections.

2.6 Capital Structure Irrelevance Theories

These theories, which argue that capital structure are not relevant in determining the value of the firm, are:

- NOI Approach and MM Hypothesis Without Taxes

2.6.1 NOI Approach and the MM Hypothesis Without Taxes

MM do not agree with the traditional view. They argue that, in perfect capital markets without taxes and transaction costs, a firm’s market value and the cost of capital remain invariant to the capital structure changes. The value of the firm depends on the earnings and risk of its assets
(business risk) rather than the way in which assets have been financed. The MM hypothesis can be explained in terms of their two propositions.

**Proposition 1**

Consider two pharmaceutical firms, which have identical assets, operate in same market segments and have equal market share. These two firms belong to the same industry and they face similar competitive and business conditions. Hence, they are expected to have same net operating income and exposed to similar business risk. Since the two firms have identical business risk, it is logical to conclude that investors’ expected rates of return from assets, \( k_a \), or the opportunity cost of capital of the two firms, would be identical. Suppose both firms are totally equity financed and both have assets of Rs 225 crore each. Both firms expect to generate net operating income of Rs 45 crore each perpetually. Further, suppose the opportunity cost of capital or the capitalization rate for both firms is 15 percent. Assume that there are no taxes so that the before and after-tax net operating income is the same. Capitalizing NOI (Rs 45crore) by the opportunity cost of capital (15 percent), you can find the value of the firm. The two firms would have the same value:

\[
\frac{45}{0.15} = Rs 300 \text{ crore.}
\]

If the assumption regarding the financing is changed. Suppose there is an unlevered firm with 100 percent equity and a levered firm with 50 percent equity and 50 percent debt. Should the market values of two firms differ? Debt will not change the earnings potential of as it depends on its investment in assets. Debt also cannot affect the business conditions and therefore, the business (operating) risk of Lifeline – the levered firm. The
value of a firm depends upon its expected net operating income and the overall capitalization rate or the opportunity cost of capital. Since the form of financing (debt or equity) can neither change the firm’s net operating income nor its operating risk, the values of levered and unlevered firms ought to be the same. Financing changes the way in which the net operating income is distributed between equity holders and debt holders. Firms with identical net operating income and business (operating) risk, but differing capital structure, should have same total value. MM's Proposition I is that, for firms in the same risk class, the total market value is independent of the debt-equity mix and is given by capitalizing the expected net operating income by the capitalization rate (i.e., the opportunity cost of capital) appropriate to that risk class:

\[
Value\ of\ levered\ firm = Value\ of\ unlevered\ firm
\]

\[
V_1 = V_u
\]

\[
\text{Value of the firm} = \frac{\text{Net operating income}}{\text{Firm's opportunity cost of capital}}
\]

\[
V = V_1 = V_u = \frac{\text{NOI}}{k_a}
\]

Where \( V \) is the market value of the firm and it is sum of the value of equity, \( E \), and the value of debt, \( D \); \( \text{NOI} = \text{EBIT} = \bar{X} \), the expected net operating income; and \( k_a \) = the firm’s opportunity cost of capital or the capitalization rate appropriate to the risk class of the firm.

MM’s approach is a net operating income approach because the value of the firm is the capitalized value of net operating income. Both net operating income and the firm’s opportunity cost of capital are assumed to
be constant with regard to the level of financial leverage. For a levered firm, the expected net operating income is sum of the income of shareholders and the income of debt-holders. Debt-holders' income is interest and shareholders' income, called net income, is the expected net operating income less interest. The levered firm's value is the sum of the value of equity and value of debt. The levered firm's expected rate of return is the ratio of the expected operating income to the value of all its securities. This is an average expected rate of return that the levered firm's all security-holders would require the firm to earn on total investments. The average rate of return required by all security-holders in a levered firm is the firm's weighted average cost of capital; i.e,

$$WACC = k_0$$ or $$k_1$$. Thus:

$$V_1 = \frac{NOI}{k_1} = \frac{NOI}{k_0}$$

$$k_0 = k_1 = \frac{NOI}{V_1}$$ \hspace{1cm} (2.29)

In the case of an unlevered firm, the entire net operating income is the shareholders net income. Therefore, the unlevered firm's WACC or $$k_u$$ is equal to its opportunity cost of capital:

$$k_a = k_u = \frac{NOI}{V_u}$$ \hspace{1cm} (2.30)

Since the values of the levered and unlevered firms and the expected net operating income (NOI) do not change with financial leverage, the weighted average cost of capital would also not change with financial leverage. Hence, MM's Proposition I also implies that the weighted average
cost of capital for two identical firms, one levered and another unlevered, will be equal to the opportunity cost of capital (Figure 2.4)

Levered firm’s cost of capital \( (k_1) = \) Unlevered firm’s cost of capital \( (k_u) \)

\[
k_1 = k_0 = k_a = k_u
\]

Arbitrage Process

The simple logic of proposition I is that two firms with identical assets, irrespective of how these assets have been financed, cannot command different market values. Suppose this were not true and two identical firms, except for their capital structures, have different market values. In this situation, arbitrage (or switching) will take place to enable investors to engage in the personal or homemade leverage as against the corporate leverage, to restore equilibrium in the market.
Above theory can be explained with the help of following illustration. Suppose two firms- Firm U, an unlevered firm and Firm L, a levered firm — have identical assets and expected net operating income (NOI=\(\bar{X}\)) of Rs 100000. The value of Firm L is Rs 100000 assuming the cost of equity of 10 percent under the traditional view. Since Firm U has no debt, the value of its equity is equal to its value \(E_u = V_u\). Firm L employs 6 percent Rs 50000 debt. Suppose its cost of equity under the traditional view is 11.7 percent. Thus, the value of Firm’s L’s equity shares \(E_1\) is Rs 60000, and its total value \(V_1\) firm is Rs 110000 \(V_1 = E_1 + D_1 = 60000 + 50000\).

**Table 2.4: Value of Levered and Unlevered Firms**

<table>
<thead>
<tr>
<th></th>
<th>Firm U (Unlevered)</th>
<th>Firm L (Levered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net operating income, (\bar{X})</td>
<td>10000</td>
<td>10000</td>
</tr>
<tr>
<td>Interest, INT</td>
<td>0</td>
<td>3000</td>
</tr>
<tr>
<td>Net Income (dividends), (\bar{X} - INT)</td>
<td>10000</td>
<td>7000</td>
</tr>
<tr>
<td>Cost of equity, (k_e) (traditional view)</td>
<td>0.100</td>
<td>0.117</td>
</tr>
<tr>
<td>Market value of equity, E</td>
<td>10000</td>
<td>60000</td>
</tr>
<tr>
<td>Market value of debt, D</td>
<td>0</td>
<td>50000</td>
</tr>
<tr>
<td>Market value of firm, V=E+D</td>
<td>100000</td>
<td>110000</td>
</tr>
<tr>
<td>WACC, (k_0) (traditional view)</td>
<td>0.10</td>
<td>0.091</td>
</tr>
</tbody>
</table>
Firm L and Firm U have identical assets and NOI, but they have different market prices. The cheaper debt of Rs 50000 of Firm L has increased shareholders wealth by Rs 10000. MM argue that this situation cannot continue for long, as arbitrage will bring two prices into equilibrium.

Assume that Mr.X hold 10 percent shares of the levered firm L. Since Mr.X holds 10 percent of L’s shares, his equity investment is: $0.10 \times (110000 - 50000) = Rs 6000$. Mr.X is entitled to 10 percent of the equity income (dividends):

\[
Return = 0.10(X - INT)
\]

\[
= 0.10[(10000 - 0.06 \times 50000)]
\]

\[
= 0.10(10000 - 3000) = Rs 700
\]

Mr.X can earn same return at lesser investment through an alternate investment strategy. This can be done by switching investment from firm L and firm U as follows:

1. Selling investment in firm L’s shares for Rs 6000.
2. Borrowing an amount equal to Mr. X’s share of firm L’s corporate debt at 6 percent rate of interest: $0.10(50000) = Rs 5000$.
3. Buying 10 percent of the unlevered firm U’s shares investing: $0.10 \times 100000 = Rs 10000$.

Mr. X has Rs 11000; that is, Rs 6000 from sale of L’s shares and Rs 5000 borrowed funds. His investment in U’s shares is Rs 10000. Thus, he has surplus cash of Rs 1000.

His return is:

\[
\text{His return is:}
\]
Return from investment in U’s share = 0.10×10000

= Rs 1000

However, he has borrowed Rs 5000 at 6 percent interest. Therefore, he will have to pay an interest of Rs 300:

Interest payable on borrowed funds = 0.06×5000 = Rs 300

Thus his net return is Rs 700 = Rs 1000 – Rs 300:

Equity return from U: 0.10×Rs 10000 = Rs 1000

Less: Interest on personal borrowing: 0.06 × Rs 5000 = Rs 300

Net return = Rs 700

He earn the same return from the alternate strategy. But now he also has extra cash of Rs 1000 that he can invest to enhance his return. Thus, the alternate strategy will yield higher overall return. Risk is same in both the cases. While shifting investment from firm L to firm U, he replaced his share of L’s debt by personal debt. He has created ‘personal’ or ‘homemade leverage’ instead of ‘corporate leverage’.

Due to the advantage of the alternate investment strategy, a number of investors will be induces towards it. They will sell their shares in firm L and buy shares and debt of firm U. This arbitrage will tend to increase the price of firm U’s shares and to decline that of firm L’s shares. It will continue until the equilibrium price for the shares of firm U and firm L is reached.
The arbitrage would work in the opposite direction if we assume that the value of the unlevered firm U is greater than the value of the value of the levered firm L (i.e., \( V_u > V_1 \)). Let us assume that \( V_u = E_u = \text{Rs 100000} \) and \( V_1 = E_1 + D_1 = \text{Rs 40000 + Rs 50000} = \text{Rs 90000} \). Further, suppose that he still own 10 percent shares in the unlevered firm U, his return and investment will be:

\[
\text{Return} = 0.10(10000) = \text{Rs 1000} \\
\text{Investment} = 0.10(100000) = \text{Rs 10000}
\]

He can design a better investment strategy by dividing:

1. Sell his shares in firm U for Rs 10000
2. Buy 10 percent of firm L’s shares and debt:
   \[
   \text{Investment} = 0.10(40000 + 50000) \\
   = \text{Rs 9000}
   \]

   His investment in firm L is Rs 9000. He has extra cash of Rs 1000. Since he owns 10 percent of equity and debt of firm L, his return will include both equity income and interest income. Thus his return is Rs 1000:

\[
\text{Return} = 0.10(10000) = 0.10(10000 - 3000) + 0.10(3000) \\
= \text{Rs 1000}
\]

Alternative investment strategy pays the same return but at a lesser investment. Both strategies give the investor same return, but his alternate investment strategy costs you less since \( V_1 < V_u \). In such a situation, investors will sell their shares in the unlevered firm and buy the shares and debt of the levered firm. As a result of this switching, the market
value of the levered firm’s shares will increase and that of the unlevered firm will decline. Ultimately, the price equilibrium will be reached (i.e., \( V_1 = V_u \)) and there will be no advantage of switching anymore.

So in the first instance, let the value of levered firm L be greater than the value of unlevered firm U (i.e., \( V_1 > V_u \)). Both firms earn the same expected net operating income, \( \bar{X} \). The borrowing and lending rate, \( k_d \), is same for both corporations and individuals. Assume that an investor holds \( \alpha \) (alpha) fraction of firm L’s shares. His investment and return will be as follows:

<table>
<thead>
<tr>
<th>Investment in L’s shares</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha(V_1 - D_1) )</td>
<td>( \alpha(\bar{X} - k_d D_1) )</td>
</tr>
</tbody>
</table>

The investor can also design the following alternate investment strategy:

<table>
<thead>
<tr>
<th>Investment</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy fraction of U’s shares ( \alpha V_u )</td>
<td>( \alpha \bar{X} )</td>
</tr>
<tr>
<td>Borrow equal to fraction of L’s debt ( -\alpha D_1 )</td>
<td>( -\alpha k_d D_1 )</td>
</tr>
<tr>
<td>( \alpha(V_1 - D_1) )</td>
<td>( \alpha(\bar{X} - k_d D_1) )</td>
</tr>
</tbody>
</table>

The investor obtains the same return, \( \alpha(\bar{X} - k_d D_1) \) in both the cases, but his first investment strategy costs more since \( V_1 > V_u \). The rational investors at the margin would prefer switching from levered to unlevered
firm. The increasing demand for the unlevered firm’s shares will increase their market price, while the declining demand for the levered firm’s shares will decrease their market price. Ultimately, market values of the two firms will reach equilibrium, and henceforth, arbitrage will not be beneficial.

In the opposite case where \( V_u > V_1 \). Suppose our investor holds a fraction of firm U’s shares. His investment and return will be as follows:

<table>
<thead>
<tr>
<th>Investment</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment in U’s shares</td>
<td>( \alpha V_u )</td>
</tr>
</tbody>
</table>

The investor can design an alternate investment strategy as follows:

<table>
<thead>
<tr>
<th>Investment</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy fraction of L’s shares</td>
<td>( \alpha(V_1 - D_1) )</td>
</tr>
<tr>
<td>Buy equal to fraction of L’s debt</td>
<td>(+\alpha D_1)</td>
</tr>
<tr>
<td>( \alpha V_1 )</td>
<td>( \alpha X )</td>
</tr>
</tbody>
</table>

The investor earns the same return from the alternate strategy but by investing less since \( V_u > V_1 \). Other investors can also benefit similarly by switching their investment. Investors will sell shares of firm U and buy shares of firm L. This arbitrage will cause the price of firm U’s shares to decline and that of firm L’s shares to increase. It will continue until the value of the levered firm’s equal that of the unlevered firm. Thus, in equilibrium
the value of levered firm will be equal to the value of unlevered firm, i.e., $V_1 - V_u$.

On the basis of the arbitrage process, MM conclude that the market value of a firm is not affected by leverage. Thus, the financing (or capital structure) decision is irrelevant. It does not help in creating any wealth for shareholders. Hence one capital structure is as much desirable (or undesirable) as the other.

So, MM's Proposition I is based on certain assumptions. These assumptions relate to the behavior of investors and capital markets, the actions of the firm and the tax environment.

a. Securities (shares and debt instruments) are traded in the perfect capital market situation. This specifically means that

(i) Investors are free to buy or sell securities;

(ii) They can borrow without restriction at the same terms as the firms do; and

(iii) They behave rationally.

b. Firms operate in similar business conditions and have similar operating risk. They are considered to have similar operating risk and belong to homogeneous risk classes when their expected earnings have identical risk characteristics.
c. The operating risk is defined in terms of the variability of the net operating income (NOI).

d. There do not exist any corporate taxes.

e. Firms distribute all net earnings to shareholders.

**Proposition II**

As observed, the value of the firm depends on the expected net operating income and the opportunity cost of capital, $k_a$, which is same for both levered and unlevered firms. In the absence of corporate taxes, the firm’s capital structure (financial leverage) does not affect its net operating income. Hence, for the value of the firm to remain constant with financial leverage, the opportunity cost of capital, $k_a$, must also stay constant with financial leverage. The opportunity cost of capital, $k_a$ depends on the firm’s operating risk. Since financial leverage does not affect the firm’s operating risk, there is no reason for the opportunity cost of capital, $k_a$ to change with financial leverage.

Financial leverage does not affect a firm’s net operating income, but as we have discussed in does affect shareholders’ return (EPS and ROE). EPS and ROE increase with leverage when the interest rate is less than the firm’s return on assets. Financial leverage also increases shareholders’ financial risk by amplifying the variability of EPS and ROE. Thus, financial leverage causes two opposing effects: it increases the
shareholders' return but it also increases their financial risk. Shareholders will increase the required rate of return (i.e., the cost of equity) on their investment to compensate for the financial risk. The higher the financial risk, the higher the shareholders’ required rate of return or the cost of equity. This is MM’s Proposition II.

An all-equity financed or unlevered firm has no debt; its opportunity cost of capital is equal its cost of equity; that is, unlevered firm’s \( k_e = k_a \). MM’s proposition II provides justification for the levered firm’s opportunity cost of capital remaining constant with financial leverage. In simple words, it states that the cost of equity, \( k_e \), will increase enough to offset the advantage of cheaper cost of debt so that the opportunity cost of capital, \( k_a \), does not change. A levered firm has financial risk while an unlevered firm is not exposed to financial risk. Hence, a levered firm will have higher required return on equity as compensation for financial risk. The cost of equity for a levered firm should be higher than the opportunity cost of capital, \( k_a \); that is, the levered firm’s \( k_e > k_a \). It should be equal to constant \( k_a \), plus a financial risk premium. A levered firm’s opportunity cost of capital is the weighted average of the cost of equity and the cost of debt:

\[
k_a = k_e \times \frac{E}{E+D} + k_d \frac{D}{E+D}
\]

Solving the equation we get;

\[
k_e = k_a + (k_a - k_d) \frac{D}{E}
\]

For an unlevered firm, D (debt) is zero; the opportunity cost of capital, \( k_a \) equals the cost of equity, \( k_e \). So financial risk premium of a levered firm is equal to debt-equity ratio, D/E, multiplied with the spread.
between the constant opportunity cost of capital and the cost of debt, 
\((k_0 - k_d)\). The required return on equity is positively related to financial 
leverage, because the financial risk of shareholders increases with financial 
leverage. The cost of equity, \(k_e\), is a linear function of financial leverage, 
\(D/E\). Irrespective of any particular valuation theory. Functional relationship
will be valid.

To understand the implications of MM's Proposition II assume I Ltd.

I Ltd is an all-equity financed company. It has 10000 shares outstanding. The market value of these shares is Rs 120000. The expected operating income of the company is Rs 18000. The expected EPS of the company is: \(Rs18000/10000 = Rs 1.80\). Since I Ltd is an unlevered company, its opportunity cost of capital will be equal to its cost of equity, \(k_e\):

\[
k_a = k_e = \frac{\text{Expected NOI}}{\text{Market value of debt and equity}}
\]

\[
= \frac{18000}{120000} = 0.15 \text{ or } 15\%
\]

Now suppose I Ltd is considering borrowing Rs 60000 at 6 percent rate of interest and buying back 5000 shares at the market value of Rs 60000. I Ltd has Rs 60000 equity and Rs 60000 debt in its capital structure. Thus, the company’s debt-equity ratio is 1. The change in the company’s capital structure does not affect its assets and expected net operating income. However, EPS will change. The expected EPS is:

\[
EPS = \frac{\text{Net Income}}{\text{Number of shares}} = \frac{18000-3600}{5000} = Rs 2.88
\]
I Ltd expected EPS increases by 60 percent due to financial leverage. If its expected NOI fluctuates, its EPS will show greater variability with financial leverage than as an unlevered firm. Since the firm’s operating risk does not change, its opportunity cost of capital (or WACC) will still remain 15 percent. The cost of equity will increase to compensate for the financial risk:

\[ k_e = k_a + (k_a - k_d) \frac{D}{E} \]

\[ = 0.15 + (0.15 - 0.06) \frac{60000}{60000} = 0.24 \text{ or } 24\% \]

The crucial part of proposition II is that the levered firm’s opportunity cost of capital will not rise even if very excessive use of financial leverage is made. The excessive use of debt increases the risk of default. Hence, in practice, the cost of debt, \( k_d \), will increase with high level of financial leverage. MM argue that when \( k_d \) increases, \( k_e \) will increase at a decreasing rate and may even turn down eventually. The reason for this behavior of \( k_e \), is that debt-holders, in the extreme leveraged situations, own the firm’s assets and bear some of the firm’s business risk. Since the operating risk of shareholders is transferred to debt-holders, \( k_e \) declines. As shown in Figure 2.5.
Figure 2.5: Cost of equity under the MM

Criticism of the MM Hypothesis

- **Lending and borrowing rates discrepancy** – The assumption that firms and individuals can borrow and lend at the same rate of interest does not hold in practice. Because of the substantial holding of fixed assets, firms have a higher credit standing.

- **Non-substitutability of personal and corporate leverage** – It is incorrect to assume that “personal (homemade) leverage” is a perfect substitute for “corporate leverage.” The existence of limited liability of firms in contrast with unlimited liability of individuals clearly places individuals and firms on a different footing in the capital markets.

- **Transaction costs** – The existence of transaction costs also interferes with the working of arbitrage.

- **Institutional restrictions** – The “home-made” leverage is not practically feasible as a number of institutional investors would not be able to
substitute personal leverage for corporate leverage, simply because they are not allowed to engage in the "home-made" leverage.

- **Existence of corporate tax** – The incorporation of the corporate income taxes will also frustrate MM’s conclusions. Interest charges are tax deductible.

### 2.7 Capital Structure Relevance Theories

These theories, which argue that capital structure are relevant in determining the value of the firm, are:

- Net Income (NI) approach
- Traditional Approach
- MM Approach With Tax
- Miller Model
- Trade-off theory
- Pecking order theory

#### 2.7.1 The Net Income Approach

Net Income (NI) approach is the earlier version of the view that capital structure is relevant. A firm that finances its assets by equity and debt is called a levered firm. On the other hand, a firm that uses no debt and finances its assets entirely by equity is called an unlevered firm. Suppose firm L is a levered firm and it has financed its assets by equity and debt. It has perpetual expected EBIT or net operating income (NOI) of Rs.1000 and the interest payment of Rs 300. The firm’s cost of equity (or equity capitalization rate), \( k_e \), is 9.33 per cent and the cost of debt, \( k_d \), is 6 per
cent. So value of the firm is the sum of the values of all of its securities. In this case, firm L’s securities include equity and debt; therefore the sum of the values of equity and debt is the firm’s value. The value of a firm’s shares (equity), \( E \), is the discounted value of shareholders’ earnings, called net income, NI. Firm L’s net income is:

\[
\text{NOI} - \text{interest} = \text{Rs 1,000} - \text{Rs 300} = \text{Rs 700},
\]

and the cost of equity is 9.33 per cent. Hence the value of L’s equity is:

\[
\frac{700}{0.0933} = \text{Rs 7,500}
\]

Value of equity = Discounted value of net income

\[
E = \frac{\text{Net Income}}{\text{Cost of equity}} = \frac{\text{NI}}{k_e} = \frac{700}{0.0933} = \text{Rs. 7,500} \quad (2.32)
\]

Similarly the value of a firm’s debt is the discounted value of debt-holders’ interest income. The value of L’s debt is:

\[
\frac{300}{0.06} = \text{Rs 5000}
\]

Value of debt = discounted value of interest

\[
D = \frac{\text{Interest}}{\text{Cost of debt}} = \frac{\text{INT}}{k_d} = \frac{300}{0.06} = \text{Rs. 5000} \quad (2.33)
\]

The value of firm L is the sum of the value of equity and the value of debt:

Value of the firm = Value of equity + Value of debt

\[
V = E + D \quad (2.34)
\]

\[
= \text{Rs 7500} + \text{Rs 5,000} = \text{Rs. 12500}
\]

Firm’s L’s value is Rs. 12500 and its expected net operating income is Rs.1,000. Therefore, the firm’s overall expected rate of return or the cost of capital is:
Firm's cost of capital = \( \frac{Net \ operating \ income}{Value \ of \ the \ firm} \)

\[ k_0 = \frac{NOI}{V} = \frac{1,000}{12,500} = 0.08 \text{ or } 8\% \quad (2.35) \]

The firm’s overall cost of capital is the weighted average cost of capital (WACC). There is an alternative way of calculating WACC. Firm L’s securities include debt and equity. Therefore, firm L’s WACC or \( k_0 \), is the weighted average of the cost of equity and the cost of debt. Firm L’s value is Rs.12500. Hence, the firm’s debt ratio

\[(D/V) = \frac{5000}{12500} = 0.40 \text{ or } 40 \text{ percent}\]

The equity ratio

\[(E/V) = \frac{5,750}{12,500} = 0.60 \text{ or } 60 \text{ per cent.}\]

Firm L’s weighted average cost of capital is:

\[ WACC = Cost \ of \ equity \times \text{equity weight} + \text{cost of debt} \times \text{debt weight} \]

\[ k_0 = k_e \times \frac{E}{V} + k_d \times \frac{D}{V} \quad (2.36) \]

\[ = 0.0933 \times \frac{7,500}{12,500} + 0.06 \times \frac{5,000}{12,500} \]

\[ = 0.0933 \times 0.60 + 0.06 \times 0.40 \]

\[ = 0.056 + 0.025 = 0.08 \text{ or } 8\% \]

Suppose firm L operates in a frictionless world. There are no taxes and transaction costs and debt is risk-free and shareholders perceive no financial risk arising from the use of debt. Under these conditions, the cost
of equity, $k_e$, and the cost of debt, $k_d$, will remain constant with financial leverage. Since debt is a cheaper source of finance than equity, the firm’s weighted average cost of capital will reduce with financial leverage. Suppose firm L’s substitutes debt for equity and raises its debt ratio to 90 per cent. Its WACC will be:

$$0.0933 \times 0.10 + 0.06 \times 0.90 = 0.0633 \text{ or } 6.33\%.$$  

Firm’s L’s WACC will be 6 Percent if it employs 100 per cent debt.

Rearranging Equation (2.36), we get

$$WACC = k_e = k_e \times (1 - \frac{D}{V}) + k_d \times \frac{D}{V}$$

(2.37)

$$WACC = k_0 = k_e - (k_e - k_d) \times \frac{D}{V}$$

It may noted from Equation (2.37) that, given the constant cost of equity, $k_e$, and cost of debt, $k_d$, and $k_d$ less than $k_e$, the weighted average cost of capital, $k_0$, will decrease continuously with financial leverage, measured by $D/V$. $k_0$ equals the cost of equity, $k_e$, minus the spread between the cost of equity and the cost of debt multiplied by $D/V$. WACC, $k_0$, will be equal to the cost of equity, $k_e$, if the firm does not employ any debt (i.e. $D/V = 0$), and $k_0$, will approach $k_d$, as $D/V$ approaches one (or 100 per cent).

Under the assumption that $k_e$ and $k_d$ remain constant, the value of the firm will be:

$$V = E + D = \frac{NOI - INT}{k_e} + \frac{INT}{k_d}$$

$$= \frac{NOI - k_dD}{k_e} + \frac{k_dD}{k_d} = \frac{NOI - k_dD}{k_e} + D$$

90
\[ V = \frac{NOI}{k_e} + D \left(1 - \frac{k_d}{k_e}\right) \] (2.38)

It may be noted that for an unlevered firm, the second term on the right-hand side of Equation (2.38) will be zero, the unlevered firm’s cost of equity is also its WACC and its expected net operating income is its expected net income. Hence, the value of an unlevered (an all-equity) firm is the discounted value of the net operating income. As the firm substitutes debt for equity and so long as \( k_e \) and \( k_d \) are constant, the value of the firm, \( V \), increases by debt multiplied by a constant rate, \( (k_e-k_d)/k_e \).

Above theory can be explained with the help of following illustration. Suppose that a firm has no debt in its capital structure. It has an expected annual net operating income of Rs 100000 and the equity capitalization rate, \( k_e \), of 10 percent. Since the firm is 100 percent equity financed firm, its weighted cost of capital equals its cost of equity, i.e., 10 percent. The value of the firm will be:

\[
100000 \div 0.10 = Rs \ 1000000.
\]

Let us assume that firm is able to change its capital structure replacing equity by debt of Rs 300000. The cost of debt is 5 percent, interest payable to debt-holders is:

\[
Rs \ 300000 \times 0.05 = Rs \ 15000
\]

The net income available to equity holders is:

\[
Rs100000 - Rs \ 15000 = Rs \ 85000.
\]

The value of the firm is equal to the sum of values of all securities.
\[
E = \frac{\text{NOI} - \text{Interest}}{k_e} = \frac{NI}{k_e} = \frac{85000}{0.10} = Rs \ 850000
\]

\[
D = \frac{\text{Interest}}{k_d} = \frac{15000}{0.05} = Rs \ 300000
\]

\[V = E + D = 850000 + 300000 = Rs \ 1150000\]

The value of the firm as follows will be:

\[V = \frac{100000}{0.10} + 300000 \left(1 - \frac{0.05}{0.10}\right)
\]

\[= 1000000 + 150000 = Rs \ 1150000\]

The weighted average cost of capital, \(k_o\), is:

\[k_o = \frac{NOI}{V} = \frac{100000}{1150000} = 0.087 \text{ or } 8.7 \text{ percent}
\]

\[k_o = k_d \frac{D}{V} + k_e \frac{S}{V} = 0.05 \left(\frac{300000}{1150000}\right) + 0.10 \left(\frac{850000}{1150000}\right)
\]

\[= 0.013 + 0.074 = 0.087 \text{ or } 8.7 \text{ percent}\]

Suppose the firm uses more debt in place of equity and increases debt to Rs 900000. As shown in Table 2.5, the firm’s value increases to Rs 1450000, and the weighted average cost of capital reduces to 8.1 percent. Thus, by increasing debt, the firm is able to increase the value of the firm and lower the WACC.
Table 2.5: Value of the Firm (NI Approach)

<table>
<thead>
<tr>
<th></th>
<th>Zero debt</th>
<th>5% Rs 300000 debt</th>
<th>5% Rs 900000 debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net operating income, NOI</td>
<td>100000</td>
<td>100000</td>
<td>100000</td>
</tr>
<tr>
<td>Total cost of debt, INT = ( k_d D )</td>
<td>0</td>
<td>15000</td>
<td>45000</td>
</tr>
<tr>
<td>Net Income, NI: NOI – INT</td>
<td>100000</td>
<td>85000</td>
<td>55000</td>
</tr>
<tr>
<td>Market value of equity, E: NI/( k_e )</td>
<td>1000000</td>
<td>850000</td>
<td>550000</td>
</tr>
<tr>
<td>Market value of debt, D: INT/( k_d )</td>
<td>0</td>
<td>300000</td>
<td>900000</td>
</tr>
<tr>
<td>Market value of the firm, ( V = E + D = NOI/k_0 )</td>
<td>1000000</td>
<td>1150000</td>
<td>1450000</td>
</tr>
<tr>
<td>Debt/Total value, D/V</td>
<td>0.00</td>
<td>0.261</td>
<td>0.62</td>
</tr>
<tr>
<td>WACC, NOI + V ( = k_e \times E/V + k_d \times D/V )</td>
<td>0.100</td>
<td>0.087</td>
<td>0.081</td>
</tr>
</tbody>
</table>

Table 2.6 shows the effect of financial leverage on the value of the firm and WACC under the NI approach. It is assumed that the net operating income is Rs 100000 and the debt-capitalization rate and the equity-capitalization rate respectively are 5 percent and 10 percent, and they remain constant with debt. It is noticeable from the table that the value of the firm increases steadily as the debt ratio, D/V, increases and WACC declines continuously, ultimately reducing to 5 percent at 100 percent debt ratio.
Under NI approach, $k_e$ and $k_d$ are constant. So as debt is replaced for equity in the capital structure, being less expensive, it causes weighted average cost of capital, $k_0$, to decrease, so that it ultimately approaches the cost of debt with 100 percent debt ratio (D/V). From Figure 2.6 the optimum capital structure occurs at the point of minimum WACC. Under the NI approach, the firm will have the maximum value and minimum WACC when it is 100 percent debt-finished.

2.7.2 Traditional Approach

The traditional view has emerged as a compromise to the extreme position taken by the NI approach. Like the NI approach, it does not assume constant cost of equity with financial leverage and continuously declining WACC. According to the view, a judicious mix of debt and equity capital can increase the value of the firm by reducing the weighted average cost of capital (WACC or $k_0$) up to certain level of debt. This approach very
clearly implies that WACC decreases only within the reasonable limit of financial leverage and after reaching the minimum level, it starts increasing with financial leverage. Hence, a firm has an optimum capital structure that occurs when WACC is minimum, and thereby maximizing the value of the firm. Why does WACC decline? WACC declines with moderate level of leverage since low-cost debt is replaced for expensive equity capital. Financial leverage, resulting in risk to shareholders, will cause the cost of equity to increase. But the traditional theory assumes that at moderate level of leverage, the increase in the cost of equity is more than offset by the lower cost of debt. The assertion that debt funds are cheaper than equity funds carries the clear implications that the cost of debt plus the increased cost of equity, together on a weighted basis, will be less than the cost of equity that existed on the equity before debt financing.

Above theory can be explained with the help of following illustration. Suppose the cost of capital for a totally equity-financed firm is 12 percent. Since the firm is financed only by equity, 12 percent is also the firm’s cost of equity ($k_e$). The firm replaces, say, 40 percent equity by a debt bearing 8 percent rate of interest (cost of debt, $k_d$). According to the traditional theory, the financial risk caused by the introduction of debt may increase the cost of equity slightly, but not so much that the advantage of cheaper debt is taken off totally. Assume that the cost of equity increases to 13 percent. The firm’s WACC will be:

\[ \text{WACC} = k_0 = k_e \times w_e + k_d \times w_d \]

\[ = 0.13 \times 0.6 + 0.08 \times 0.4 = 0.078 + 0.032 = 0.11 \text{ or } 11\% \]
Thus, WACC will decrease with the use of debt. But as leverage increases further, shareholders start expecting higher risk premium in the form of increasing cost of equity until a point is reached at which the advantage of lower-cost debt is more than offset by more expensive equity. Let us consider an example as given in Table 2.6.

**Table 2.6: Effect of Leverage on Value and Cost of capital under NI Approach**

<table>
<thead>
<tr>
<th>Leverage (D/V)%</th>
<th>0.00</th>
<th>18.18</th>
<th>33.34</th>
<th>46.15</th>
<th>66.67</th>
<th>94.74</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOI (in Rs)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Interest, INT</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>NI = NOI - INT (in Rs)</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>50</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>$k_d$(%)</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>$k_e$(%)</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>$k_d$(%)</td>
<td>10.0</td>
<td>9.1</td>
<td>8.3</td>
<td>7.7</td>
<td>6.7</td>
<td>5.3</td>
<td>5.0</td>
</tr>
<tr>
<td>$E = (NOI - INT)/k_e$ (in Rs)</td>
<td>1000</td>
<td>900</td>
<td>800</td>
<td>700</td>
<td>500</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>$D = INT/k_d$(in Rs)</td>
<td>0</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>1000</td>
<td>1800</td>
<td>2000</td>
</tr>
<tr>
<td>$V = E + D$(in Rs)</td>
<td>1000</td>
<td>1100</td>
<td>1200</td>
<td>1300</td>
<td>1500</td>
<td>1900</td>
<td>2000</td>
</tr>
</tbody>
</table>

Above theory can be explained with the help of following illustration. Suppose a firm is expecting a perpetual net operating income of Rs 150 crore on assets of Rs 1500 crore, which are entirely financed by equity. The firm’s equity capitalization rate (the cost of equity) is 10 percent. It is considering substituting equity capital by issuing perpetual debentures of Rs
300 crore at 6 percent interest rate. The cost of equity is expected to increase to 10.56 percent.

The firm is also considering the alternative of raising perpetual debentures of Rs 600 crore and replace equity. The debt-holders will charge interest of 7 percent, and the cost of equity will rise to 12.5 percent to compensate shareholders for higher financial risk.

Notice that a higher level of debt (Rs 600 crore), both the cost of equity and cost of debt increase more than at lower level of debt. The calculations for the value of the firm, the value of equity and WACC are shown in Table 2.7.
Table 2.7: Market value and the cost of capital of the firm under Traditional Approach

<table>
<thead>
<tr>
<th></th>
<th>No Debt (Rs in crore)</th>
<th>6% Debt (Rs in crore)</th>
<th>7% Debt (Rs in crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net operating income, NOI</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Total cost of debt, INT = $k_dD$</td>
<td>0</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>Net Income, NOI - INT</td>
<td>150</td>
<td>132</td>
<td>108</td>
</tr>
<tr>
<td>Cost of equity, $k_e$</td>
<td>0.1000</td>
<td>0.1056</td>
<td>0.1250</td>
</tr>
<tr>
<td>Market value of equity, $E=(NOI-INT)/k_e$</td>
<td>1500</td>
<td>1250</td>
<td>864</td>
</tr>
<tr>
<td>Market value of debt, $D$</td>
<td>0</td>
<td>300</td>
<td>600</td>
</tr>
<tr>
<td>Total value of firm, $V=E+D$</td>
<td>1500</td>
<td>1550</td>
<td>1464</td>
</tr>
<tr>
<td>Equity-to-total value, $w_e=E/D$</td>
<td>1.00</td>
<td>0.806</td>
<td>0.590</td>
</tr>
<tr>
<td>Debt-to-total value, $w_d=D/V$</td>
<td>0.00</td>
<td>0.194</td>
<td>0.410</td>
</tr>
<tr>
<td>WACC, $k_0=NOI/V=k_e \times w_e+k_d \times w_d$</td>
<td>0.1000</td>
<td>0.0970</td>
<td>0.1030</td>
</tr>
</tbody>
</table>

When the firm has no debt, WACC and the cost of equity are the same (10 percent). We assume that the expected net operating income, the net income and interest are perpetual flows. We also assume that the expected net income is distributed entirely to shareholders. Therefore, the value of equity is:

$$Value \ of \ equity = \frac{Net \ income \ of \ equity}{cost \ of \ equity} = E = \frac{NI}{k_e}$$

The value of debt is interest income to debt-holders divided by the cost of debt.
\[ Value \ of \ debt = \frac{Interest \ income}{cost \ of \ debt} = D = \frac{INT}{k_d} \]

The sum of values of debt and equity is the firm's total value, and is directly given by net operating income divided by WACC:

\[ Value \ of \ firm = \frac{Net \ Operating \ income}{WACC} = E + D = \frac{NOI}{k_0} \]

According to the traditional theory, the value of the firm may first increase with moderate leverage, reach the maximum value and then start declining with higher leverage. This is so because WACC first decreases and after reaching the minimum, it starts increasing with leverage. Thus, the traditional theory on the relationship between capital structure and the firm value has three stages.

**First stage: Increasing value**

In the first stage, the cost of equity, \( k_e \), the rate at which the shareholders capitalize their net income, either remains constant or rises slightly with debt. The cost of equity does not increase fast enough to offset the advantage of low-cost debt. During this stage, the cost of debt, \( k_d \), remains constant since the market views the use of debt as a reasonable policy. As a result, the overall cost of capital, WACC or \( k_0 \), decreases with increasing leverage, and thus, the total value of the firm, \( V \), also increases.

**Second stage: Optimum value**

Once the firm has reached a certain degree of leverage, any subsequent increases in leverage have a negligible effect on WACC and hence, on the value of the firm. This is so because the increases in the cost of equity due to the added financial risk just offsets the advantage of low-cost
debt. Within that range or at the specific point, WACC will be minimum, and the maximum value of the firm will be obtained.

**Third stage: Declining value**

Beyond the acceptable limit of leverage, the value of the firm decreases with leverage as WACC increases with leverage. This happens because investors perceive a high degree of financial risk and demand a higher equity-capitalization rate, which exceeds the advantage of low-cost debt.

The overall effect of these three stages is to suggest that the cost of capital (WACC) is a function of leverage. It first declines with leverage and after reaching a minimum point or range, starts rising. The relation between costs of capital and leverage is graphically shown in Figure 2.7 wherein the overall cost of capital curve, $k_0$, is saucer-shaped with a horizontal range. This implies that there is a range of capital structure in which the cost of capital is minimized. $k_e$, is assumed to increase slightly in the beginning and then at a faster rate. In Figure 2.8 the cost of capital curve is shown as U-shaped. The U-shaped cost of capital implies that there is a precise point at which the cost of capital is minimum. This precise point defines the optimum capital structure.

As stated earlier, many variations of the traditional view exist whether the cost of equity function is horizontal or slightly rising is not very pertinent from the theoretical point of view, as a number of different costs of equity curves can be consistent with a declining average cost of capital curve. The relevant issue is whether or not the average cost of capital curve
declines at all, as debt is used. All supporters of the traditional view agree that the cost of capital declines with debt.

Figure 2.7: The cost of capital (saucer-shaped)

Figure 2.8: The cost of capital (U-shaped)
Criticism of the Traditional View

The traditional theory implies that investors value levered firms more than unlevered firm. This means that they pay a premium for the shares of levered firms. The contention of the traditional theory, that moderate amount of debt in 'sound' firms does not really add very much to the 'riskiness' of the shares, is not defensible. There does not exist sufficient justification for the assumption that investors' perception about risk of leverage is different at different levels of leverage. However, as we shall explain later, the existence of an optimum capital structure can be supported on two counts: the tax deductibility of interest charges and other market imperfections.

2.7.3 MM Approach With Tax

MMs hypothesis that the value of the firm is independent of its debt policy is based on the critical assumption that corporate income taxes do not exist. In reality, corporate income taxes exist, and interest paid to debt-holders is treated as a deductible expense. Thus, interest payable by firms saves taxes. This makes debt financing advantageous. In their 1963 article, MM show that the value of the firm will increase with debt due to the deductibility of interest charges for tax computation, and the value of the levered firm will be higher than of the unlevered firm.

Suppose two firms L and U are identical in all respects except that firm L is levered and firm U is unlevered. Firm U is an all-equity financed firm while firm L employs equity and Rs 5000 debt at 10 percent rate of interest. Both firms have expected earnings before interest and taxes
(or net operating income) of Rs 2500, pay corporate tax at 50 percent and distribute 100 percent earnings as dividends to shareholders.

The after-tax income accruing to investors of firm L and firm U are shown in Table 2.8. It may be noted that the total income after corporate tax is Rs 1250 for the unlevered firm U and Rs 1500 for the levered firm L. Thus, the levered firm L’s investors are ahead of the unlevered firm U’s investors by Rs 250. It may also be noted that the tax liability of the levered firm L is Rs 250 less than the tax liability of the unlevered firm U. For firm L the tax savings has occurred on account of payment of interest to debt-holders. Hence, this amount is the interest tax shield or tax advantage of debt of firm L: $0.5 \times (0.10 \times 5000) = 0.5 \times 500 = Rs 250$. Thus,

Interest tax shield = corporate tax rate x interest

$$INTS = T \times INT = T \times k_d D$$

Where $T$ is the corporate tax rate, $k_d$ is the cost of debt, $D$ is the amount of debt and $k_dD$ is the amount of interest (INT). The total after-tax income of investors of firm L is more by the amount of the interest tax shield. The levered firm’s after-tax income consists of after-tax net operating income and interest tax shield. The unlevered firm after-tax income is just equal to the after-tax net operating income: The after-tax income of levered firm – The after tax income of unlevered firm

$$= \text{Interest tax shield} = \left[\bar{X}(1 - T) + Tk_dD\right] - \left[\bar{X}(1 - T)\right] = Tk_dD$$

$$= [2500(1 - 0.50) + 0.50 \times 0.10 \times 5000] - [2500 \times (1 - 0.50)]$$

$$= Rs 250$$
### Table 2.8: Income of the firm under MM with Tax Traditional Approach

<table>
<thead>
<tr>
<th></th>
<th>Firm U</th>
<th>Firm L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net operating income</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>Interest</td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td>Taxable income</td>
<td>2500</td>
<td>2000</td>
</tr>
<tr>
<td>Tax at 50%</td>
<td>1250</td>
<td>1000</td>
</tr>
<tr>
<td>Income after tax</td>
<td>1250</td>
<td>1000</td>
</tr>
<tr>
<td>Total income to investors after corporate tax:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dividends to shareholders</td>
<td>1250</td>
<td>1000</td>
</tr>
<tr>
<td>Interest to debt-holders</td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td>Total income to investors</td>
<td>1250</td>
<td>1500</td>
</tr>
<tr>
<td>Interest tax shield (tax advantage of debt)</td>
<td>0</td>
<td>250</td>
</tr>
<tr>
<td>Relative advantage of debt: 1500/1250</td>
<td></td>
<td>1.20</td>
</tr>
</tbody>
</table>

*All figures are Rupees

**Value of Interest Tax Shield**

Interest tax shield is a cash inflow to the firm and therefore, it is valuable. Suppose that firm L will employ debt of Rs 5000 perpetually. If firm L’s debt of Rs 5000 is permanent, then the interest tax shield of Rs 250...
is perpetuity. Discount rate, is required which reflects the riskiness of these cash flows to find the value.

The cash flows arising on account of interest tax shield are less risky than the firm’s operating income that is subject to business risk. Interest tax shield depends on the corporate tax rate and the firm’s ability to earn enough profit to cover the interest payments. The corporate tax rate does not change very frequently. Firm L can be assumed to earn at least equal to the interest payable otherwise it would not like to borrow. Thus, the cash inflows from interest tax shield can be considered less risky, and they should be discounted at a lower discount rate. It will be reasonable to assume that the risk of interest tax shield is the same as that of the interest payments generating them. Thus, the discount rate is 10 percent, which is the rate of return required by debt-holders. The present value of the unlevered firm L’s perpetual interest tax shield of Rs 250 is:

\[
PV of \text{ interest tax shield} = \frac{250}{0.10} = Rs \, 2500
\]

Thus, under the assumption of permanent debt, we can determine the present value of the interest tax shield as follows:

\[
PV \text{ of interest tax shield} = \frac{\text{Corporate tax rate} \times \text{interest}}{\text{Cost of debt}}
\]

\[
PVINTS = \frac{T \times k_a D}{k_d} = TD
\]  

(2.41)

From Equation (2.41) that the present value of the interest tax shields (PVINTS) is independent of the cost of debt: it is simply the corporate tax rate multiplied by the amount of permanent debt (TD). For firm L, the present value of interest tax shield can be determined as:
0.50 \times 5000 = Rs 2500. Suppose government, through its fiscal policy, assumes 50 percent (the corporate tax rate) of firm L's Rs 5000 debt obligation.

Value of the Levered Firm

Here the unlevered firm U has the after-tax operating income of Rs 1250. Suppose the opportunity cost of capital of the unlevered firm U, \( k_u = k_a \) is 12.5 percent. The value of the unlevered firm U will be Rs 10000:

\[
Value \ of \ the \ unlevered \ firm = \frac{After \ tax \ net \ operating \ income}{Unlevered \ firm's \ cost \ of \ capital} = \frac{NOI (1-T)}{k_u} = \frac{1250}{0.125} = Rs \ 10000
\]

The after-tax income of the levered firm includes the after-tax operating income, NOI (1-T) plus the interest tax shield, \( Tk_dD \). Therefore, the value of the levered firm is the sum of the present value of the after-tax net operating income and the present value of interest tax shield. The after tax net operating income, NOI (1-T), of the levered firm L is equal to the after-tax income of the pure-equity (the unlevered) firm U. Hence, the opportunity cost of capital of a pure-equity firm, \( k_u \) or \( k_a \), should be used to discount the stream of the after-tax operating income of the levered firm. Thus, the value of the levered firm L is equal to the value of the unlevered firm U plus the present value of the interest tax shield:

\[
Value \ of \ levered \ firm = Value \ of \ unlevered \ firm + PV \ of \ taxshield = Rs \ 10000 + Rs \ 2500 = Rs \ 12500
\]
We can write the formula for determining the value of the levered firm as follows:

\[ V_1 = \frac{x(1-T)}{k_u} + \frac{Tk_d D}{k_d} \]  
(2.42)

\[ V_1 = V_u + TD \]  
(2.43)

Equation (2.43) implies that when the corporate tax rate, T, is positive \( T > 0 \), the value of the levered firm will increase continuously with debt. Thus, theoretically the value of the firm will be maximized when it employs 100 percent debt. This is shown in Figure 2.9.

Figure 2.9: Value of the levered firm

One significant implication of the MM hypothesis with the corporate tax in practice is that a firm without debt or with low debt can enhance its value if it exchanges debt for equity.
Implications of the MM hypothesis with Corporate Taxes

The MM's "tax-corrected" view suggests that, because of the tax deductibility of interest charges, a firm can increase its value with leverage. MM suggest that firms would adopt a target-debt ratio so as not to violate the limits of the debt levels imposed by lenders. They state:

Existence of a tax advantage for debt financing does not necessarily mean that corporations should at all times seek to use the maximum possible amount of debt in their capital structure. Here are, as we pointed out, limitations imposed by lenders, as well as many other dimensions in real world problems of financial strategy which are not fully comprehended within the framework of static equilibrium models. These additional considerations, which are typically grouped under the rubric of the need for preserving flexibility, will normally imply the maintenance by the corporation of a substantial reserve of untapped borrowing power.

Companies do not employ extreme level of debt in practice. There could be two possibilities: First, the impact of both corporate and personal taxes for corporate borrowing. Personal income tax may offset the advantage of the interest tax shield. Second, borrowing may involve extra costs (in addition to contractual interest cost) — costs of financial distress — that may also offset the advantage of the interest shield.
• Financial Leverage and Corporate and Personal Taxes

Companies everywhere pay corporate tax on their earnings. Hence, the earnings available to investors are reduced by the corporate tax. Further, investors are required to pay personal taxes on the income earned by them. Therefore, from investors’ point of view, the effect of taxes will include both corporate and personal taxes. A firm should thus aim at minimizing the total taxes (both corporate and personal) to investors while deciding about borrowing. How do personal income taxes change investors’ return and value? It depends on the corporate tax rate and the difference in the personal income tax rates of investors.

Suppose the expected net operating income of a firm is Rs 100. The firm may distribute this income either as interest income or equity income. In case of interest, there will be no corporate taxes and debt-holders will receive Rs 100. But they will have to pay personal tax. Assume that the personal tax rate on internal income is 40 percent. Thus, debt-holders’ interest income after personal taxes is:

Interest income after personal taxes

\[ = \text{Interest income} - \text{personal tax on interest income} \]

\[ = 100 - (0.40 \times 100) = 100(1 - 0.40) = Rs \ 60 \]

The equity shareholders will pay personal tax on the equity income received from the firm. Assume that the personal tax rate on equity income is 30 percent. Thus, the equity income after personal tax is:

Equity income after personal taxes

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Since shareholders' income is derived after paying corporate tax and personal tax, we can calculate the equity income after personal tax as follows:

Equity income after personal tax

\[ \text{Equity income after personal tax} = \text{Net operating income} \times (1 - \text{Corporate tax rate}) \times (1 - \text{Personal tax rate}) \]

\[ = 100(1 - 0.50) (1 - 0.30) = \text{Rs 35} \]

Note that the firm pays corporate tax (Rs 50) as well as shareholders pay personal tax (Rs 15). Overall taxes are Rs 65 and shareholders receive Rs 35. It may noted that the borrowing alternative is better as the firm saves corporate taxes and a larger part of the firm's income goes to investors.

Suppose that the corporate tax rate is 40 percent instead of 50 percent and the personal tax rate on equity income is 20 percent instead of 30 percent. Under the debt alternative, the interest income after personal tax will remain Rs 60, but the firm will save Rs 40 corporate tax instead of Rs 50. Under the equity alternative, the equity income will be: \[60 \times 0.20 = \text{Rs 12} \]. Thus the equity income after personal tax will be Rs 48:

Equity income after personal tax \[= 100(1 - 0.40) (1 - 0.20) \]

\[= \text{Rs 48} \]

When the corporate tax rate and equity income personal tax rate decrease, the advantage of borrowing reduces. With reduced corporate tax
rate and personal tax rate on equity income, the overall tax is less under the equity alternative and investors (shareholders) get a larger share of the firm’s income. Thus, the attractiveness of borrowing depends on corporate tax rate, personal tax rate on interest income and personal tax rate on equity income. The advantages of borrowing reduces when corporate tax rate decreases, or when the personal tax rate on equity income decreases. When will a firm stop borrowing?

Suppose the expected net operating income of a firm is Re 1 and it is distributed as equity income, then the firm will pay corporate tax, $T$ and the equity income will be:

Interest income after personal taxes $= 1 - T_{pd}$ \hspace{1cm} (2.44)

On the other hand, if the firm’s expected net operating income is distributed as equity income, then the firm will pay corporate tax, $T$ and the equity income will be:

Equity Income $= 1 - T$ \hspace{1cm} (2.45)

Assume that the personal tax rate on equity income is $T_{pe}$. The equity income after personal tax will be:

Equity income after personal tax $= (1 - T) - T_{pe}(1 - T) = (1 - T) \times (1 - T_{pe})$ \hspace{1cm} (2.46)

So corporate borrowing will be advantageous if the interest income after personal tax is greater than the equity income after personal tax:

$$(1 - T_{pd}) > (1 - T) \times (1 - T_{pe})$$ \hspace{1cm} (2.47)
A firm will stop borrowing when \((1 - T_{pd})\) becomes equal to \((1 - T_{pe})(1 - T)\). Thus, the net tax advantage of debt or the interest tax shield after personal taxes is given by the following:

\[
\text{Net tax advantage of debt} = (1 - T_{pd}) - (1 - T) \times (1 - T_{pe}) \tag{2.48}
\]

We can rewrite Equation (2.48) as follows:

\[
\text{Net tax advantage of debt} = (T - T_{pd}) + T_{pe} (1 - T) \tag{2.49}
\]

In the absence of personal taxes (i.e., \(T_{pd} = T_{pe} = 0\)), the tax advantage of debt is determined by the corporate tax rate, \(T\).

The corporate tax and the personal tax on equity income favor debt and the personal tax on interest income reduces tax advantage of debt.

In the absence of the personal tax on equity income, the personal tax on interest income reduces the tax advantage of debt and it disappears if the personal tax rate on interest income is equal to the corporate tax rate.

In case of a single personal tax rate for equity income and interest income \((T_{pd} = T_{pe} = T_p)\), the tax advantage of debt is reduced by the personal tax rate of equity income and interest income:

\[
\text{Net tax advantage of debt} = (T - T_p) + T_p (1 - T)
\]

\[
= T - T_p + T_p - TT_p = T(1 - T_p)
\]

In practice, the finance manager will find it difficult to arrive at the numerical values of \(T_{pd}\) and \(T_{pe}\) since the firm will have a large number of shareholders and debt-holders in different tax brackets.
Equal personal tax rates for equity income and debt income –- 
Suppose in a country where the government does not distinguish between 
interest income, dividends and capital gains for the purpose of taxes and has 
one rate of personal tax for all personal income. In this situation, the relative 
advantage of debt comes from the corporate tax.

If the personal tax rate for equity income and interest income is 
same (ie.,$T_{pd} = T_{pe}=T_p$), then the interest tax shield (INTS) after all taxes is 
given as follows:

$$INTS = k_d D[(1 - T_p) - (1 - T)(1 - T_p)]$$

$$= k_d D T (1 - T_p) \text{ (since } T_{pd} = T_{pe}=T_p \text{ ) (2.50)}$$

The tax advantage of debt (interest tax shield) reduces by the 
personal tax rate. However, the relative advantage of debt remains same with 
or without personal taxes.

When there is no difference between the personal tax rates of 
equity income and interest income, then the levered firm’s total income after 
all taxes is:

Levered firm’s income after all taxes = Unlevered firm’s income after all 
taxes + Net tax advantage of debt

$$= \bar{X}(1 - T)(1 - T_p) + k_d T D (1 - T_d)$$

The total income after all taxes of the unlevered firm is:

Unlevered firm’s income after all taxes = $\bar{X}(1 - T)(1 - T_p) + k_d$
For the levered firm, the total income after all taxes is:

Levered firm’s income after all taxes

\[
= (\bar{X} - k_d D)(1 - T)(1 - T_{pe}) + k_d D(1 - T_{pd})
\]

\[
= \bar{X}(1 - T)(1 - T_{pe}) - k_d D(1 - T)(1 - T_{pe}) + k_d D(1 - T_{pd})
\]

\[
= \bar{X}(1 - T)(1 - T_{pe}) + k_d D[(1 - T_{pd}) - (1 - T)(1 - T_{pe})]
\]

The leverage firm’s income after all taxes is equal to the unlevered firm’s income after all taxes Plus the net tax advantage of debt.

In the presence of the personal tax on interest income, adjust the discount rate for the personal taxes. This is done because the cash flows of the net tax advantage are computed after personal taxes. The debt-holders of the levered firm L expect 10 percent return before tax, but they can expect only 0.10 \((1 - 0.3) = 0.07\) or 7 percent after personal tax. Thus, the present value of the interest tax shield after all taxes, \(PVINTS\) (or the net tax advantage of debt) is:

\[
PVINTS = \frac{\text{Interest tax shield after personal taxes}}{\text{Cost of debt after personal taxes}}
\]

So the formula for calculating the present value of interest tax shield after corporate and personal taxes, assuming that there is one single personal rate for equity income and interest income:

\[
PVINTS = \frac{\text{Interest \times corporate tax rate \times (1-personal tax rate)}}{\text{Cost of debt \times (1-corporate tax rate)}}
\]

\[
= \frac{k_d D \times T \times (1-T_{pd})}{k_d (1-T_{pd})} = TD
\]
Hence, the value of the levered firm with corporate and personal taxes is still given by the following formula:

\[ V_1 = V_u + TD \]

Unequal personal tax rates for equity income and debt income –
In reality, in a number of countries, dividends are treated differently from interest income for tax purposes. Debt-holders are required to pay personal tax on interest income. Shareholders may also be required to pay personal tax on dividends. But in some countries, either there is no tax on dividends or the personal tax rate on dividends may be lower than the personal tax rate on interest income. However, in most countries, the capital gain tax rates are lower than the personal tax rates on interest income and dividends. Shareholders can choose to receive their income and dividends. Shareholders can choose to receive their income in the form of capital gains, and they can defer paying tax on capital gains for a long period if they do not realize them. Thus, the effective tax rate on equity income is almost close to zero or much less than the tax rate on interest income.

2.7.4 Miller’s Model

How does financial leverage affect the value of the firm when the personal tax rates of shareholders and debt-holders are considered. We know that after-tax income of the firm will be reduced when the personal tax rate of lenders is higher than personal tax rate of shareholders. The present value of interest tax shield (PVINTS) represents gain from financial leverage, and it is the difference between the value of the levered firm and the value of the unlevered firm. PVINTS is the present value of tax saved on interest paid by the firm to lenders. It is given by the product of the
corporate tax rate and the amount of debt under the assumption of perpetual
debt and no personal taxes:

\[ INTS = T \times k_d D \]

\[ PVINTS = \frac{T \times k_d D}{k_d} = TD \]

\[ V_1 - V_u = TD \]

This is the MM hypothesis with corporate tax. Miller introduced personal taxes in the model. Putting together, in case of a pure-equity or unlevered firm, the shareholder’s income after corporate and personal taxes will be:

Unlevered firm’s income after all taxes

\[ = \bar{X}(1 - T)(1 - T_{pe}) \]  

(2.51)

Since these cash flows are after the corporate tax as well as the personal tax, the appropriate discount rate will be the pure-equity capitalization rate, \( k_a \) (or \( k_u \)) adjusted for personal taxes, i.e., \( k_a (1 - T_{pe}) \).

The value of the unlevered firm with corporate and personal taxes will be:

\[ V_u = \frac{\bar{X}(1 - T)(1 - T_{pe})}{k_a (1 - T_{pe})} \]  

(2.52)

In case of the levered firm, the shareholders’ income is adjusted for interest before calculating corporate and personal taxes as shown below:

Levered firm’s equity income after all taxes

\[ = (\bar{X} - k_d D)(1 - T)(1 - T_{pe}) \]
\[ = X(1 - r)(1 - T_{pe}) - k_d D(1 - T)(1 - T_{pe}) \]  

The levered firm’s debt-holders’ income after personal taxes will be:

Debt-holders’ income after personal tax

\[ = k_d D(1 - T_{pd}) \]  

The levered firms’ to investors (shareholders and debt-holders) after corporate and personal taxes will be:

Levered firm’s combined income after all taxes

\[ = X(1 - r)(1 - T_{pe}) - k_d D(1 - T)(1 - T_{pe}) + k_d D(1 - T_{pd}) \]

\[ = X(1 - r)(1 - T_{pe}) + k_d D[(1 - T_{pd}) - (1 - T)(1 - T_{pe})] \]  

The first term in Equation 2.55 is equal to the unlevered firm’s income after all taxes. Hence, the value of these cash flows is equal to the value of unlevered firm, \( V_u \). The second term is interest tax shield including the effect of personal taxes. Therefore, these cash flows have the same risk as the interest payments, and the appropriate ratio to discount these cash flows is \( k_d (1 - T_{pd}) \). Thus, the value of the levered firm is equal to the value of the unlevered firm plus the present value of interest tax shield:

**Value of levered firm**

\[ V_l = V_u + \left[ 1 - \frac{(1-T)(1-T_{pe})}{(1-T_{pd})} \right] D \]  

\[ 117 \]
The second term on the right hand side of Equation (2.56) is the present value of the interest tax shield. Following important relationships with regard to the present value of interest tax shield.

i. If personal taxes do not exist (i.e., $T_{pe} = T_{pd} = 0$), the present value of the interest tax shield is equal to the product of the corporate tax rate times the amount of debt, viz., TD. This is MM’s hypothesis with corporate taxes.

ii. If the personal tax rate on interest income is greater than the personal tax rate on equity income (i.e., $T_{pd} > T_{pe}$), the present value of the interest tax shield will be less than TD.

iii. If personal tax on equity is zero (i.e., $T_{pe} = 0$), the present value of the interest tax shield depends on the corporate tax rate, T, and the personal tax rate, $T_{pd}$, on interest income. The value of interest tax shield declines as the personal tax rate becomes equal to the corporate tax rate, i.e., $T_{pd} = T$.

iv. If $(1 - T_{pd}) = (1 - T)(1 - T_{pe})$, the advantageous of leverage will be completely lost as the present value of interest tax shield will be zero.

Miller’s model is based on the assumption that the personal tax rate on equity income is zero ($T_{pe} = 0$). If the personal tax rate on equity income were zero, investors would prefer to invest in equity. From the firm’s point of view, there is strong incentive to borrow, as they will be able to reduce corporate taxes. These firms can issue debt to those investors who
do not have enough taxable income. To induce tax-paying investors to lend to the firms, they will have to offer them a higher before-tax interest rate. This implies that if the rate of interest on the debt of tax-exempt investors is, say 10 percent, then investors with personal tax rate of, say 20 percent, will have to be offered a rate of interest equal to: 0.10/(1 - 0.20) = 0.125 or 12.5 percent. The tax-paying investors, like the tax-exempt debt-holders, will earn 10 percent after personal tax. In formal terms, if the tax-exempt investors get interest rate \( k_d \), the tax-paying investors will be offered before-tax rate of interest equal to \( k_d/(1 - T_{pd}) \), otherwise they will not lend to the firms. The personal income tax system is generally progressive. Therefore, the firms will have to keep the interest rate rising to attract investors in high tax brackets. Firms will be motivated to keep the interest rate rising if the corporate tax saving is greater than the personal tax loss. They will stop borrowing once the corporate tax rate, \( T \), equals the personal tax rate, \( T_{pd} \). Thus, in the equilibrium, the interest rate should be equal to: \( k_d/(1 - T) \).

The advantage from leverage will become zero once the interest rate offered (i.e., they supply rate) becomes equal to tax-exempt rate grossed up for taxes, \( k^s_d = k_d/(1 - T) \). The supply rate \( k^s_d \) is equal to the demand rate \( k^d_d \) in equilibrium:

\[
k^s_d = \frac{k_d}{1 - T} = k^d_d = \frac{k_d}{1 - T_{pd}}
\]

This implies \((1 - T) = (1 - T_{pd})\), and PVINTS = 0. This is shown in Figure 15.7.

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Miller’s model has two important implications:

1. There is an optimum amount of debt in the economy, which is determined by the corporate and personal tax rates. In other words, there is an optimum debt-equity ratio for all firms in the economy.

2. There is no optimum debt-equity ratio for a single firm. There are hundreds of firms, which have already induced ‘tax-exempt’ and ‘low tax bracket’ investors. Therefore, a single firm cannot gain or lose by borrowing more or less.

Criticism of Miller’s model

- Miller’s model implies that tax-exempt persons and institutions will invest only in debt securities and ‘high-tax bracket’ investors in equities. In practice, investors hold portfolio of debt and equity securities.
• The personal tax rate on equity income in a number of countries is not zero. Firms pay dividends, and shareholders are required to pay dividends, and shareholders are required to pay personal taxes on dividends. If the personal tax rate on dividends, $T_{pe}$, is positive, more investors can be induced to hold debt securities. Assume $T_{pe} = 0.25$ and $T = 0.50$. Then the total tax on equity income is: $0.5 + 0.25 (1-0.5) = 0.625$ or 62.5 percent. More debt can be raised until investors in 62.5 percent tax brackets are covered.

• Investors in high-tax brackets can be induced to invest in debt securities indirectly. They can invest in the tax-exempt institutions. These institutions, in turn, can invest in the corporate bonds.

Under MM's model, the existence of the corporate taxes provides a strong incentive to borrow. In fact, it is ideal for a firm to have 100 percent debt in its capital structure. They ignore personal taxes. Miller's model considers both the corporate as well as the personal taxes. It concludes that the advantage of corporate borrowing is reduced by the personal tax loss. The important implication of the model is that there is no optimum capital structure for a single firm, although for the economy as a whole, therefore, the capital structure does not matter. Miller's model is based on some controversial assumptions, and therefore, most people still believe that in balance, there is a tax advantage to corporate borrowing.

2.7.5 Trade-off Theory

Miller has shown that personal tax on interest reduces the attractiveness of debt. The other corresponding disadvantages of debt are
grouped under financial distress. Financial distress arises when a firm is not able to meet its obligation (payment of interest and principal) to debt-holders. The firm’s continuous failure to make payments to debt-holders can ultimately lead to the insolvency of the firm. For a given level of operating risk, financial distress exacerbates with higher debt. With higher business risk and higher debt, the probability of financial distress becomes much greater. The degree of business risk of a firm depends on the degree of operating leverage (i.e., the proportion of fixed costs), general economic conditions, demand and price variations, intensity of competition, extent of diversification and the maturity of the industry. Companies operating in turbulent business environment and in highly competitive markets are exposed to higher operating risk. The operating risk is further aggravated if the companies are highly capital intensive and have high proportion of fixed cost. Matured companies in relatively stable market conditions have lesser operating risk. Similarily, diversified companies with unrelated businesses are in better position to face fluctuating market conditions.

Financial distress may ultimately force a company to insolvency. Direct costs of financial distress include costs of insolvency. The proceedings of insolvency involve cumbersome process. The conflicting interests of creditors and other stakeholders can delay liquidation of the company’s assets. The physical conditions of assets, which are not in use once the insolvency proceeding start, may deteriorate over time. They may not be properly maintained. Their realizable values may decline. Finally, these assets may have to be sold at “distress” prices, which may be much lower than their current values. Insolvency also causes high legal and administrative costs. The expected costs of insolvency raises the lenders’
required rate of return, which causes a dampening effect on the market value of equity.

Financial distress, with or without insolvency, also has many indirect costs. These costs relate to the actions of employees, managers, customers, suppliers and shareholders.

- **Employees** of a financially distressed firm become demoralized, as they are worried about their future. Their efficiency and productivity decline. This affects the quality of products. The efficient managers and other employees start leaving the company. This affects the reputation of the firm, and sales of its products may drop.

- **Customers** of the financially distressed firm may fear its liquidation, and get concerned about the quality of product or service. They presume problems concerning to after-sale services and maintenance. Consequently, the demand for the firm’s products or services starts falling rapidly.

- **Suppliers** also curtail or discontinue granting credit to the firm fearing liquidation and liquidity problems of a financially distressed firm. Creditors become less tolerant when a firm faces financial problems. They force the firm into liquidation to realize their claims.

- **Investors** become concerned. Hence more important consideration during the financial distress is the firm’s inability of raising funds to undertake profitable investments. Either the investors are not ready to supply capital to the firm or they make funds available at high costs.
and rigid terms and conditions. Non-availability of funds on acceptable terms could adversely affect the operating performance of the firm.

- **Shareholders** start behaving differently. When a firm is under financial distress, but not insolvent, shareholders may be tempered to undertake risky projects using whatever cash the firm is left with. If a risky project succeeds, their gain can be substantial. If the project fails, the creditors will suffer the loss. Suppose a financially distressed firm has a liability of Rs 300 crore, due after a year, towards its creditors. The market value of the firm's equity is Rs 50 crore. The firm has Rs 100 crore cash besides other current and fixed assets. Let us assume that there is an investment opportunity requiring Rs 100 crore. There is 20 percent probability that the present value of the project's cash flows will be Rs 400 crore and 80 percent probability that the present value of the project's cash flows will be zero. Thus, the expected net present value of the project is negative: 
  \[ -100 + 0.2 \times 400 + 0.8 \times 0 = -Rs \, 20 \, crore \]. It is a risky project. The shareholders may undertake the project. If the project succeeds, the firm can meet the creditors' claims of Rs 300 crores and shareholders will gain a wealth of Rs 100 crore. On the other hand, if the project fails, the creditors' claim on assets reduces and shareholders do not suffer any further loss. Shareholders have limiter liabilities. They have the option of easily existing from a financially distressed firm.

- **Managers** generally have a tendency to expropriate the firm's resources in the form of perquisites and avoid risk. When the firm is under financial distress, they may have higher temptation to pocket
the firm’s resources. Managers also start making decisions keeping in mind short-term rather than the long-term interests of the company. They may cut costs that affect the quality of products and sell productive assets to improve the short-term liquidity of the company. They may pass up profitable investment opportunities to avoid any sort of risk. These sub-optimal decisions will further deepen the problems of a distressed firm, and ultimately cause its liquidation.

Financial distress reduces the value of the firm. Thus, the value of a levered firm is given as follows:

\[
V_1 = V_u + PVINTS - PVFD
\]  

(2.58)

Figure 2.11 shows how the capital structure of the firm is determined as a result of the tax benefits and the costs of financial distress. The present value of the interest tax shield increases with borrowing but so does the present value of the costs of financial distress. However, the costs of financial distress are quite insignificant with moderate level of debt, and therefore, the value of the firm increases with debt. With more debt, the costs of financial distress increases and therefore, the tax benefit shrinks. The optimum point is reached when the marginal present values of the tax benefit and the financial distress cost are equal. The value of the firm is maximum at this point.
Figure 2.11: Value of levered firm under corporate taxes and financial distress

Agency costs

In practice, there may exist a conflict of interest among shareholders, debt holders and management. These conflicts give rise to agency problems, which involve agency costs. Agency costs have their influence on a firm's capital structure.

- **Shareholders-Debt-holders conflict** – Debt-holders have a preferential, but fixed claim over the firm’s assets. Shareholders, on the other hand, have a residual, but unlimited claim on the firm’s assets. They also have limited liability for the firm’s obligation. In financial crisis, shareholders can simply opt out from owning the firm. In a highly geared (levered) firm, the debt holders’ risk is very high since shareholders have limited liability. They are not compensated for the added risk of default, which tantamount to transfer of wealth from debt-holders to shareholders. The conflict between shareholders
(or managers working on behalf of shareholders) and debt-holders arise because of the possibility of shareholders transferring the wealth of debt-holders in their favour. The debt-holders may lend money to invest it in low-risk projects while the firm may invest it in high-risk projects. Firm may also raise substantial risky new debt and thus, increase the debt-holders’ risk.

- **Shareholders-Managers conflict** – Shareholders are the legal owners of a company, and management is required to act in their best interests as their agents. The conflict between shareholders and managers may arise on two counts. First, managers may transfer shareholders wealth to their advantage by increasing their compensation and perquisites. Second, managers may not act in the best interest of shareholders in order to protect their jobs. Managers may not undertake risk and forego profitable investments.

- **Monitoring and agency costs** – The agency problems arising from the conflicts between shareholders, debt-holders and managers are handled through monitoring and restrictive covenants. External investors know that managers may not function in their interests; therefore, they have a tendency of discounting the prices of the firm’s securities. These investors require monitoring and restrictive covenants to protect their interests. Debt-holders put restrictions on the firm in terms of new debt. They also involve experts and outsiders to evaluate the soundness of the firm and monitor the firms’ subsequent actions. Similarly, shareholders create many monitoring mechanisms to ensure that managers raise and invest funds keeping in
mind the principle of shareholders' Wealth Maximization. The costs of monitoring and restrictive covenants are called agency costs. Agency costs of debt take account of the likelihood of the shareholders' attempt to expropriate wealth. Agency costs of equity comprise incentives to managers to motivate them to act in the best interests of shareholders by maximizing their wealth. The implications of agency costs for capital structure are that management should use debt to the extent that it maximizes the shareholders' wealth. Agency costs reduce the tax advantage of debt. Thus, Figure 2.11 can be redrawn to include agency costs with costs of financial distress.

2.7.6 Pecking order theory

The 'pecking order' theory is based on the assertion that managers have more information about their firms than investors. This display of information is referred to as asymmetric information. Other things being equal, because of asymmetric information, managers will issue debt when they are positive about their firms' future prospects and will issue equity when they are unsure. A commitment to pay to fixed amount of interest and principal to debt-holders implies that the company expects steady cash flows. On the other hand, an equity issue would indicate that the current share price is overvalued.

Therefore, the manner in which managers raise capital gives a signal of their belief in their firm's prospects to investors. This also implies that firms always use internal finance when available, and choose debt over new issue of equity when external financing is required. Myers et al. (1984) has called it the "pecking order" theory since there is not a well-defined debt-equity target, and there are two kinds of equity, internal and external,
one at the top of the pecking order and one at the bottom. Debt is cheaper than the costs of internal and external equity due to interest deductibility. Internal equity is cheaper and easier to use than external equity. Internal equity is cheaper because (a) personal taxes might have to be paid by shareholders on distributed earnings while no taxes are paid on retained earnings, and (b) no transaction costs (issue costs etc.) are incurred when the earnings are retained.

Managers avoid signaling adverse information about their companies by using internal finance. The profitable firms have lower debt ratios not because they have lower targets but because they have internal funds to finance their activities. They will issue equity capital when they think that shares are overvalued. Because of this, it has been found that the announcement of new issue of shares generally causes share price to fall. Thus, the pecking order theory implies that managers raise finance in the following order.

- Managers always prefer to use internal finance.
- When they do not have internal finance, they prefer issuing debt. They first issue secured debt and then unsecured debt followed by hybrid securities such as convertible debentures.
- As a last resort, managers issue shares to raise finances.

The pecking order theory is able to explain the negative inverse relationship between profitability and debt ratio within an industry. However, it does not fully explain the capital structure difference between industries.