CHAPTER 4
MACRO ECONOMIC FACTORS AND CAPITAL STRUCTURE

4.1 Introduction

As investment decision is very important for any type of company along with that capital sourcing for such investment is also important. Many theories have been suggested for an optimal capital structure and the issue of reaching optimum capital structure became dominant during the second half of the century. It all started with the proposition that earnings and valuation of the company is not affected due to debt equity mix in the capital structure. But subsequently, these assumptions were questioned, and several financial theories were developed to explain optimal capital structure. Through these theories the impact of macro economic factors over the optimal capital structure is discussed below.
In this chapter we have taken up the following issues.

- How capital structure has been described through different models?
- What are the criteria for managing capital structure?
- How financial leverage is determined?
- How the macro factors affect capital structure of the corporate sector?

### 4.2 Models of capital structure

The focus on capital structure started during 1950s. The first one to consider the structure was David Durand and followed by Miller and Modigliani and in the early part of 1960s by Weston. The literature on the determination of the capital structure can be broadly divided into five categories.
MODELS BASED ON ASYMMETRIC INFORMATION

APPROACH

These models use the fact that managers of the company have access to more information about the value of the company than the outsiders. Literature on capital structure in this category can be divided into two categories.

In the first category Myers [1984] and Myers and Majluf [1984] discuss the pecking order hypothesis, where the firms design the capital structure to avoid the underinvestment problem that a firm faces.

In the second category Ross [1977] has developed a capital structure theory where the firm financing decision used as a signal the insider can give to outsiders.

MODELS BASED ON AGENCY APPROACH

These models are based on the assumption that there is a conflict of interest among the different stakeholders of a company. The most influencing paper in this category is the one written by Jensen and Meckling [1976]. These papers discuss
either how firms design their capital structure to alleviate the agency costs the firm faces or how the agency costs encourage certain type of capital structure.

**MODELS BASED ON TAX SHIELD APPROACH**

These papers recognized that one of the most important advantages of debt is that it gives a tax shield to the company. This advantage comes because the interest expensed is tax-deductible expenses. Modigliani and Miller [1963] have found that the value of a levered company will increase by the present value of the tax shield. Mackie and Mason [1990] for example have observed that tax-paying firms prefer debt to other sources of financing. However, as the firms' increases its dependence on debt, the bankruptcy cost also increase. Thus, this theory predicts that there will be an optimum leverage for the firm at which it maximizes the shareholder's wealth.
MODELS BASED ON CORPORATE CONTROL CONSIDERATIONS

These papers look at the debt to equity ratio as a variable that affect the takeovers of the companies. Harris and Raviv [1988] have developed a model where the takeover targets have been found to have a high debt to equity ratio. They also have found that the debt to assets ratio of unsuccessful targets will be higher on an average.

MODELS BASED ON PRODUCT MARKET CONDITIONS

These models depict the relationship between the capital structure of a company and the input/output market conditions. Firms that produce unique products are predicted to have a lower debt to equity ratio. Brander and Lewis [1986] have predicted that oligopolies will have a higher debt to equity ratio compared to firms in the competitive industry.

Until the mid 1970s, companies had simple choice of financing either raising funds through equity issue or by borrowing from banks or issuing bonds. Since the mid 1970s there are choices
of different debt maturities and priorities by choosing among secured, unsecured and subordinated debt. Some of the innovations are introduction of rating sensitive bonds, equity linked bond issues, and mortgage baked securities etc.

4.3 Criteria for managing capital structure

The optimum debt equity ratio is achieved when the net difference between the tax benefits and the expected bankruptcy cost is minimized. Debt can be designed to match the cash flows on the underlying assets. Damodaran [1999] suggests the following:

- The duration of a firm's debt should match the duration of the assets financed with the debt. The estimation of the optimal duration can be done either by matching individual assets and liabilities or by matching the total assets with the total liabilities of the firm. The duration of all assets can be estimated either by a weighted average of the duration of all individual assets or by estimating
the duration of all assets from the interest rate sensitivity

- The choices of interest rate are many such as fixed rate or a floating rate pegged to index rate
- The currency risk exposure is similar to interest rate risk exposure. This requires a currency matching.

The criteria for managing capital structure as listed by Cardozo et al [1997] are as follows

- Maximizing value for present shareholders by minimizing costs
- Maintaining control
- Maintaining financial flexibility
- Asset type
- Product type
- Profitability and cash flow
- Age
- Growth rate
- Ownership
4.4. Determining financial leverage and impact of macro factors on corporate sector

DETERMINING FINANCIAL LEVERAGE

The optimization of capital structure means optimization of the debt equity ratio, taking into account the following factors:

- Minimization of weighted average cost of capital [WACC]
- Minimization of insolvency cost [higher percentage of debt increases interest rates, security requirements, loan covenants]
- Dilution cost [preference is first via retained earnings [non dilative] then through debt and equity]
- Financial flexibility [higher equity and lower debt]

Cardozo et al [1997] suggested the differentiation hypothesis. According to this hypothesis, the capital structure of emerging business resembles one another, and not across industries in established business.
Some studies have been conducted to ascertain the determinants of financial leverage under the Indian context.

Bhat's [1980] paper concerned the impact of size, growth, business risk, dividend policy, profitability, debt service capacity and the degree of operating leverage on the leverage ratio of the firm. The study used the multiple regression models to find out the contribution of each characteristic. Business risk [defined as earning instability], profitability, dividend payout and debt service capacity were found to be significant determinants of leverage ratio. The study used a sample of 62 companies from engineering industry.

Pandey's [1984] study about the corporate manager's attitude towards use of borrowings in India revealed that the practicing managers generally preferred to borrow instead of using other sources of funds because of low cost of debt due to the interest tax deductibility and the complicated procedures for raising the equity capital. In the light of this finding Pandey [1985] conducted another empirical study examining the industrial pattern, trend and volatilities of leverage and the impact of size,
profitability and growth on leverage. It was found that about 72% to 80% of the assets of the sample companies were financed by external debt, including current liabilities. The study also indicated that classifying leverage percentages by the type of industry does not produce any pattern, which could be regarded as systematic and significant. The trends and volatilities associated with the leverage percentages also did not give any support to the belief that the type of industry had an impact on the degree of leverage. It also revealed that there was some evidence of the tendency of large size companies to concentrate in the high levels of leverage. But it is difficult to say conclusively that size has an impact on the degree of leverage since a large number of small firms were also found employing high levels of debt.

Chakraborty [1977] has also conducted a study to investigate debt equity ratio in the private corporate sector in India. He tested the relation of debt equity ratio with age, total assets, retained earnings, profitability and capital intensity. He found that age, retained earnings and profitability were negatively
correlated while total assets and capital intensity was positively related to debt equity ratio. He also provided a glimpse of the regional patterns of debt equity ratios in different industrial centers in India. He also attempted a prediction equation for debt equity ratio for each industry. He also used a very simple methodology for calculating the cost of capital. An indirect attempt was also made to test the M-M hypothesis by plotting debt equity ratios on the X-axis and the cost of capital on Y-axis for 22 firms. The result showed almost horizontal line parallel to the X-axis. The study also discussed the environmental factors influencing corporate debt equity ratios and cost of capital in India.

**IMPACT OF MACRO FACTORS ON CAPITAL STRUCTURE**

The research into the nature of impact of macro economic environment on corporate capital structure could be discussed under the following set of points:

- Influence of inflation on capital structure
• Influence of stock market performance on capital structure
• Influence of interest rate of debt on capital structure
• Influence of GDP growth rate on capital structure

Although the research study on influence of macro economic factors on capital structure is few and inadequate in numbers, but still some works could be traced in this direction. In this context it may be mentioned that financial literature mostly deals with influence of micro factors on capital structure.

Influence of inflation on capital structure

Modigliani-Miller's [1958] works consist of various studies on capital structure of firms. In one of this study they tried to find the effect of (steady) inflation on corporate financial leverage. They and other researchers like Corcoran [1977], Zwick [1977], and DeAngelo and Masulis [1980] theoretically explain that inflation lead to more debt: since inflation lower the real cost of
debt, the demand for corporate bonds on the part of corporate manager increase during inflationary periods. On the other hand, if corporate bonds' return becomes higher relative to stocks return as inflation decreases, the aggregate demand of corporate bonds from the viewpoint of the company decrease. The literature identifies different possible causes of a positive relationship between corporate gearing and inflation.

Firstly, Franks and Broyles [1979], and the authors of many other standard finance texts, argue that the relationship between gearing and inflation depends on the extent to which expectations are reflected in interest rates. If inflation exceeds that expected rate then firms will gain at the expense of investors whereas if inflation is less than expected rate then investors will gain at the expense of the firms. Intuitively, if inflation exceeds expectations then the firm gains as it is essentially repaying cheaper pound to investors whilst not compensating them fully through adequate interest rate increases. However, following this line of argument, a positive relationship can only exist in the long
run if investors may be consistently fooled with respect to interest rate expectations.

Secondly, authors such as Corcoran [1977] argued that any relationship between gearing and inflation depends on the extent to which inflation and interest rates rise together. If they raise equally then the cost of debt finance will fall approximately by the amount of the increased tax deductions. Thus, a positive relationship may arise because higher inflation causes higher interest rates and higher tax deductions on corporate debt interest.

Authors such as DeAngelo and Masulis [1980], Zwick [1977] and Modigliani [1982], suggest a positive relationship between corporate gearing and inflation.

An exceptional work has been done by Schall [1984] who suggest a negative relationship whereby in inflationary conditions, investors sell debt in exchange for equity as real after tax return on equity becomes relatively higher than the return on debt.
Again Kim and Wu [1988] explained that inflation decreases the demand for debt if the debt yield becomes relatively lower than the equity yield, but the supply of debt increase if the tax deductibility effect related to debt exceeds the tax deductibility effect related to inflation. Empirical evidence in support of such relation exists. Zwick [1977] found that higher inflation experienced between 1968 and 1974 caused US firms to significantly increase their debt equity ratios. Corcoran [1977] studied US non financial firms and found that the debt to debt plus equity ratios of such firms increased from 22 percent to 42 percent over the 1956 to 1974 period, paralleling the acceleration of inflation. Holland and Myers [1977] discovered a similar relationship for US firms. Rudolph [1978] studied the effect of inflation on the entire balance sheet of 311 US manufacturing firms over the period 1964 to 1974 and found that long term debt to total assets increased with increase in the rate of inflation. Kim and Wu [1988] studied 1,092 US firms over the period 1953 to 1980 and determined from their regression model that a 1 percent rise in inflation leads to a 0.7 percent rise in the
corporate debt ratio. Therefore, the theoretical and empirical literature clearly supports a positive relationship between corporate gearing and inflation, although it is noted that the empirics focus on the behavior of US firms alone.

In this context we could refer to seminal paper on the tax and capital structure literature by Miller [1977]. He extends the Modigliani-Miller proposition for an economy with taxes, and argues that even in a world in which interest payments are fully deductible in computing corporate income taxes, the value of the firm, in equilibrium, will still be independent of its capital structure.

Dammon [1988] states, Miller determined the optimal level of debt for the aggregate corporate sector and he introduces uncertainty and progressive marginal tax rates. Further, Miller allows investors to freely choose their portfolio in his model and he concludes that marginal tax rates differ across states of nature depending on the taxable personal income, which does not necessarily equal the corporate tax rate. This prevents firms from adjusting their capital structure on a state-by-state basis.
and from maximizing the firm value. If tax rates are quoted as percentages of nominal income, progressive taxes make inflation a source of government revenue since it may bring taxpayers to higher tax brackets. Since firms cannot adjust their optimal capital structure on a state-by-state basis, as in Dammon [1988], inflation affects capital structure and firm value. Thus, higher inflation fosters investors to sell bonds in exchange for stocks and hence firms' capital structure, measured as the debt-capital ratio, tends to drop.

Related to this literature, Dokko [1989] finds empirical support for a change in expected inflation to create a wealth redistribution between creditors (bondholders) and debtors (shareholders); Kelly and Miles [1989] incorporate the capital structure theory to model the response of nominal interest rates to expected inflation in a world with taxes; Platt et al [1995] states that while distressed firms may prefer a no growth strategy, external pressures such as inflation may cause their sales to rise exogenously and develops a new sustainable growth rate formula that describes how much growth the firm
with no new debt capacity can endure; Franks and Schwartz [1991] analyze whether innovations in good price volatility can explain changes in equity price volatility; and Hodder and Senbet [1990] develop a theory of capital structure in an international setting with corporate and personal taxes to characterize an international equilibrium with differential international taxation and inflation in otherwise perfect international capital markets. It can be easily realized that there are a number of possible indirect ways in which inflation may affect firm's capital structure. The empirical testing of these effects has been done mainly using aggregate measurements of the different variables involved in the models. The study of inflation and capital structure CERGE-EI by Jose Noguera is very important. This essay is a contribution to the empirical literature on the effect of inflation tax on the capital structure in which micro data of a number of American corporations is considered. The paper was structured as follows. Section II reviews the literature, identifies the different ways in which both variables are related, and shows a general model to analyze this
relationship. Section III exposes the empirical tests and shows the results for forty major American companies. Section IV concludes. Some studies have been done in Indian context which are as follows:

S.K. Chakrabority examined the effect of inflation on the debt equity ratio. The price indices of all assets and liabilities except those of money assets and liabilities go up during periods of continuous inflation. Although the subject of giving effects inflation induced changes is engaging worldwide attention, definitive conclusions have yet to emerge for universal application. Yet, in this general climate of uncertainty a certain measure of agreement with respect to depreciation of fixed assets at higher rates than historical figures has been reached. This is where the impact of inflation is felt with its greatest long-term implication. For stocks too the need for suitable adjustments to profit has been recognized a given effect to in many cases. However, for monetary assets and liabilities the effects of inflation have only just began to be given an attention.
For our purposes the principal point for consideration is that fixed obligation in money terms owed by the firm under various heads of liabilities results in gains under inflation. From the viewpoint of the capital structure, therefore having more debt finance will be more beneficial to the firm in a continuously inflationary situation. The real liability on account of debt is even on the decline because the real value money is suffering erosion.

Although it is argued in financial literature that during inflation debt is more advantageous to the firm, and therefore firms should tend to have higher debt equity ratios in such period. The study made by S. K. Chakraborty has shown the correlation coefficient between rates of inflation and debt equity ratio for each industry group over the period 1961/62 to 1970/71. The signs were both positive and negative [although all should have been positive according to the hypothesis]. Moreover none of them, except coffee, showed a significant value. But this logic itself is imperfect because it works at the issue exclusively from the viewpoint of the firm. What is a gain to the firm during
inflation is loss to the investor. This is true of all fixed claims financial instruments.

These two factors in combination may explain largely why the rate of increase in debt equity ratio in the private sector has been low compared to that in the U.K. or U.S.A.

Influence of stock market performance on capital structure

The financial market conditions, which encompass the performance of equity markets and debt interest rates used to influence the corporate capital structure decision of the firms. Authors most of the time agree that the finance manager would be more likely to issue equity than debt when the stock market is performing strongly. Martin and Scott [1974] argued that equity issues are more likely when equity prices are buoyant and price earnings ratios are thus high. King [1977] and Marsh [1982] argued that managers are more likely to issue equity after periods of strong equity market performance. Martin and Scott found evidence to support this relationship in their multiple discriminate analysis of 112 US firms issuing securities during
1971, finding that the price earnings ratio was a very significant differentiating factor between the debt equity issuing firms and that lower price earnings ratios were associated with debt issuing firms. Marsh made an analysis of the choice between equity and long term debt for 748 security issues by UK companies during the period 1959 to 1970 and found that market conditions and the past history of security prices were very strong determinants of the debt equity choice of the firm. King found no relationship between stock market performance and the capital structure decision in his analysis of UK companies over the period 1950 to 1971. So in most of the cases there is theoretical and empirical support for a negative relationship between stock market performance and corporate gearing as finance managers are unwilling to issue equity when its price is depressed.

**Influence of interest rate of debt on capital structure**

Interest rate of debt is another factor that influences the capital structure. To find the relation between these two variables
different study has been done from time to time. Marsh [1982] argued that the level of debt issuance is related to the performance of bond markets such that finance managers are more likely to issue debt when interest rates are low or are expected to rise. It was empirically studied on UK firms over the period of 1959 to 1970. Again Corcoran [1977] discussed a positive relationship between these two variables. There could exist either a negative or a positive relationship between gearing and the level of interest rates. In addition to these arguments, it is unclear which term of interest rate influence the corporate capital structure decision most significantly. It is proposed that the finance manager is more likely to adjust the long term external funding stock to changes in longer term interest rates as he or she will largely ignore fluctuations in interest rates, particularly those embodied in shorter term rates. Thus it is clear that conditions in debt and equity markets are capable of exerting a significant influence upon the corporate capital structure decision as such conditions impinge upon the direct costs of external finance borne by the firms.
Influence of GDP growth rate on capital structure

Another objective of our study is to find out how the GDP growth affects the capital structure. GDP is summation of goods and services produced during a year within a country. Summation is made by adding the total products of different sector of economy such as agriculture, mining, manufacturing, small enterprises, commerce, transport communication and other services. Rudolph [1978] constructed a theoretical model of the effect of the economic environment on balance sheet items, predicting that as an economy moves from recession to recovery firms should raise their gearing ratios. It states that as the economy improves, especially if firms are investing in fixed assets, then increasing emphasis should be placed on long term financing. Although there is no apparent empirical support for a positive relationship, on an intuitive level it is likely that firms will greatly increase their long term debt financing towards the perceived end of a recession to finance investment in order to cope with the increased demand associated with eventual recovery. When emerging from a recession, debt financing may be preferred to
equity financing as firms may be unwilling at that stage to issue equity until prices are more buoyant. Thus there should exist a positive relationship between corporate gearing and the growth of GDP and the growth of aggregate investment, respectively, underpinned by intuitive investment cycle theory. To find the impact of GDP on capital structure the following study is very important. “The interplay between capital flows and the domestic Indian financial system” by Ila Patnaik & Ajay Shah in Indian Express, New Delhi, 19 June 2006:

From 1992 onwards, India has experienced a substantial integration with the world economy on both the current account and the capital account which is summarized in the following table:
India's Integration with the World, 1992-93 to 2004-05

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Capital Flows</td>
<td>5.16</td>
<td>31.03</td>
<td>16.1</td>
<td>2.40</td>
<td>4.79</td>
</tr>
<tr>
<td>Official</td>
<td>1.85</td>
<td>1.51</td>
<td>-1.9</td>
<td>0.88</td>
<td>0.23</td>
</tr>
<tr>
<td>Debt</td>
<td>2.38</td>
<td>12.71</td>
<td>15.0</td>
<td>1.11</td>
<td>1.96</td>
</tr>
<tr>
<td>FDI</td>
<td>0.32</td>
<td>5.59</td>
<td>27.1</td>
<td>0.15</td>
<td>0.86</td>
</tr>
<tr>
<td>Portfolio Equity</td>
<td>0.24</td>
<td>8.91</td>
<td>35.1</td>
<td>0.11</td>
<td>1.37</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>-0.98</td>
<td>3.90</td>
<td>-0.45</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Metric of Integration Current Account</td>
<td>96.60</td>
<td>471.71</td>
<td>14.1</td>
<td>44.91</td>
<td>72.76</td>
</tr>
<tr>
<td>Capital Account</td>
<td>59.93</td>
<td>313.41</td>
<td>14.8</td>
<td>27.86</td>
<td>48.34</td>
</tr>
</tbody>
</table>

Table-4.1  
Source: Study by Ila Patnaik & Ajay Shah

While GDP at Factor Cost, measured in USD, grew at a compound rate of 9.63 per cent per year, gross flows on the current account and the capital account grew much faster. Owing to an extensive program of trade liberalization, and services exports made possible by telecommunications technology, gross flows on the current account rose at a compound rate of 14.8%, going from 27.86% of GDP to 48.34%
of GDP. Similarly, through a more modest easing of capital controls, gross flows on the capital account grew at a slower rate of 13% per year, going from 17.05% of GDP to 24.42% of GDP. Putting these together, gross flows across the border rose from 44.91% of GDP to 72.76% of GDP. This constitutes a substantial change in the degree of globalization of the economy. While India continues to have onerous capital controls, the capital account is fairly open for FDI, and for "foreign institutional investors". In addition, as is well known in the literature, there is a strong relationship between a large and open current account, and capital controls. The needs of firms engaged in trade induce an easing of many capital controls, and capital controls become increasingly porous once there is a large current account. The current account can be used by economic agents to implement cross-border capital flows through over/under invoicing, lags in payments and trade credit [Patnaik and Vasudevan, 2000]. Combining across these elements of openness, India has made significant movement towards de facto convertibility. Net capital flows grew by 16.1%
per year, thus going from 2.4% of GDP in 1992-93 to 4.79% of GDP in 2004-05. The outstanding feature of this increase appears to be a profound change in the composition of capital flows. Official flows faded away, from 0.88% of GDP to 0.23%. Debt flows grew slowly, going from 1.11% of GDP to 1.96%. Dramatic growth took place with FDI and portfolio equity. The sum of these two kinds of equity inflows rose from 0.26% of GDP to 2.23% of GDP over this 12-year period.

A quest for explanations about these broad empirical facts is central to understanding Indian macroeconomics today. Some elements are now well understood, but many unsolved puzzles remain. In 2.3.3 part they tried to find out the impact of this GDP on the financing pattern on the Indian companies, which is as follows:

"The exceptional success of the equity market may have shaped the corporate financial structure chosen by firms. In addition, the distress experienced by many leveraged firms in period of slow economic growth from 1997 to 2001, when many trade restrictions and entry barriers were removed, may have also
shaped the optimization of managers in choosing the level of leverage. The stylized empirical fact of this period is that a dramatic de-leveraging has taken place on the part of large non-finance firms. Using accounting measures of debt and equity, the debt-equity ratio dropped from 1.43 in 1989-90 and 1.82 in 1992-93 to a level of 1.06 in 2004-05. Using the market value of equity, the debt-equity ratio dropped from 2.19 in 1989-90 to 0.27 in 2004-05. By January 2006, aggregate bank credit - to all firms and individuals put together - stood at Rs. 13.3 trillion, while the equity market capitalization of the biggest 2,550 firms (only) stood at Rs. 26 trillion. These relationships suggest that India has evolved into an equity-market-dominated financial system. An examination of the sources and uses of funds, aggregated across all large firms in the country, shows that the phenomenon which appears to have been at work is an increased importance of internal financing. Internal financing rose from roughly a quarter in 1990 to roughly half in 2005. In the 2002-05 periods, securities (the sum of debt and equity) as a source of funds stood at roughly zero: the repayment of
outstanding bonds offset the fresh issuance of equity. However, this may reflect the relatively low pace of investment activity in the aftermath of the 2001-02 recessions. In recent years, investment activity has picked up, and the importance of securities issuance from 2005-06 onwards might be greater."

The following table represents the features of the sources of funds of corporate sector.

**Features of the Sources of Funds of the Corporate Sector**

<table>
<thead>
<tr>
<th>Period</th>
<th>1990-1993</th>
<th>2002-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Financing (percent of total)</td>
<td>25.3</td>
<td>51.7</td>
</tr>
<tr>
<td>Securities Markets (percent of total)</td>
<td>19.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Borrowing from Banks / Other Institutions</td>
<td>30.4</td>
<td>12.1</td>
</tr>
<tr>
<td>Number of Companies</td>
<td>2455</td>
<td>6060</td>
</tr>
</tbody>
</table>

Table-4.2  
*Source: Study by Ila Patnaik & Ajay Shah*
From the above study we tried to make a comprehensive framework within which the role of macro economy in corporate capital structure determination is considered.

### 4.5 Conclusion

It can be concluded from the above discussion that many models of capital structure put more stress on micro economic factors than that of macro economic factors while determining the capital structure. However, macro economic factors cannot be ignored altogether and they have certainly their influences on capital structure planning of the company. The factors like inflation, stock market performance, interest rate; GDP affects the capital market, or in other words affect the borrowing habit of the company. In following chapters we consider the impact of macro economic factors on capital structure of selected leading Indian companies.