

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Nowadays the main foundation for the economic prosperity of the country is industrialization. Although the large segment of the population has been engaged in the agricultural sector, it has not been generating sufficient employment opportunities. Hence the economic growth of the nation can be fostered by the mutual development of the agriculture sector and industrial sector. Agricultural sector can provide the raw materials to the industrial sector's development and similarly industrial sector provides the market for the agro-products and lightens the employment weightage from the agriculture sector. So, the mutuality concept in development of industrial sector and agro-sector is the centre formula to industrialization and agricultural development.

The economic development of any country depends upon its industrial growth. The industrial development is the backbone of economic development. So, industrial sector must be developed to accelerate the pace of economic development of the country. To develop economic condition of the country, industrialization is the most important tool. Manufacturing industry is the major component of the industrialization. Development and modernization of manufacturing companies help to widen the scope in the process of industrialization. To develop manufacturing companies, the government should arrange the necessary infrastructure like transportation, water supply, electricity, communication, road etc. In the process of industrialization, huge amount of investment and innovation of new technology, huge amount of investment of efficient management and potential markets are also the essential factors.

Nepal is developing country in the world with 30.85% of its population living below the poverty line. Agriculture is the mainstay of the economy providing a livelihood for over 68% of the population and accounting for 40% of GDP. Industrial activity mainly involves the processing of agricultural products including jute, sugarcane, tobacco etc. Security concerns have led to decrease in tourism; a key source of foreign exchange. Areas of recent foreign investment on other sectors are remain poor, however, the small size of the economy, its technological backwardness, remoteness, landlocked geographic location, civil strife and susceptibility to natural disaster. Industrial growth rate is not sufficient for general growth of the national economy. But it can be said that Industrializations is the back-bone of the national economy and it is important factor for achieving the basic objective or country's economic and social progress. (*Joshi, 2058:08*).

After the dawn of democracy in 1951, Industrial development started getting regular attention of the government. Nepal started planning industrial development with the launching of the first five-year development in 1956. After planned programs, several industries were established in the public sectors. Even after planned effort for industrialization, Nepal remained as a least industrialized country of the world. The situation of industrial development growth was not satisfactory. Thus, the government changed its policy from state lead economy to market-lead economy after mid 1980s. The HMG of Nepal took the privatization policy for contribution to the industrial development. Among the SAARC countries, Nepal was the first country to formulate privatization act (*Dhungana, 1994:104*). In the end of Ninth plan (1997-2002), 17 public industries were privatized.

Nepal is a small and land locked and least developed country. It is surrounded by India in south, east and west. There is hilly region in the northern part of it which is attached with China. Nepalese market is not big market for industrial products. So, due to the unbounded globalization, Nepal has to focus on its market beyond its territory. Only then, the manufacturing industries can make its sustainable future.

The contribution of industrial sector in the economic growth of Nepal is not effective because manufacturing industries along with mineral industries, service industries, forest industries and agro industries, construction industries, transportation industries, power industries etc. are not in the sound condition to foster the economic growth. Industrial sickness has been surrounded in all sectors of the industries. External environment like political instability is too challenging and is not favorable. Due to the problem of integrated market, the cost of product is very high which has made difficulties to compete in the international market. There is the idlest capacity left due to the ineffective utilization of assets and lack of market and market based industrialization.

Because of these hurdles and big challenges, Nepalese manufacturing industries should adopt the differentiation policy. The manufacturing companies have to be careful in the quality and price of product to differentiate it from other products in the international market. Due to the whim of globalization, the scope of the manufacturing industries has been widening. Hence, the manufacturing industries should increase its strength to cope with the invasion of the global market by attributing the investment and decreasing the cost of product. The government encouraged the private industries by simplifying procedures and made industrial policy more liberal and effective for the investment as joint ventures and collaboration. The first industrial policy was announced in 1992, which encouraged private sector participation in business and expert with the objectives to increase the contribution of industrial sector, national economy, and to put emphasis on the development to industries utilizing local resources, to reduce pressure of employment and underemployment, and to adopt appropriate policy conducive to industrialization for all round balanced development of the country.

The efficiency and effectiveness of the manufacturing industry can be increased by the investments and by making the balanced and standard capital structure. To generate maximum return but to reduce the cost of the manufacturing products, the manufacturing companies should use the appropriate resources of capital.

There are different types of capital which can be used in the capital structure of the company. They may be equity capital, debt capital and preference share capital. The choice of the mix of the capitals is the process of capital structure decision-making which is the most important responsibility of the financial manager of the companies. The mixing of resources of capital reflects about the future policy of the company. It also makes clear about the risk averting or risk taking nature of the companies to reap the cream of the world market in the present context of the globalization. So, it is necessary to know about the different types of capital along with their advantages and disadvantages to make the sound capital structure decision.

Equity capital is the most essential source of capital in the company, which gives the ownership of the company to the equity shareholders. The company collects the capital by issuing the equity shares. The people who purchase the equity share are called equity shareholders and are the real owner of the issuing company. The company generally distributes the dividend to the equity shareholders as a return for their investment in the case of making profit. The company may not distribute its profit in the form of dividend to the equity shareholders. The management of the company may decide to retain the profit to make investment in the potential investment opportunities arising in the market. This type of profit retained is called retained earnings and is also the equity capital for the company. Hence the company has not the compulsory obligation to pay return in fixed rate for the equity shareholders. Reserved fund, general reserve, profit and loss a/c etc. are also taken as the sources of equity capital.

When the company does not want to liquidate its ownership, it issues the bond or debenture to collect debt capital for the purpose of increasing the return and wealth of the equity shareholders. The company generally collects the debt capital when there is the potential opportunity to increase the profitability of the company. As the debt capital bears the cost in the form of interest, it is regarded as the riskier source of capital.

The use of debt capital has the advantage in the form of tax saving which decreases the cost. Interest to the debt capital should be paid periodically as the fixed charge to the lenders. The equity shareholders may earn certain amount as dividend only after the payment of fixed interest from the company's profitability to the lenders. In this way, the payment of fixed interest to debt affects the return to the equity shareholders. This effect is known as leverage. There are two types of debt. These are long-term debt or short-term debt. The use of the short-term debt may be less expensive than long-term debt but short-term debt is riskier than the long-term debt. Hence, the use of the appropriate type of debt in the capital structure to make the sound leverage is the sound capital structure decision making.

The company also uses another type of capital which has the characteristics of both equity and debt capital and is less risky than debt capital and more risky than equity capital. This type of capital is called hybrid securities and is known to be preference share capital. Depending upon the different types of the preference shares, the company has the fixed liability to pay the preferred dividend to the preference shareholders. But the company does not need to bear the fixed liability to pay the preferred dividend like in the case of interest to debt in the condition of not making the profit. So the company has the liberal fixed responsibility in using the preference share capital in the capital structure. The equity shareholders' profit can be calculated only after the payment of preferred dividend. But, the payment of preferred dividend is ranked after the payment of interest to the debt holders.

Equity capital is mostly used in their capital structure of Nepalese manufacturing companies and other companies. Only few companies are using the debt. But the use of preference share capital is rarely found in Nepal. The good mix of all sources of capital is the important for maximizing the shareholder's wealth. The appropriate use different sources of capital reduce the overall cost of capital and the cost of product which helps to compete in the market and to foster the industrialization process for contributing to the

national economy. Hence, the study of the capital structure is the most important for the manufacturing companies to increase their profitability.

1.2 Historical development of Industry in Nepal

Industrial development is the key to rapid economic development of a country like Nepal. So the attempt to develop modern industries is a recent phenomenon in Nepal. But, some historical facts indicate that Licchhibi Kings tried to promote exports oriented industries like wood carving works, statues, paper, food products etc. King Prithivi Narayan Shah has emphasized the industrial development to protect cottage industries by discouraging imports. In 1935 A.D., establishment of 'Udyog Parisad' with an attempt of producing goods for industrial development. After the establishment of the board, other specialized organization succeeded named Krishi Parisad, Khani Adda, Nepal Kapada Ra Gharelu Illam prachar Adda and enactment of 'Company Law' in 1936 AD. Biratnagar Jute Mill was the first joint stock company and marked the beginning of the industry Development in Nepal. As a result, other public limited companies were started under the company act in initial period.

Planned development was started in 1956 A.D. and the program of industrial development was integrated for accelerating the economic development of country. So government initiated a periodical plan for industrialization. During the first five (1956-61) year plan, Industrial policy of Nepal was declared in 1957. This policy was replaced by a new policy in 1961. The government had established a number of industries under the public sector. Industrial Development Center was established in 1957, which was turned into Nepal Industrial Development Corporation in 1959. The main objectives of the corporation were to provide financial and technical assistance to private industrialists and entrepreneurs.

During second three (1962-65) year plan, several industries like Sugar, Matches, Textiles, Metal, Hotels and Transport etc. were established by private sectors and in the public sector also various types of industries were started like Birgunj Sugar Factory, Bansbari Leather and Shoe Factory and Janakpur Cigarette Factory. The industrial Estate of Balaju and Patan was established in the second plan.

During third five (1970-76) year plan gave higher priority to the private sector as the previous plans. Industries established were a flourmill, a bee factory, a cement factory, and a ghee processing plant. The other achievement in this field of industrial development was the establishment of Industrial Services Center with a view of providing consultancy services, training and information. A new industrial policy was formulated in 1974.

The fifth five (1975-80) year plan was started in 1975, whose main objective was to increase the production of mass consumer goods, maximum utilization of labour force and regional of labour force and regional allocation of development resources. Moreover, the plan shifted emphasis from infrastructure to directly production investments. Industry established in this infrastructure to directly production investment. Industry established in this plan period under the government sector was Hetauda Textiles Factory, Bhaktapur Brick Factory and Agriculture Lime Industry. In the private sector, very few small-scale industries like biscuit flour, soap and sugar were established.

The objective of sixth plan was to increase production, increase output and to create more employment opportunities. In the private sector, biscuit, sweet, shoes and rice etc and in the public sector were Bhirkuti Paper Industries, Lumbini Sugar Factory, Nepal Paper Industries, Herbs Production and Processing Company Limited and Butwal Spinning Mills Ltd were established.

The objective of seventh five (1985-90) year plan was to focused on increase in industrial contribution to enhance gross domestic production to meet basic minimum needs of the people, to setup import substitution industries and to create employment opportunities. The policies were to promote industries based on local raw material, to increase contribution to GDP, emphasize the development of water resource, promote export trade, control population and so on. In the public sector, the industries established were Udaypur Cement Factory, Industrial District Management Limited and Economic Services Center Limited while in the private sectors was readymade garments, beer, distillery, cement, soap and cigarette.

The Eight / five (1992-97) year plan was launched in 1992 after the restoration of Multiparty Democracy in the country. The plan focused on promotion of export-oriented and import substitute Industries Act 1992 and Industrial Policy 1992 were introduced. The main objectives of this plan were to achieve sustainable economic growth to reduce poverty and to regional imbalance. (*Joshi, 2058:194*).

The Ninth Plan had started form 1997. The current Plan has been implemented to continue liberal economy policy and strategy. This plan has focused the need of the country and the desire of the people. The objectives of the plan are:

- ❖ To increase the contribution of industrial sector in domestic production.
- ❖ To increase the earning and services of foreign exchange through the identification of comparative advantages.
- ❖ To increase the production of process goods through the arrangement of infrastructure.
- ❖ to increase the income and purchasing power of people residing in rural areas with contribution of industrial sector in domestic production, through cottage and small scale industries.

1.3 Focus of the Study

The main purpose of this study is to evaluate the capital structure of the private manufacturing firms. Capital structure refers to the mix of equity share capital and long-term source of fund such as: debenture, long-term debt and preference share capital. In the lack of proper planning of the capital structure, the organization may face difficulties in rising funds to finance their activities, thus the firm cannot achieve their goal. The capital structure decision is a major decision, which affects the overall cost of capital, total value of the firm and earnings per share. The financial manager is responsible to plan on optimal capital structure. It's already stated that optimum capital structure maximize the total value of firm and earnings per share and minimize the cost of capital. It does not affect the total operating earnings of the firm cannot achieve their goal. The capital structure decision is a major decision, which affects the overall cost of capital, total value of the firm and earnings per share. The financial manager is responsible to plan an optimal capital structure. It's already stated that optimum capital structure maximize the cost of capital. It does not affect the total operating earnings of the firm.

Bottlers Nepal Limited, Unilever Nepal Limited, Nepal Lube Oil Limited, Jyoti Spinning Mills Limited and Raghupati Jute Mills Limited are the big manufacturing companies producing the products of daily use of their customer and the products of exportable nature. They are generating the employment and also earning foreign currencies. These five are the representatives of the manufacturing companies. The sources of capital, the proportion of capital and the cost of the capital used by these five companies in the capital structure are the focus of the study. Because of these elements, capital structure determines the success of their production strategy.

Hence, the focus of the study can be summarized as follows:

- Nepali manufacturing companies is on the process of industrialization.
- The importance of the capital structure in the successful running of the manufacturing companies.
- The capital structure decision making of the manufacturing companies like BNL, UNL, NLOL, JSML and RJML.
- The composition of the equity capital and the debt capital in the capital structure of manufacturing companies.
- The return with respect to the capital used in the capital structure of the manufacturing companies.
- The capital structure of the manufacturing companies using the cost of the capital and the return on the capital.
- The correlation among the different elements, regression analysis for relationships between two variables and dimensions of the capital structure of the manufacturing companies.
- The capital structure of the BNL, UNL, NLOL, JSML and RJML.

1.4 Statement of the Problem

A company cannot achieve its target objectives and profit due to different sort of problems, which is related to both external and internal environment. So, concerned companies are also suffering for different problems by external environment as well as internal environment. External environment that is uncontrollable but a company can control internal environment to some extent. Amount of internal problems keeping an optimal capital structure is a major challenge to affirm. It may a way for achieving targeted objectives because it effects in the overall cost of capital, earning per share and total value of the firm primarily. But in long run it affects assets structure, profitability, growth rate of operating leverage, tax liability, market and internal condition, control position, management attitude and performance financial flexibility, timing and solvency, cash flow and sales stability.

It is already stated that due to sound mix of capital structure a firm can achieve its target. But if the capital structure is inappropriate it can bear high cost of capital.

If a company is earning profit without its optimal capital structure, it can increase the portion of profit while making its capital structure optimal. Some companies of private sector are also earning profit without optimal capital structure. It means all the profit earning companies may not have optimal capital structure. So this study includes five companies from private sector. This study tries to seek that they are utilizing their optimal financial mix or not? Change in its financial mix cause fluctuation in the profit margin or not?

BNL, UNL, NLOL, JSML and RJML are using the short-term debt, long-term debt along with the equity capital. But the combination is not satisfactory to generate the appropriate profit. The development of the manufacturing industry can be possible by making their capital structure balanced. Most of the Nepalese manufacturing companies have not the specific policies regarding the balanced capital structure. They generally make low cost capital structure. These companies also use the long-term debt. UNL has also used the long term debt in the fiscal year 1997/98. But the purpose of the use of debt is not determined according to the risk associated to it.

An appropriate balance of debt and owner equity is essential to avoid financial risk. A firm should arrange capital structure in such a manner that it can substitute one form of financing by another. But most of the companies do not give importance for the balance capital. The question of the proportion of the debt capital and the equity capital to maximize the shareholders' wealth is the main problem to be resolved by the manufacturing companies. The leverage of the capital structure is the greater impact on the success of the companies. But it is not generally practiced in Nepalese manufacturing companies.

Debt financing is more in these companies but the efficient use of leverage is rarely realized. In Nepal, there is no model for determining capital structure in the Nepalese business organization. In the initial period of any company, they want to use only equity capital and do not want to include the debt in their capital structure due to high interest charges. But, later on, they start to include the debt capital to satisfy the requirement of more capital in the capital structure.

The problems can be stated by pointing out the following issues in the summarized form.

- Is the company's capital structure planned?
- What is the cause of the financial inefficiency?
- What is the existing capital structure position of these companies?
- Is there an effort to maximize value through capital structure?
- Have sampled companies been able to maintain appropriate capital structure?
- How far have these companies been able to utilize the debt efficiency for income generation?
- What is the comparative position of these five firms in respect of their capital structure?

1.5 Objectives of the Study

The main objective of the study is to identify, analyze, interpret and pinpoint the right picture of the capital structure of selected manufacturing companies in Nepal. The overall objective of a business is to earn a satisfactory return on the capital invested with maintaining a sound financial position.

The specific objectives of the study are as follows:

- To the composition structure and characteristics of capital structure of the sampled manufacturing companies.
- To make financial analysis of selected sample companies.
- To compute the correlation between long term debt and capital.
- To analyze the impact of debt financing on profitability.
- To provide recommendations on the basis of the study.

1.6 Significance of the Study

All Nepalese firms do not take the capital structure decision concept seriously that plays vital role in the firm. Despite less than satisfactory capital structure, some Nepalese firms are earning profit. But they are taking burden of higher cost of capital and it may affect the value of the firm, and earnings per share, as a result the company fails to achieve its objectives. So this study believes that some manufacturing companies and also other companies will be benefited more hence the study is conducted on the basis of annual reports of these companies. This study has conducted on the basis of five firms financial reports using various financial tools and statistical tools.

The study is based on the comparison of concerned firm's financial performance in terms of capital structure, which helps to the companies to formulate strategies. It is also believed that it will provide valuable inputs for future researchers. The study of capital structure provides the information about the types of the sources of capital used by such type of companies. Because of the sources of capital in the capital structure reflects the financial policies of the company.

The study of the capital structure also gives the prior knowledge of the possibility of the success of the industry. Hence, the study of the capital structure of the manufacturing companies is important to assess the present and future contributions of this industry to the national economy. The reasons of the need of the study can also be summarized by the following points:

- This study will help to understand the capital structure of the Nepalese manufacturing companies.
- This study provides the knowledge about capability of the Nepalese manufacturing companies and their financial sources.
- This study provides the information towards the stakeholders of the manufacturing companies.
- This study will provide the comparative knowledge of the return on the capital, cost of capital in the capital structure, correlation among the elements, relationships between two variables through regression analysis and dimensions of the capital structure.

1.7 Limitations of the Study

Every study has its own limitations. This is the study capital structure of selected manufacturing companies and selection of companies is based on the varieties and quick availability or data. These factors are the circumstances that the researchers have to face to conduct the study.

Similarly this study has also some limitations which are as follows.

- Secondary data which are collected from books, financial statements, reports of the relevant companies and websites based on this learning. So the secondary data and primary data are not accurate.
- This study covers only five years i.e. from year 2001/02 to 2005/06 and deals only five manufacturing companies in Nepal and results from the study may or may not be appropriate to other company.
- Some of the data and information are taken from telephone enquiries and the personal communication. So it may not reflect the accurate analysis.
- The study may incomplete because of there are more difficult to the personal visits to the companies.
- This study gives emphasis to the capital structure of concerned companies and due to shortage of necessary data, this study does not analyze the all factor of determinants of capital structure.
- This study has not used all the financial and statistical tools due to the various constraints. This may cause not to be cover the total study and analysis.
- Another limitation of the study is time and resources constraints, many effective factors have been more detailed and effective in order to tie the study to its time boundary and limited resources.

1.8 Organization of the Study

This study has been comprised into five chapters. The titles of each these chapters are summarized and the contents of each of these chapters of this study are briefly mentioned here.

Chapter I	:	Introduction
Chapter II	:	Review of Literature
Chapter III	:	Research Methodology
Chapter IV	:	Presentation and Analysis of Data
Chapter V	:	Summary, Conclusion and Recommendations

The first chapter deals with the subject matter consisting introduction which includes the background of the study, historical development of industry in Nepal, focus of the study, statement of the problem, objectives of the study, significance of the study, limitations of the study and Organization of the study. This chapter covers general explanation about the thesis.

The second chapter is the review of literature which deals with the conceptual thoughts and related study with capital structure. It also includes the definitions, viewpoints, explanation of the capital structure of different personalities and critics. Hence in this chapter, all the dimensions like leverage, financial ratios, cost of capital, etc are well defined.

The third chapter describes the research methodology adopted in carrying out the present research. It deals with the research methodology, which consists of research design, sources of data and information, types of data as well as different analytical tools used in the study.

The fourth chapter is the core of the study which deals with the data collection procedure and presentation of the data with different financial tools like leverage, financial ratios, and cost of capital, capital structure theories etc. and the statistical tools like coefficient of correlation, probable error and regression analysis. This chapter also includes the analysis and interpretation of the study.

The fifth or the final chapter is concerned with the suggestive framework that consists with the overall findings, conclusions and recommendations of the study.

The bibliography and appendices are incorporated at the end of the study.

CHAPTER TWO

REVIEW OF LITERATURE

Literature review is basically a ‘stock taking’ work of available literature. To make the research more realistic- review of literature is required. It provides significant knowledge in the field of research. Thus, the review of various books, research studies and articles have been used to make clear about the concept of capital structure as well as to recall the previous studies made by various researchers. This chapter is comprehensive study on the conceptual framework review of books, journals and various researches regarding the capital structure of concerned manufacturing companies of Nepal.

This part of the thesis specifies the review of literature about the capital structure of the firms. “Capital structure or capitalization of a firm is the permanent financing represented by long term debt, preferred stock and shareholders equity. Thus a firm’s capital structure is only the part of its financial structure (*Weston and Copeland, 1990: 565*). Review of Literature can be studied by dividing it in the following ways:

- 1) *Conceptual Framework*
- 2) *Review of Related Studies*

2.1. Conceptual Framework

The conceptual framework is the framework of the literature of the research study, which includes concept and theories of capital structure and the different variables related to the capital structure of the companies. This provides the concept of the various determinants of capital structure of the company.

2.1.1. Concept of Capital Structure

"Capital is an important factor of a new and existed company or capital is the lifeblood for the existence of company. A new business requires capital for production and expansion. Capital is a scarce source and much more essential to maintain smooth operation of any firm. The required funds can raise form different sources and many different firms. The available capital and financial resources should be utilized so effectively that it could generate maximum return. "However all capital can be classified into two basic types- debt and equity." (*Bringham, Gapenski and Ehrhardt, 2001: 579*).

"Capital Structure is the permanent financing of the firm represented preliminary by long term debt, preferred stock and common equity, but excluding all the short term credit" (*Western and Bringham, 1978:555*).

The capital structure involves long term loan financing decision or choice between debt and equity capital. Selection of appropriate mix of debt and equity tends to minimize cost of capital and maximize value of the firm or shareholders wealth. The cost of capital and value of the firm varies with changes in Capital structure. The cost of capital and capital structure are interrelated and has a joint impact upon the value of the firm.

Capital Structure refers to the combination of long term sources of funds, such as debentures, long term debt, preference share capital and equity share capital including reserves and surpluses. Capital structure represents the relationship among different kinds of long term sources of capital and their amount. Normally, a firm raises long term capital through the issue of common shares, sometimes accompanied by preference shares. The share capital is often supplemented by debt securities and other long term borrowed capital. In some cases, the firm accepts deposits. In a going concern, retained earnings or surpluses form a part of capital structure. Except for the common shares, different kinds of external financing i.e., preference shares as well as borrowed capital carry fixed return to the investors.

The capital structure of the firm, defined as the mix of financial instruments use to finance the firm, is simplified to include only long term interest bearing debt, common stock and preferred stock. “Capital structure is the combination of long term sources of financing i.e. debt preferred stock and common stock that are used to finance the firm.” (Steven and Robert, 1981:348) The natures of capital structure vary form company to company, which is directly guided, regulated and controlled by the management of the company.” However, a reasonable satisfactory capital structure can be determined by considering relevant factors and analyzing the impact of alternative financing proposals on the earning per share.”(Chandra, 1985:176).

Capital structure refers to the combination of debt and equity capital, which a firm uses to finance its long-term operations. Capital in this context refers to the permanent or long-term financing arrangements of the firm. Debt capital therefore is the firm’s long-term borrowings and equity capital is the long-term funds provided by the shareholders, the firm’s owners. Capital structure is illustrated in following figure. (MEMENAMIN, 1999:452).

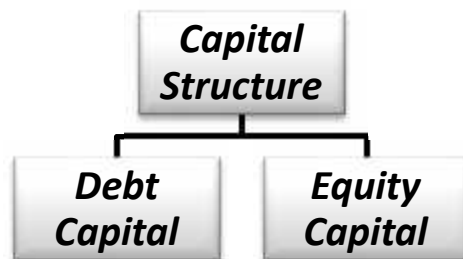


Figure no. 2.1 Combinations of Capital Structure.

Therefore, capital structure can be defined as the combination of long-term source of funds i.e. preference share capital, equity share capital and long term debt capital. The capital structure mix affects the total value of the firm, its earnings per share and overall or weighted average cost of capital. It should well plan. It should aim to maximize the value of the firm, earning per share by minimizing the overall cost of capital without affecting the operation earning of the firm. So, firms always tend to maintain the

appropriate capital structure, which is advantageous for the firm. A sound or appropriate capital structure should have the following features. (*Johnson and Pandey, 1973:45*).

- a) **Risk:** The use of excessive debt threatens the solvency of the company. To the point debt does not add significance risk it should be used, otherwise its use should be avoided.
- b) **Return:** The capital structure of the company should be most advantageous. Subject to other considerations, it should generate maximum returns to the shareholders without adding additional cost to them.
- c) **Control:** the capital structure should involve minimum risk of loss of control of the company. The company should use debt to avoid the loss of control. But a very excessive amount of debt can also cause bankruptcy, which means a complete loss of control.
- d) **Flexibility:** The Company should adapt its capital structure with a minimum cost and delay id warranted by changed situation. The company should be able to raise funds, without undue delay and cost, whenever needed to finance the profitable investments that's why capital structure of the company should be flexible.
- e) **Capacity:** The capital structure should be determined within the debt capacity of the company, and its capacity should not be exceeded. The debt capacity of the company depends on its ability to generate future cash flows. It should have enough cash to pay creditors' fixed charges and principle sum.

2.1.2. Optimum Capital Structure

The optimal capital structure is the structure or the combination of debt and equity that maximizes the price of the firm's stock. Optimum capital structure maximizes the value of the company or shareholders' wealth and minimizes the company's cost of capital. The value will be maximized or the cost will be minimized when the marginal cost of each source of the funds is same. The optimal capital structure is the combination of debt, preferred stock and common equity that minimizes the weighted average cost of capital. Optimal capital structure is defined as the combination of debt and equity where the value of the firm's securities or the value of the firm is maximized and which minimize the cost of capital.

"A firm's optimal capital structure is that mix of debt and equity, which specific target capital structure to make presumably the optimal one, although this target may change over time. (*Brigham and Houston, 1986:55*)."

"An optimal capital structure would be obtained at the combination of debt and equity that maximize the total value of the firm or minimize the weighted average cost of capital. (*Pandey, 675:77*)."

The optimum capital structure may be defined as the relationship of debt and equity securities that maximizes the value of firm's equity stock. There should be balance between risk and return borne by equity shareholders. The objectives of optimal capital structure are as follows.

- ❖ Maximize the return on equity capital.
- ❖ Minimizing the cost of capital.
- ❖ Maintaining the control power.
- ❖ Minimize the risk.
- ❖ Increasing the flexibility.
- ❖ To employ high-grade securities.

2.1.3. Factors Affecting Capital Structure

Firms generally consider the following factors when making capital structure decisions: (*Weston and Brigham, 1982:106*).

- 1. Sales Stability:** A firm whose sales are relatively stable can safely take on more debt and incur higher fixed charges than a company with unstable sales. Utility companies, because of their stable demand, have historically been able to use more financial leverage than industrial firms.
- 2. Asset Structure:** Firms whose assets are suitable as security for loans tend to use debt rather heavily. General-purpose assets, which can be used by much business, make good collateral, whereas special-purpose assets do not. Thus, real estate companies are usually highly leveraged.
- 3. Operating Leverage:** A firm with less operating leverage is better able to employ financial leverage because it will have less business risk.
- 4. Growth Rate:** Faster-growing firms must rely more heavily on external capital. Further, the flotation costs involved in selling common stock exceed those incurred when selling debt, which encourages them to rely more heavily on debt. At the same time, however, rapidly growing firms often face greater uncertainty, which tends to reduce their willingness to use debt.
- 5. Profitability:** Generally high profitable firms that have very high rates of return on investment do not need to do much debt financing. Their high rates of return enable them to do most of their financing with internally generated funds.

- 6. Taxes:** Interest is a deductible expense, and deductions are the most valuable to firms with high tax rates. Therefore, the higher the firm's tax rate, the greater the advantage of debt.
- 7. Control:** The effect of debt versus stock on a management's control position can influence capital structure. If the company may decide to use debt, the firm's financial situation becomes weak and the use of debt might be the subject for serious risk of default. However, if too little debt is used, management runs the risk of a takeover. Control considerations could lead to the use of either debt or equity, because the type of capital that protects management will vary from situation to situation. In any event, if management is at all insecure, it will consider the control situation.
- 8. Management Attitudes:** Since no one can prove that one capital structure will lead to higher stock prices than another, management can exercise its own judgment about the proper capital structure. Portion of debt used in a firm largely depends on management attitudes.
- 9. Market Condition:** Conditions in the stock and bond markets undergo both long and short-run changes that can have an important bearing on a firm's optimal capital structure.
- 10. The Firm's Internal Condition:** A firm's own internal condition can also have a bearing on its target capital structure.

Although it is theoretically possible to determine the optimal capital structure, as a practical matter we cannot estimate this structure with precision. Accordingly, financial executive generally treat the optimal capital structure as a range for example: 40 to 50 percentage debts rather than as a precise point such as 45 percent (*Weston and Brigham, 1982; 719*).

2.1.4. Capital Structure Theory

Capital structure of a firm is a mirror in which one can see the actual image of the firm. The study of the leverage cannot be possible without the study of the capital structure. So, the capital structure of a company plays a vital role with regard to leverage. The leverage and the capital structure concepts are closely related linked to cost of capital and capital budgeting decisions.

In fact, the long term debt and equity maintained by the firm for its investment is known as capital structure, where as leverage is the study of fixed charges, i.e. debt and preference share capital, of the firm's capital structure. So, the study of leverage and study of the capital structure are complementary, which is the analysis of proportionate relationship between debt and equity. "However, the capital structure can affect the value of a company by affecting either its expected earnings or cost of capital or both" (*Khan and Jain, 1998:488*).

As being the crucial in the process of financial decision making, capital structure concept and its effective analysis could be the basis for a company's future. Some companies do not make plan about their capital structure. Because they use to take the financial decisions without the formal planning. They collect the essential capital from different sources but they have to face considerable difficulties in raising fund to operation. Due to this reason, company may bear a loss in the long run. So, the capital structure decisions should be well planned and the financial manager should try to plan the optimal capital structure for a company.

In practice, the determination of capital structure is a necessary and responsible task. As being not an easy task to make the optimal capital structure, capital structure theories help to make the capital structure decision by its detailed study. Capital structure theories are the principles given by some finance experts about the financial decision making process.

The capital structure can be studied in two ways through relevant theory and the irrelevant theory. There are two types of relevant theories, i.e., net income theory and traditional theory. The irrelevant theory is also divided into two approaches, i.e. net operating income approach and Modigliani and Miller's approach. The value of the firm is affected by the capital structure in the relevant theory; where as the value of the firm is not affected by capital structure in irrelevant theory.

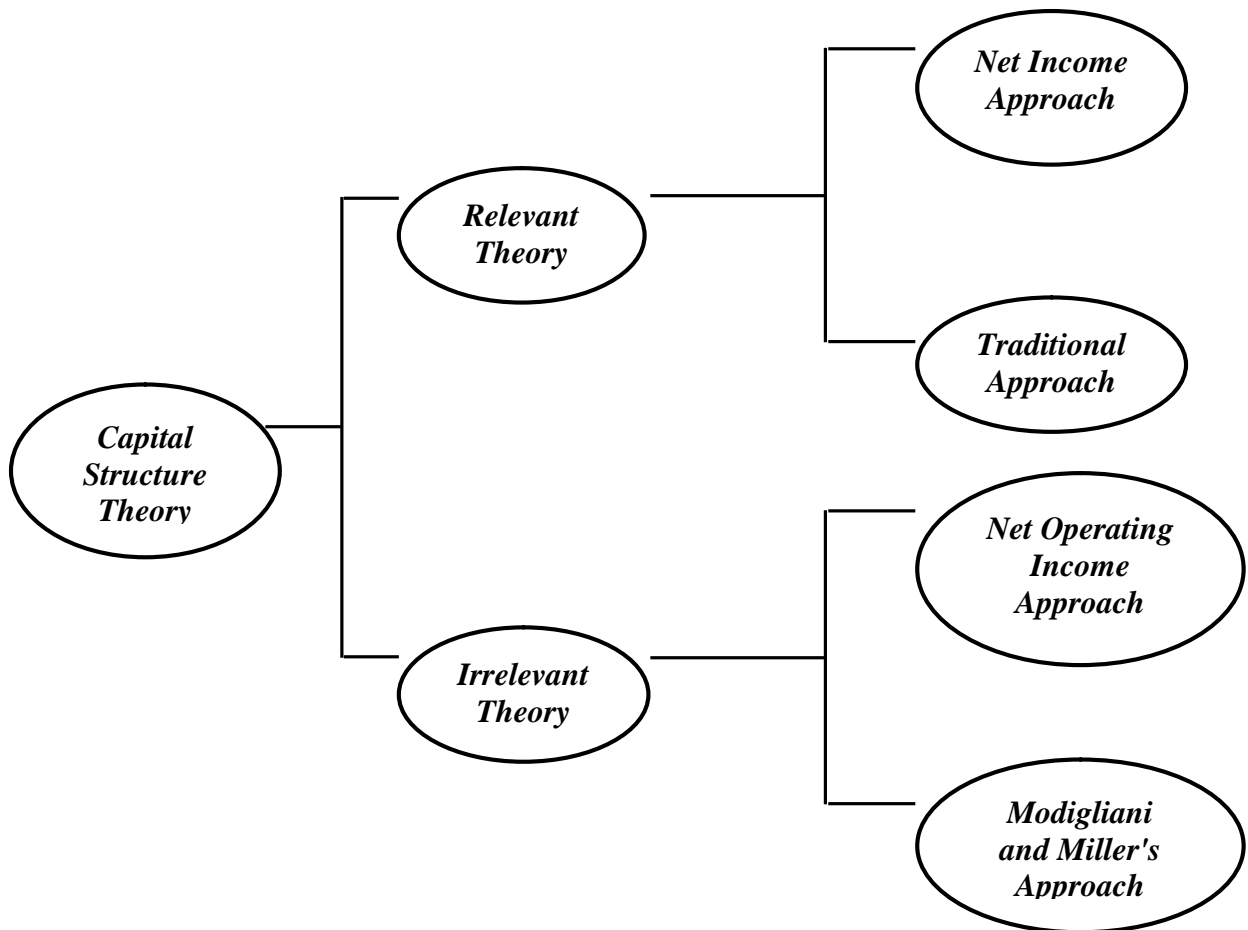


Figure no. 2.2 Theory of Capital Structure & Its Approaches.

Common Assumptions of capital structure theory:

- ❖ There are no corporate or personal taxes and bankruptcy cost.
- ❖ The ratio of debt to equity for the firm is changed by issuing debt to repurchase stock, or issuing stock to payoff debt. In other words, a change in capital stock is affected immediately. In this regard, we assume no transaction costs.
- ❖ The firm has a policy of paying 100 percent of its earning in dividends. Thus, we abstract from the dividend decision.
- ❖ Investors have the same subjective probability distributions of expected future operating earnings of a given firm
- ❖ The operating earnings of the firm are not expected to grow. The expected value of probability distribution of expected operating earnings for all future periods are same as present operating earnings.
- ❖ Two types of capital are employed: long term debt and shareholders' equity.
- ❖ The firm is expected to continue forever.

In the theoretical analysis one shall use the following symbols to make clear basic definitions of capital structure.

S	=	<i>Total Market Value of Stock</i>
B	=	<i>Total Market Value of Debt</i>
V	=	<i>Total market Value of The firm (S+B)</i>
K_e	=	<i>Equity Capitalization Rate</i>
K_o	=	<i>Overall Capitalization Rate</i>
K_d	=	<i>Cost of Debt Capital</i>
I	=	<i>Total Amount of Capital Interest</i>
$EBIT/NOI$	=	<i>Earning Before Interest and Taxes or Net Operating Income.</i>
$EBIT$	=	<i>Earning Before taxes</i>

By using the above symbols, cost of capital and their respected values can be calculated by using the following formulas.

$$\text{Cost of Debt } (K_d) = \frac{\text{Interest}}{\text{Debt}} = \frac{I}{B}$$

$$\text{Cost of Equity } (K_e) = \frac{\text{EBIT} - I}{S} = \frac{\text{NOI} - I}{S}$$

$$\text{Value of Debt } (B) = \frac{\text{INTEREST}}{K_d} = \frac{I}{K_d}$$

$$\text{Overall cost of capital } (K_o) = \frac{\text{NOI}}{V}$$

$$\therefore K_o = K_d(B/V) + K_e(S/V)$$

The value of the firm is combined value of debt capital and share capital

So,

$$V = B + S, \text{ Or, } V = \frac{\text{NOI}}{K_o}$$

2.1.4.1. Net Income Approach (NIA)

Net Income Approach focuses the increase in total valuation of the firm through the reduction in the cost of capital leading to increase in the cost of capital leading to an increase in the degree of leverage. It is also known as dependent hypothesis of capital structure. The essence of this approach is that the firm can reduce its cost of capital by using debt. According to *I. M. Pandey* “The approach is based on the crucial assumption that the use of debt does not change the risk perception of the investors. Consequently, the interest rate on debt (***Kd***) and the equity capitalization rate (***Ke***) remains constant to debt.

Importance of net income approach is that the firm can increase its value or lower the overall cost of capital by increasing the proportion of debt in the capital structure. It supports the traditional theory of capital structure. This theory assumes that the cost of debt and cost of equity remain constant as change in the firm’s capital structure.

A change in the capital structure will lead to the corresponding changes in the overall cost of capital as well as total value of the firm. If the firm adds cheaper debt to its capital structure, its cost of capital declines because debt is less risky than equity. On the other hand, the overall value of the firm increases. Thus, if the firm increases its leverage by increasing debt in capital structure, the overall cost of capital will decline which ultimately increases the value of firm.

The crucial assumptions of this approach are: (*Horne,1996:380*).

- The use of debt does not change the risk perception of investor; as a result the equity-capitalization rate, K_e , and the debt-capitalization rate, k_d , remains constant with change in leverage.
- The debt-capitalization rate, K_d , is less than equity-capitalization rate, K_e , (i.e., $K_d < K_e$)
- The corporate income taxes do not exist.

According to the concerned assumption K_e and K_d are constant. Increased use of debt will result in the higher value of the firm via higher value of equity. Consequently, the overall cost of capital, K_o , will decrease. The overall cost of capital is measured by following formula:

$$\text{Overall cost of capital } (K_o) = \frac{\text{Net operating income}}{\text{Total value of the firm}} = K_o = \frac{EBIT}{V}$$

The overall cost of capital can also be measured by using the following equation:

$$K_o = K_e - (K_e - K_d) \times \frac{B}{V}$$

As per assumptions of NI Approach, K_e and K_d are consistent and K_d is less than K_e . Therefore, K_o will decrease as D/V increase. It also implies that the overall cost of capital, K_o , will be equal to K_e if the firm does not employ any debt. The effects of leverage on the cost of capital under NI approach can be shown by the following figure.

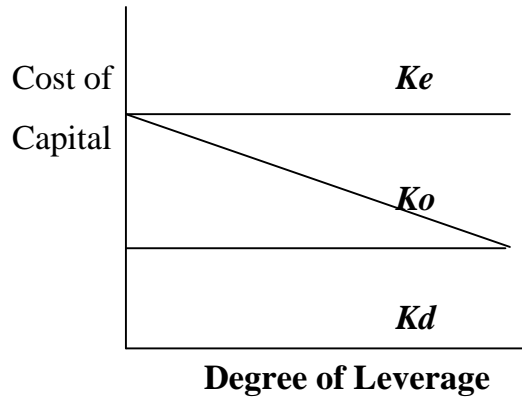


Figure No. 2.3: *The effect of leverage on- Cost of capital under NI approach*

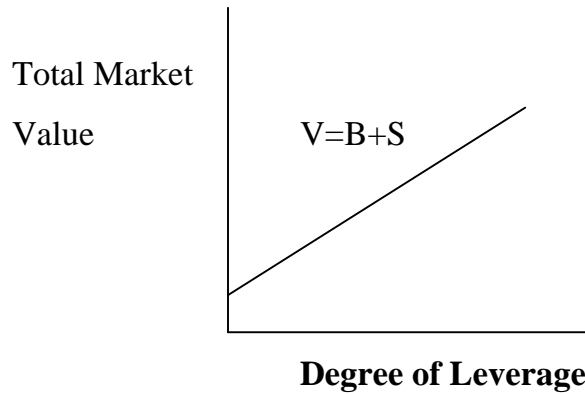


Figure No. 2.4: *The market value under NI approach*

In the above figures, the degree of financial leverage is shown in the horizontal axis and cost of capital (K_o and K_d) in the vertical axis. Under NI approach K_e and K_d are assumed not to change with leverage. As the portion of debt is increased in the capitals structure, it causes weighted average cost of capital to decrease and approach to cost of debt. The optimal capital would occur at the point where the value of the firm is maximum and overall cost of capital is minimum. Under this approach, the firm will have a maximum value and lower cost of capital when it is almost debt financing.

2.1.4.2. Net Operating Income Approach (NOIA)

Net operating income approach is the approach to the valuation of the earnings of a company. It is an irrelevant theory and it is just opposite of net income approach. According to this theory, the market value of the firm is not affected by the changing capital structure. The changes in leverage will not lead to any change in total value of the firm and market price of the share as well as overall cost of capital is independent of the degree of leverage.

The increase of debt capital in the capital structure does not affect the market price of the share and overall cost of capital. The increase in debt may be the reason for repurchase of share and is offset by the decrease in equity capital. Similarly the increase in equity capital may be the reason to write off the debt capital and is offset by the decrease in debt capital. Hence the total capital structure remains the same.

So far the explanation of the net operating income approach has been purely definitional and it lacks behavioral significance. In this theory, market value of the firm can be calculated by capitalizing the net operating income at the overall cost of capital.

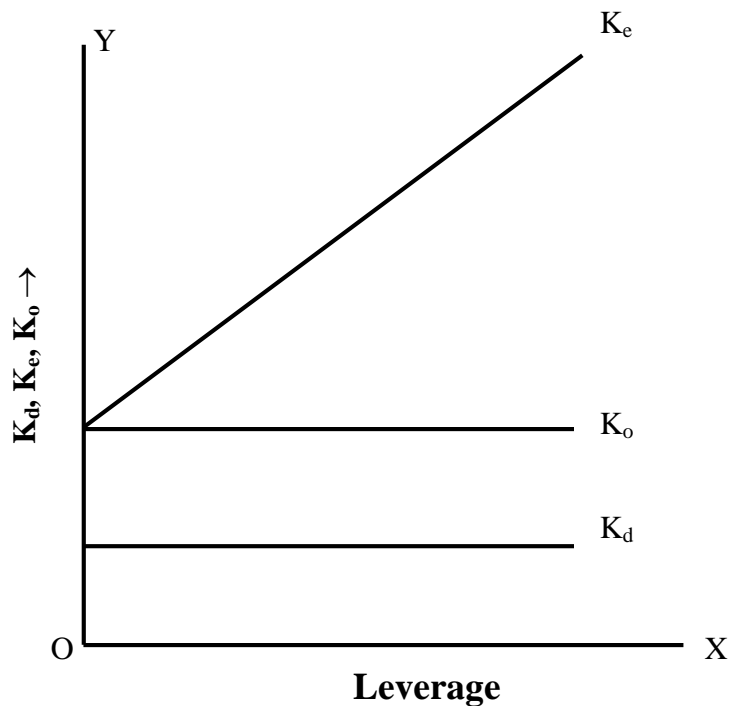


Figure No. 2.5: *The effect of leverage on cost of capital under NOI Approach*

Assumptions:

- ❖ K_d is constant regardless of the degree of leverage.
- ❖ The market capitalizes the value of the firm thus the split between debt and equity is not important.
- ❖ This approach implies that there is no one optimal capital structure.
- ❖ Increase in leverage is offset by the increasing
- ❖ Required rate of return of equity, k_e
- ❖ The high leverage increases the risk of shareholders.
- ❖ The overall cost of capital k_o remains constant

2.1.4.3. Traditional Approach

The traditional approach is also known as an intermediate approach compromise between the NI approach and NOI approach. This approach says that the value of the firm can be increased or the judicious mix of debt and equity can be reduced cost of capital. In additions the cost of capital decreases with in the reasonable limit of debt and then increase with leverage. Thus an optimal capital structure exists when the cost of capital is minimal or the value of the firm is maximum.

According to *I. M. Pandey*, "The more sophisticated version of the net income approach is contained in the traditional view. According to this approach, the value of the firm can be increased or the cost of capital can be reduced by a judicious mix of debt and equity capital". (*Pandey, 1999:30*). "The statement that the debt funds are cheaper than the equity capital carries the clear implication that the cost of debt plus the increase cost of equity together on a weighted basis, will be less than the cost of equity which existed on equity before debt financing". (*Alexander, 1963: 11*). So, traditional position implies that the cost of capital is not independent of the capital structure and that there is an optimal capital structure.

The crucial assumptions of the traditional approach are:

- ❖ The cost of debt (K_d) remains more or less constant up to a certain degree of leverage but rise thereafter at an increasing rate.
- ❖ The cost of equity (K_e) remains more or less constant or rises only gradually up to a certain degree of leverage and rises sharply there after.
- ❖ The average cost of capital (K_o) as a consequence of above behavior or K_e' and ' K_d ' (i) decreases up to a certain point (ii) remains more or less unchanged for moderate increases in leverage thereafter and rise beyond a certain point.

According to the traditional position, the manner in which the overall cost of capital reacts to changes in capital structure can be dividend into three stages. (Soloman, 1963:94).

2.1.4.3.1. First Stage: (Increasing value)

First stage of the traditional approach starts with the total capital at which the shareholders capitalize their net income. In this stage, the cost of equity, K_e , remain constant or rise slightly with debt. But when it increases, it does not increase fast enough to offset the advantages low cost debt. During this stage, the cost of debt, K_d , remains constant or raises negligibly since the market views the use of debt as reasonable policy. As a result, the value of firm increase or overall cost of capital falls with increasing leverage.

2.1.4.3.2. Second Stage: (*Optimal Value*)

In this stage, once the firm has reached a certain degree of leverage, increases in leverage have a negligible effect on the value, or the cost of capital of the firm. This is so, because this increases in the cost of equity due to added financial risk that offsets the advantage of low cost of debt. Within the range or at a specific point, the value of the firm will be maximized or cost of capital will be minimum.

2.1.4.3.3. Third Stage: (*Declining Value*)

In this stage, after the accepted degree of leverage, the market value of the firm decreases with leverage or overall cost of capital increases with leverage. This happens because investors perceive a high degree of financial risk and demand a high equity capitalization rate, which offsets the advantage of low cost debt. In this stage, the cost of debt and equity will tends to rise as a result of increasing the degree of financial risk that will make an increase in the overall cost of capital.

The overall effect of these three stages is to suggest that the cost of capital is the function of leverage. First it declines with leverage and after reaching a minimum point or range, it starts rising. The relationship between cost of capital and leverage can be graphically shown as under:

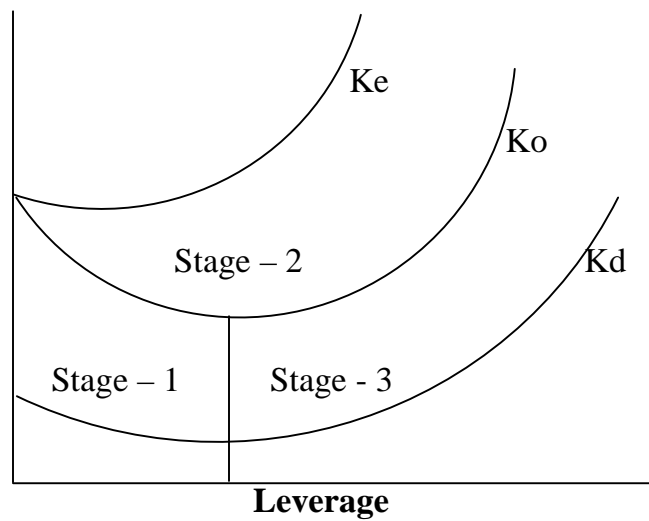


Figure No. 2.6: Effect of leverage on cost of capital under traditional theory

In the above figure, it is assumed that K_e rises at an increasing rate with leverage, whereas K_d assumed to rise only after significant leverage has occurred. At first, the weighted cost of capital, K_o , declines with leverage because the rise in K_e does not entirely offset the use of cheaper debt funds. As a result, K_o declines with moderate use of leverage. After a point, however, the increase in K_e more than offset the use of cheaper debt funds in the capital structure, and K_o begins to rise. The rise in K_o is supported further once K_d begins to rise. The optimal capital structure is point X . Thus the traditional position implies that the cost of capital is not independent of capital structure of the firm and that there is an optimal capital structure.

2.1.4.4. Modigliani-Miller Approach

Modigliani-Miller is an irrelevant theory and it tells that the value of the firm does not change by simply changing the capital structure or leverage. It is identical to the net operating income approach but it is somewhat vaster than the NOI approach. There is the lack of conceptual and behavioral significance in NOI approach. But M-M approach supports the NOI approach relating to the independence of the cost of the degree of leverage at any level of debt-equity ratio (*Khan and Jain, 1998:11-11*).

Until 1958, capital structure theory considered the loose assertions about investors rather than carefully constructed model, which could test by formal statistical analysis. In what has been called the most influential setoff financial paper ever published, Franco Modigliani and Merton Miller (MM) addressed capital structure in a rigorous, scientific fashion, and they setoff a chain of research that continuous to this day. (*Bringham, Gapenski and Ehrhardt, 2001:622*).

M-M approach is significant because it provides the behavioral justification for constant overall cost and total value of the firm. Modigliani and Miller advocated that the relationship between leverage and the cost of capital is explained by the net operating income approach.

Assumptions:

- There is the homogenous expectation of investors.
- There is no existence of corporate tax.
- The firms can be grouped as homogeneous risk class.
- The capital market should be perfect, i.e.
 - Large numbers of buyers and sellers.
 - No transaction cost and availability of information free of cost.
 - The same rate and terms of borrowing and leading.
 - Infinitively divisible stock.

2.1.4.5. Arbitrage Process

Capital structure changes are not the thing of value in the perfect capital market world that Modigliani and Miler assume. Therefore two firms alike in every respect except capital structure must have the same total value. If not, arbitrage will be possible, and its occurrence will cause the two firms to sell in the market at the same title value. Hence arbitrage will drive the total values of the two firms together.

The total value of the levered firm cannot be greater than the total value of the unlevered firm and the value of the unlevered firm because the arbitrage process sets the value differentiation to the identical level. The investors can sell the shares of the levered firm to the shares of the levered firm due to smaller investment outlay and lesser financial risk.

Hence the value of the levered firm increases and value of the unlevered firm gradually decreases to equalize the value of both of the firms, especially in the case when the value of the levered firm is higher and vice-versa.

2.1.5. Theory of Cost of Capital

“The cost of capital is an important in formulating a firm’s capital structure. It is one of the basis corner stones of the theory of financing management”. (*Kuchhal, 1982:367*). It is a crucial part of a dynamic or ever changing financing and operational environment of the corporations.

There are different types of risks associated with each investment category. Therefore, it requires certain expected rate of return in order to provide funds. This required rate of return is called the opportunity cost to the investor for investing his scarce resources elsewhere with equivalent risk. Therefore, the concept of cost of capital has been paid increasing attention in recent years, especially as it affects the proper economic is an essential choice criterion for investment decision-making, accordingly, the theory of measurement of cost of capital is of fundamental importance in business finance.

An investment projects for its acceptance must earn minimum rate of return equal to the cost of capital. In this sense, the cost of capital represents a standard for allocating the firm’s fund in the optimal manner. In theory, it is the rate of return on a project on a project that will leave the market value of shares unchanged” (*Van Horne, 1994:101*).

In Nepal, majority of corporations are still not in a position to meet the minimum required rate of return. Many corporations are running at losses and corporations running at profit are also could not maintain rate which a project must earn in order to be acceptable to shareholders” (*Weston and Copland, 1990:72*).

Cost of capital can be understood as cut off rate concept. It is a point for the choice of investment proposals in corporations. “From the view point of the capital allocation budget as a whole, the cost of capital provides an objective cut off point for appropriations” (Soloman, 1996:30). The term cost of capital can also be defined in terms of hurdle rate concept and structural concept. The hurdle rate is the target rate of return, which must be surpassed of the capital use, is to be justified. Corporations while using the investment hurdle rate are communicating their expectations and assure common effort to try to fulfill those expectations. Allowance must be made for the risks and uncertainties surrounding the follows, since investors insist on higher expected returns when asked to assume higher level of risks.

One of the requirement of the investment appraisal system is that prevent the investment of funds in projects where the target rate of return is less than the cost of capital. In the context of Nepalese company, the determination of this “hurdle rate’ is not so much in practice but time and situation have already made corporate managers to be cautions and attentive in practicing this “hurdle”.

The structural concept is the fundamental and mostly accepted criteria of investment appraisal system. The cost of capital is the extent of capital fund that could be made available through combinations of ownership capital, retained earnings, depreciation funds, reserves and so on. Funds that could be made available might be from the existing stock of funds or raised freshly from the market, or could be by way of commitment into the future. It is therefore, necessary that the company’s using borrowed capital should be capable of generating liquid fund to meet the interest obligations.

2.1.5.1. Importance of Cost of Capital

The cost of capital is an important element as basic information in capital investment decisions. The cost of capital concept is significant not only as an investment criterion but can also be used to evaluate the financial performance of top management.

The study on the cost of capital is significant for different purposes. The first one may be to determine the desirability of alternative investments and the second is to serve as a capitalization rate to establish the present value of cash streams. The significance of the concept of cost of capital can be explained through following points.

2.1.5.2. Capital Expenditure Decisions

Capital expenditure decisions are also called as capital budgeting decisions. The cost of capital, in these decisions is often used as a discount rate on the basis of which the future cash flows of the firms are discounted to find out their present values. It provides a yardstick to measure worth of investment proposals and thus, performs the role of accept-reject criterion. In fact, it provides a rational mechanism for making optimum investment decision, cost of capital forms the basis of financial appraisal of all capital expenditure proposals. Needles to mention, the decision in respect of a capital expenditure would be irrational and wrong, if the cost of capital is not correctly determined. This is because the business must earn at least at a rate, which equals to its cost of capital in order to make at least breakeven.

2.1.5.3. Capital Structure Decisions

The cost of capital is also an important consideration in capital structure decisions. The cost of capital is influenced by the capital structure changes. The finance manager must raise capital from different sources in such way that it optimizes the risk and cost factors.

The sources of funds, which have less cost, involve high risk. “In trying to achieve its target capital structure over time, a firm should aim at minimizing the market value of the firm”(Pandey, 1987:163).

It is absolutely necessary that cost of each source of fund is carefully considered and compared with risk involved with it. Thus, the significant of the concept of cost of capital can be known in designing the firm's capital structure.

2.1.5.4. Element of Cost of Capital

It is necessary to analyze the cost of specific sources in order to show the basic inputs for determining the overall cost of capital. "The computed value for the cost of capital can be regarded as a fair approximation of the cost of capital inputs consistent with company needs, the conditions under which it is raising its capital, the level of expectation and corporate policy constraints" (*Kuchhal, 1982:368*).

A company may use more than one type of capital. In this situation, the company's composite cost of capital can be determined after the cost of each type of funds has been obtained. The first step, therefore in the measurement of a company's cost of capital is the calculations of each specific cost which is the minimum financial obligations that is incurred in order to secure the use of capital from a particular source. This section describes the procedures for measuring the costs of specific sources.

2.1.5.5. Cost of Debt

A debt is a long-term obligation and simultaneously a promise to pay the face amount or principal at a designed date of maturity and to pay interest at a specified rate periodically. It is a contrast made between the corporation and a third party, the trustee, to whom the references is made in the debt contract.

Normally, debt arrangements involve specific interest provisions payable either during the debt period at the end or deducted in advance from the principal. The explicit cost of debt in those cases is simply the cost of this interest commitment.

The formula for the cost of debt is

$$\text{Cost of Debt} = \frac{\text{Interest}}{\text{Principal}}$$

The cost of debt is defined as the yield (internal rate of return) of the stream of contractual cash flows associated with the debt from the viewpoint of the firm. At the time of issuance, the cost of debt is determined by the cash receive and contractual cash payment to be made over the time until the debt is retired. We assume zero taxes.

The cost of debt paying an interest rate of “ K ” per period (the amount of the interest to be paid is KB) currently selling at a price of B_o . Letting K_d denote the implicit cost or yield to maturity of debt (the internal rate of years until maturity). The cost of debt is defined as the rate of discount that equates the present value of the cash flows associated with the future debt payments to the current market value of the debt that is K_d is such that.

$$B_o = \frac{K_b}{(1+K_d)} + \frac{B}{(1+K_d)^n}$$

The cost of debt must be stated on an after tax basis and since interest charges are tax deductible, a tax adjustment is required. The before tax cost of debt K_d can be converted to an after tax debt, K_i , by the following equation.

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

Here represents the firm's marginal tax rate.

2.1.5.6. Cost of Preferred Stock

Preferred stock is a hybrid form of capital possessing a mixture of debt and common stock characteristics. Preferred stock generally has a perpetual life, although it may have a call price specified and even a sinking fund where the stock is to be repurchased by the firm in the open market. The holders of a corporation's preferred stock get their dividends only if declared by its board of directors.

The cost of preferred stock is a discount rate, which equalizes the future expected dividends to the present market price. If the preferred stock is callable then the discount rate equated the future expected dividends to the call price.

Cost of preferred stock is calculated from the following equation

$$P_o = \frac{D}{K_p}$$

Where,

P_o = Current price of share / net proceed received from the sale of preferred stock issue.

D = Annual constant dividend payment.

K_p = Cost of preferred stock. Solving the above equation for K_p .

$$K_p = \frac{D}{P_o}$$

Here the dividend is assumed to be perpetuity with first payment one year from now.

2.1.5.7. Cost of Common Stock/Equity Capital

Like other source of capital, common stock of equity capital also involves certain cost to the firm. The equity shares involve a return in terms of the dividend expected by the shareholders. "The rates, at which the expected dividends are discounted to determine by their present value, represent the cost of common stock" (*Gitman, 1982:456*).

The cost of equity capital is the rate of discount that equates the present value of all future expected dividends per share to the present price of common stock. It is the return required by the investors.

The cost of common stock or equity capital is the minimum rate that must be earned by the common stockholders to keep the value of existing equity unchanged. “The cost of equity capital, K_e , may be defined as the minimum rate of return that a firm must earn on a equity financed portion of an investment project in order to leave unchanged the market price of shares (*Van Horne, 1994:93*).

“The cost of equity capital indicated the minimum rate which must be obtained on the projects before their acceptance and the raising the equity capital to finance them i.e., it should lead to an increase in the net present value of their wealth” (*Kuchhal, 1982:370*). The definitions of cost of equity capital are based on a few key assumptions with respect to the behavior of individuals and their ability to forecast future values (*Gitman, 1982:456-457*).

2.1.5.8. Cost of New Issues of Common Stock

New issue of shares is influenced by flotation costs. Flotation costs may consist of underwriting fees. Under the dividend valuation model, the flotation costs reduce the net proceeds from the sale of common stock. “If we left represent the percentage reduction in the current market price expected as a result of under pricing and underwriting charges on a new stock issue, the cost of new stock issues, the cost of new issue K_n can be expressed as follows.

$$K_n = \frac{D_1}{(1-f)} P_o + g$$

The floatation costs, as a percentage of the gross proceeds would reduce the denominator in the dividend yield expression by a factor of (1-f), where f represents the equity floatation cost percentage.

The minimum rate of return, which is required on the new investment financed by the new issue of common shares, to keep the market value of the share unchanged is the cost of new issue of common shares (or external equity).

2.1.5.9. Cost of Retained Earnings

A firm does not distribute its entire profit to the shareholders but a portion of earned profits is retained in the business for the future expansion of the business. This retained profit is internal source of funds for the company. The retained earnings of the corporation have also costs in the form of opportunity cost involved in the alternative investments. If the retained earnings could not be utilized, the shareholders feel that the company cannot do anything in accelerating their rate of return.

“The cost of retained earnings must be viewed as the opportunity cost of the forgone dividend to the existing common shareholders” (*Gitman, 1982:461*).

In the absence of floatation costs of the new issue, $K_e = k$. Here, K_r denotes the cost of retained earnings. The cost of retained earnings is calculated in the same way as the common stock capital. The company, under this method determines the opportunity cost of retained earnings, which can be obtained on external investment of funds so that rises per share remain unchanged. The formula for determining cost of retained earnings is given below.

$$K_r = \frac{D}{P_0 + g}$$

Where, K_r = cost of retained earnings

2.1.5.10. Overall or Weighted Average Cost of Capital (WACC)

Measuring of cost of capital is necessary after the calculation of various elements of cost. The composition or overall cost of capital is the weighted average cost of various sources of funds, weights being the proportion of each source of funds in the capital structure.

The cost of capital is found by weighting of the cost of each component of capital structure by their relative portion. It is to sum the separate cost of debt, preferred stock and common stock. The cost of each component is weighted by the proportions and each source is expected to have in future financing.

“A firm’s cost of capital is the weighted arithmetic average of the cost of various sources of long term financed used to it” (*Chandra, 1990:448*). “The overall composite cost of each specific type of funds” (*Khan and Jain, 1992:339*). It is the average representing the expected return on all of a company’s securities. Each source of capital such as stocks, bonds and other debt is weighted in the calculation according to its promises in the company’s capital structure.

Assignment of Weights can be done in following ways.

1. Book Value Vs Market Value Weights
2. Historical Vs Marginal Weights.

1. Book Value Vs Market Value Weights

Book Value weights use book values or accounting values of capital for the assessment of the proportion of each type of capital whereas market value weights use its market value weights use its market value to measure the proportion. It is said that the use of market value weights for calculating the cost of capital is more appealing than the use of book weights because (*Khan and Jain, 1992:342*).

- Market value of securities closely approximates the actual amount to be received from their sale.
- The cost of the specific sources of finance, which constitute the capital structure if the firms are calculated using prevailing market prices. Since the sources of long term funds have higher specific cost of capital normally increases when instead of book value weights are used.

2. Historical Vs Marginal Weights

Historical Weights are based on the actual data. It can be book value weight or market value weight. Marginal weights are related with the actual amount of each type of financing to be used in raising new funds by the company. The use of it involves weighting the specific costs by the proportion of each fund to be raised.

As observed above, alignment of weights can be done in different ways. The question that which system or market value weight is appropriate or preferable for the calculation of weighted average cost of capital is very difficult to answer. “The critical assumption in any weighting system is the firm will raise capital in the specific proportion” (*Khan and Jain, 1992:339*).

2.1.5.11. Computation of Weighted Average Cost of Capital

Weighted Average cost of capital, WACC in short which measures the quality in investment. A firm’s WACC is the overall required return on the firm as a whole. It is the appropriate discount rate to use cash flows in risk to the overall firm.

Once the component costs have been calculated, the weighted average method computing a firm’s cost of capital is found by weighting the cost of each component of capital structure by the relative proportion of that source of funds to the total. The composite or overall cost of capital is the weighted sources of funds, weighted sources of funds, weight being the proportion of each source of fund in the capital structure.

If the firm uses debt, preference share capital and equity share capital in its capital structure, and then its weighted average cost of capital is given by

$$K_o = K_i W_d + K_p W_p + K_e W_e$$

Where,

K_o = Overall cost of capital

K_i = after tax cost of debt

K_e = Cost of equity

W_d = Proportion of debt to total capital

W_p = Proportion of preference share capital to total capital

W_e = Proportion of equity share capital to total capital

2.1.5.12. Marginal Weight Cost of Capital

Some limitations are found while calculating overall cost of capital using weighted average method. “The weighted average cost of capital loses its validity when corporations are considering significant change in its debt policy, dividend policy subject to readjustment of the proportion of earning to be retained objectives and capital structure involving variation in debt equity mix” (Soloman, 1996:27).

Marginal cost of capital is the cost required for raising an additional rupee of capital. “The weighted is the average cost of new or incremental capital which is known as the marginal cost of capital”(Pandey, 1987:183). The marginal cost changes proportion of various capital components. The corporations have to change weights equity and debt and according to the profitability to each source of fund.

2.1.6 Ratio Analysis

Financial manager of the company has to engage in making lots of decisions. He has to analyze the financial statements to find the financial sources, strengths and weaknesses of the company to make the decisions and to make future strategy.

Ratio analysis is that tool which is used to analyze the financial statements. A widely used tool for the financial analysis is ratio analysis. It is defined as the systemic use of ratio to interpret the financial statements so that the strengths and weaknesses of a firm as well as its historical performance and current financial condition can be determined (*Khan and Jain, 1998:117*). By the use of it, the financial manager can find out the weaknesses of the company and take action to erase them out by making the rational decision. Hence ratio analysis helps to inform about the present situation of the firm and the corrective action to be undertaken for eliminating the problems.

The outsider investors also use ratio analysis to know about the financial surroundings of the company for the confirmation of their risk and return. This tool is also used to take the decision of the new investment or expansion of the firm by raising the extra or new sources of fund. In this way the capital structure is affected. And it is tried to make the balanced capital structure according to the analytical results from the ratio analysis. In order to bargain more effectively for outside funds, the management of a firm should interested in all aspects of financial analysis that outside supplier of capital use it in evaluating the firm (*Khan and Jain, 1998: 117*). So it can be said that the ratio analysis is one of the tools of the company in making capital structure decision.

The term 'ratio' means the relative and quotient of two mathematical expressions. They are of various types:

- **Liquidity ratio**
- **Leverage ratio**
- **Profitability ratio**
- **Activity ratio**

2.1.6.1 Liquidity Ratio

The firm has various types of obligations. Some of them are of short-term nature. Hence, the firm may need to meet them immediately or within the short time interval. Hence, it is essential for the firm to meet its obligations when they become due. It is used to measure the firm's ability to meet the short-term obligations and reflect the short-term financial solvency of the company. It is the means to test the liquidity position of the company or firm by calculating current, quick and turnover ratios.

2.1.6.1.1 Current Ratio

The current ratio is the most commonly used measure of short term solvency, since it indicates the extent to which the claims of short-term creditors are accepted to convert into costs in a period roughly corresponding to the maturity of time (*Weston and Brigham, 1982: 566*). The current ratio can be calculated by dividing the current assets by current liabilities. Current assets normally include cash, marketable securities, accounts receivable, inventories, prepaid expenses etc. Whereas the current liabilities include account payable, current maturity of long-term debt, accrued expenses and short-term notes payable. The current ratio measures the firm's current position, which should be sufficient to cover the current liabilities used by the firm.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

2.1.6.1.2 Acid Test Ratio or Quick Ratio

The quick ratio scrutinizes the liquidity position of the firm and is calculated by dividing the current assets without the inventories and prepaid expenses by the current liabilities.

In the quick ratio, the assets which have the nature of immediate conversion into cash as per the company's need are used and are said to be the quick assets. Inventories and prepaid expenses are less liquid because they take the time to convert themselves into cash.

$$\text{Acid Test Ratio or Quick Ratio} = \frac{\text{Current Assets} - \text{Inventories} - \text{Prepaid Expenses}}{\text{Current Liabilities}}$$

2.1.6.2 Leverage Ratio/ Capital Structure Ratio/ Solvency Ratio

The leverage ratio is one of the best ways to study the capital structure of the firm and utilities and appropriations of the sources of capital in the structure and leverage position of the firm. It also throws light on the periodic payment of interest during the period of loan and repayment of principal on maturity. With this ratio, the solvency position of the firm can be examined. So the firm should give first preference to the leverage ratios with comparison to another ratio analysis when the company is going to make a capital structure.

2.1.6.2.1 Debt Equity Ratio

Debt equity ratio is the relationship between borrowed fund, i.e., debt and owner's capital. The owner's capital includes equity capital, reserve, surplus, accumulated losses, discount in issue of share, preference share capital. The debt capital includes long-term debt. Since the shareholders' equity is said to be net worth, the debt equity ratio is also called debt to net worth.

$$\text{Debt Equity Ratio (D/E Ratio)} = \frac{\text{Long term Debt (LTD)}}{\text{Shareholder's Equity}}$$

It determines the financial structure of the firm. It also reflects the firm's policy about the capital structure to make it balanced and sound, D/E ratio helps to make the proper financial structure with effective sources of fund.

Higher the D/E ratio indicates the higher proportion of debt in the capital structure of the firm, which is the dangerous signal for the debt holders and the firm's risk-taking behavior. Hence, D/E ratio suggests an appropriate proportion of debt and equity. It can also be calculated by taking the relationship between the total debt and shareholders' equity.

$$\text{D/E Ratio} = \frac{\text{Total Debt}}{\text{Shareholder's Equity}}$$

Here, total debt includes long term debt and current liabilities.

2.1.6.2.2 Debt to Total Capital Ratio

The relationship between the debt holders and the equity shareholders can be expressed in various ways in the ratio form. One of the ways of expressing it in ratio form is debt to total capital ratio. It is the expression of the relationship measurement between long term debt and total capital.

$$\text{Debt to total Capital} = \frac{\text{Long term Debt}}{\text{Total Capital}}$$

This relationship gives about the information of the proportion of debt in the capital structure of the firm. That is the indication of the magnitude of the risk-taking nature of the company.

If the ratio between them is 1:1, that indicates 50% of the debt in the total capital structure and rest of all its ownership capital. The ratio more than 1:1 is the risky situation for the firm.

2.1.6.2.3 Coverage Ratio

There is the use of various types of capital in the capital structure of the firm. For this, the firm needs to pay interest on debt and dividend in preference share. These are the fixed obligation. So, the company's ability to service the claims of the investors should be examined. This can be possible by the ratio, which is called the coverage ratio. The coverage ratio measures the relationship between what is normally available from the operations of the firm and the claims of the outsiders (*Khan and Jain, 1998:135*). There are various coverage ratios but only two types of coverage ratios can be considered for this purpose.

(i) Interest Coverage Ratio

This ratio is computed by dividing the operating profit by the interest on the long term debt.

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest}}$$

Where,

$$\text{EBIT} = \frac{\text{Earning Before Interest and Tax}}{\text{Operating Profit.}}$$

Hence, this ratio gives the debt servicing capacity of the firm. Higher ratio is desired.

(ii) Dividend Coverage Ratio

Dividend coverage ratio is the numerical expression of the firm's ability to pay the preference dividend to the preference shareholders, when the source of capital is preference dividend. Higher the ratio better is the tendency of the firm to make its capital structure by including the preference share capital.

$$\text{Dividend Coverage Ratio} = \frac{\text{EAT}}{\text{Preference Dividend}}$$

2.1.6.3 Profitability Ratio

Although the firm has the social responsibilities, it can be possible only when the firm earns the maximum profit. Hence the profit is all in all for the firm for its real existence. The company designs the capital structure which gives the maximum profit under the various circumstances set by the government. Because of the profit is needed for the payment of interest to the debt holders. It is also required for the return to shareholders as well as for the preference shareholders. The operating expenses should also be covered by the profit earned through the selling of goods and services. The firm has also its responsibilities towards the society. Hence profit is the main objective of the firm to meet all of these requirements.

Hence the profit should be measured to make its balanced capital structure alive and this can be getting by the profitability ratios. Hence the profitability ratios are the major instruments for measuring the profit of the firm to make the sound policy. The most important profitability ratios are as follows:

a. Gross Profit Margin

Profit can be earned through sales and hence the profitability ratios are based on the sales. So, gross profit margin in the management of gross profit to met the indirect expenses and cost of the capital. It can be calculated by dividing the gross profit by the sales.

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100\%$$

b. Net Profit Margin

Net profit margin can be calculated by dividing the net profit by sales. This ratio measures the propensity of the firm to meet the expected returns to the owners of the firm. Higher the ratio, higher is the firm's ability to meet the obligation of cost of manufacture, operating expenses, depreciation, interest on debt, preference dividend on preference share. Hence, it indicates the sound profitability condition of the firm and higher returns to the shareholders.

c. Operating Expenses Ratio

Operating expenses ratio gives the information about the operating expenses of the firm with respect to sales and can be computed by dividing the operating expenses by sales low ratio is desired.

$$\text{Operating Expenses Ratio} = \frac{\text{Operating Expenses}}{\text{Sales}} \times 100\%$$

d. Return on Assets (ROA)

This ratio expresses the capacity of the capital used in the investment in total assets to make the profit. Hence, this is the indication of the profit of the firm by the utility of the total assets financed through different kinds of sources of capital. It is derived by dividing the net profit after tax with interest by total assets.

$$\text{ROA} = \frac{\text{Net Profit After Tax+Interest}}{\text{Total Assets}}$$

e. Earning Per Share (EPS)

Earning per share is the earning available for equity shareholders for each equity share. This ratio gives the information of the profit on the behalf of the shareholders. Higher EPS is the happiest situation for the shareholders and it is the symbol of sound profitability situation of the firm. It can be calculated dividing the net profit available to common shareholders by number of equity shares outstanding.

$$\text{EPS} = \frac{\text{Net Profit Available to Common Shareholders}}{\text{Number of Share Outstanding}}$$

f. Dividend per Share (DPS)

After calculating the earning available to the common shareholders, the firm decides to retain some part of the profit for the investment in potential investment opportunities. But, the remnant is distributed to the equity shareholders in the form of dividends. So, DPS means the dividend for the each equity shareholder in the form of return for their investment. Higher DPS is the symbol for the increase in the price of the share.

g. Earning and Dividend yield

There are two ratios that can be studied as follows:

(i) Earning Yield Ratio

This ratio is concerned with the earning per share and the market price per share. It indicates to what extent the EPS of the firm is with respect to the market price per share.

$$\text{Earning Yield Ratio} = \frac{\text{Earning Per Share (EPS)}}{\text{Market Price Per Share (MPS)}}$$

(ii) Dividend yield Ratio

The ratio is the indication of the dividend per share with respect to the market price per share. This helps to make the positive signing effect for the rise in the market price per share.

$$\text{Dividend yield} = \frac{\text{Dividend Per Share (DPS)}}{\text{Market Price Per Share (MPS)}}$$

h. Price Earning Ratio (P/E Ratio)

P/E ratio is the reciprocal of the earning yields ratio. It is the most important ratio to know to what extent the earning per share is contributing for the positive change in the market price per share. Higher the ratio attracts the investment in the company and it is the symbol for the company's prosperity.

$$\text{P/E Ratio} = \frac{\text{Market Price Per Share (MPS)}}{\text{Earning Per Share (EPS)}}$$

2.1.6.4 Activity Ratio

This ratio is directly related with the assets utilization ratio. It is used to measure the utilization of the capacity of the assets financed through different sources of capital. Debtor turnover ratio, inventory turnover ratio, average collection period, fixed assets turnover ratio, total assets turnover ratio, capital employed turnover ratio are the tools for the activity analysis of the total assets. As the activity ratios are directly related to the utilization of the assets. It does not directly affect the capital structure decision-making process.

2.1.7. Cash Flow Ability to Fixed Charges

Cash flow ability of the firm is the most important tool to capital structure decision-making process. The firm's cash flow ability should be estimated for the purpose to serve the interest to the debt, preferred dividend to preference share and lease payment to lease contract. The use of the debt in the capital structure depends on the interest on it, which should be less than the cash flow of the firm. The cash flow should be excess and enough to pay the interest, preferred dividend and lease payment. In this situation, the firm will be relevant to use debt that will increase the profit of the firm. Similar is the case for the preference share capital and the lease purchase.

Hence the selection of preference share capital and debt capital in the structure of the firm can be decided by analyzing the cash flow ability of the firm to fixed charges. This can be possible by using coverage ratios to analyze.

2.1.8. Conceptual Framework of Leverage

Leverage is the most important and fundamental part in the study of capital structure. Without the study of leverage, the study of capital structure cannot be completed. Capital structure is just the best-suited structure of different types of capitals for the benefit of the firm.

Hence capital structure refers to the composition of capital from different sources like capital stock, surplus, preferred stock and long-term debt. But leverage refers to acquiring assets that have fixed costs and employing financial resources that have fixed cost. The financing resources with the fixed cost means using the long term debt having fixed charge, i.e., interest. Long term debt is one of the financing sources financed by outsiders. In general, the term leverage means, “Power gained by using lifting force”. In the presence of lifting force, a small change in the quantity of one side may heavily affect other side. Similarly change in small unit of one source of capital will affect another source among the different sources of capital of company.

Such type of effect is known as leverage in financial language. In some cases, as with lifting heavy object, leverage allows us to accomplish things not otherwise possible at a given level of effort. The concept of leverage as a lifting force is valid in running a company. The financial manager is responsible to identify many sources of leverage. Sometimes the effect of financial decision could be reversible due to some mistake made by the financial manager. The leverage, therefore, may be favorable or unfavorable that depends upon different situations that arise inside and outside of the company.

In operation of business organizations or manufacturing companies, capital is the most essential factor. Without adequate capital, no business can be established and run. So, the capital for the business or manufacturing organization can be compared to the lifeblood for the living beings. Capital can be collected by different sources.

The financial management should take the decision about the right source of capital as per the different sources of capital. Such type of determination of the structure of capital is called capital structure. While determining the capital structure, the nature of business, availability of the source and probability should be taken as the essential basis. Capital structure is the ratio of the ownership capital and debt capital. The ownership capital might be favorable for one business organization but it might be unfavorable for another business organization at the same time. Same is the case for debt capital. Since it is the process of decision making of the right sources of capital, it is also known as capital structure decision. For the capital structure decision the knowledge of leverage is most essential.

Capital can be divided into two parts. One is ownership capital and other is debt capital. The capital obtained from the owners of the business organization is called ownership capital. Ownership capital is the performance of equity capital for the business organization. The return is generally assigned to such type of capital in the case of the profit made by the business organization. It is not necessary to pay the return to the ownership capital. But in the case of preferred stock, there is the necessity to pay the return to it. Other type of capital is debt capital. It is necessary to pay the interest to the investors in debt capital. The remnant of profit earned by the business organization after the payment of interest to the debt holder becomes under the right of the ownership capital holder. In this way, the return of the ownership capital is affected by the interest of the debt capital. If the magnitude of interest to the debt capital as the cost is higher, the magnitude of return to the ownership capital will be lower and vice-versa. In the case of no use of the debt capital, the total profit will be the return to the ownership capital is always affected by the interest of the debt capital. Such type of effect to the ownership capital by the use of debt capital is known as leverage. Hence leverage can be defined as the ratio of the net rate of return on the shareholder's equity and the net rate of return on the total capitalization. It is the percentage return on equity to percentage return to total capitalization.

The term leverage is quite commonly used to describe the firm's ability to use fixed cost assets or funds to magnify the returns to its owners. The effort to increase the return of the ownership capital by using the debt capital having low role of interest can be known as leverage. The leverage helps the financial manager of the company to increase the return of the ownership capital. Hence leverage places its great importance in the capital structure although it is a small part in the study of capital structure.

In this way leverage can be studied as a part of the process of capital structure. So both the leverage and capital structure can be taken as having the same meaning. However capital structure is somehow vast than leverage because it is the mixture of long-term debt and equity maintained by the firm. On the other hand, leverage is result from the use of fixed cost assets finds to magnify returns to the firm's owner (*Gitman, 1986:44*). Leverage can be defined in terms of risk and return also. It is the result of change in level of return and risk whereas increase in leverage means the increasing rate of return and risk. So the leverage has positive relation with risk and return.

There is no special model of the capital structure but the model should be fixed for the company as per the historical profit and ratios of the company. In fact some companies have their own company regulations to maintain the balance capital structure by using different sources of fund. But the capital structure of a firm or company is not only affected by the company regulations. Capital structure is mostly affected by the cost of capital. The company would like to use the equity and preference share capital better than debt capital against high interest payment, if the cost of debt is very high. But if the cost of debt is lower than the cost of equity, the debt capital will be the best source of capital. In such case the firm tries to use debt in maximum limit and the firm gets highly levered. Hence the leverage position depends upon company policy as well as cost of capital. Cost of capital is one of the major elements in determining the source of capital investment. So the firm can use only that type of capital source in their capital structure, which has the lower cost.

The firm has the choices over the capital source either the debt capital or ownership equity capital analyzing the cost of capital. But use of only one type of capital in capital structure could create the risk and the company could face the situation to suffer from loss.

So the collection of capital from different sources and investment of specific proportion by diversifying the risk may be the very best way for capital structure of any business enterprises. So, the study of cost of capital and risk-return analysis may be helpful in deciding whether the company should make itself levered or unlevered. Leverage, a very general concept represents influences and power. The influences of one financial variable over some other related financial variables are defined as leverage in the financial analysis and capital structure process. For the capital investment, the businessman collects money to operate the business by many different sources like debt, equity share and preference share. If the capital is equity the equity holder gets the profit in the form of dividend as per the profitability of the company, where as if the capital is debt, then the owners must pay the fixed amount of interest to the loan provider. If there is no debt in the capital structure then the shareholders can earn the total amount of profit.

Hence the increased amount of debt is quite risky to the shareholder/owners. In this way, the return is always influenced by the amount of interest, which is known as leverage. So, the leverage is the objective of maximizing the shareholder, wealth position by using low cost of securities.

For the debt capital, company should pay fixed amount of interest periodically and repay the original sum at the time of its maturity irrespective of the company's rate of return on asset. The firm is called highly levered if debt proportion is higher than other sources of capital. There is the advantage of using debt capital, because the fixed charges of interest is tax saving.

But there is the legal binding to the company to pay the interest and principal sum to the loan provider in time; otherwise the company may go to the liquidation. Hence, debt is the risky source of capital and may be the main reason of a company's liquidation. So, the board of directions of the company should be cautious and make plan before using the debt capital.

The source of capital other than debt is equity capital. It is the ownership capital by the use of which owners can get profit when the capital investment is made. It is the capital made by the investment by the owners as well as capital collected by issuing share publicly. The company should pay dividend from its profitability to shareholders. But the payment of dividend is not fixed and depends upon the dividend policy of the company. High percentage of equity capital in the capital structure creates the higher amount of tax because of its non-tax deductible nature. Hence dividend can be distributed only after the payment of tax. This shows that the high proportion of equity capital in the capital structure is also risky. Hence the best combination of equity and debt capital is made to reduce the risk and maximize the shareholders' wealth.

Hence in the capital structure decision-making process, the concept of leverage is the fundamental. A change in one source of capital due to the changing source of another capital can be studied under leverage analysis.

An effect of change of one of the capital source can be realized by the change in sales and profit of the company "A high degree of leverage implies that a large change in profit occurs due to a relatively small change in sales" (*Hampton, 1994: 157*). The concept of leverage can be helpful to make the specific knowledge to have the potential capital structure decision that make the firm's best operation process. In conceptual analysis of leverage, the different types of leverage tools can be used for financial planning of capital structure.

2.1.8.1. Type of Leverage

The study of leverage to the capital structure of the firm will not be complete unless the knowledge of the types of the leverage is not applied. There are three types of leverage related to the measurement of profit in order to operate the financial activities.

2.1.8.2. Operating Leverage

Fixed cost of any firm affects on its business risk. If fixed costs are high, even a small decline in sales can lead to a large decline on return on equity (other things remains constant). So, the higher the firm's fixed cost, the higher its business risk. If the high percentage of total costs is fixed, then the firm is said to have a high degree of operating leverage. "In business terminology, a high degree of operating leverage, other factor held constant, implies that a relatively small change in sales results in the large change in ROE.

"The measurement of the relationship between percentage change in earning before interest and tax (EBIT) and the percentage change in sales is known as operating leverage" (*Dangol, 2006: 115*).

Leverage is that portion of fixed cost, which represents a risk to the firm. Other thing held constant, al higher the operating leverage, the higher business risk. Or higher the degree of operating leverages, higher the operating risk. Where, "degree of operating leverage defines as the percentage change in operating income (**EBIT**) associated with a given percentage change in sales." (*Weston and Brigham, 705*).

$$\text{Degree of Operating Leverage (DOL)} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in Sales}}$$

So, the operating leverage is double-edged sword. If the company has a large fixed cost more than its marginal contribution, it should try to cover all fixed cost. When the company reaches its break even, i.e. no profit no loss condition, a small change in sales causes the large percentage change in EBIT. The fixed cost will be equal to the contribution margin in the condition of reaching break-even point. Beyond that point, if the company has a high operating leverage, a small change in sales brings comparatively a high change in EBIT. The financial manger of the firm should be cautious because the small decrease in sales may cause a large decline of operating profit. The fluctuating operating leverage is riskier and dangerous for the company and its reputation too. It harms the profitability and profit condition of the company.

2.1.8.3. Measuring the Degree of Operating Leverage (DOL)

The degree of the operating leverage at any single sales volume can be calculated from a ratio of the percentage change in operating profit and a percentage change in sales.

$$DOL = \frac{\% \text{ Change in Operating Profit}}{\% \text{ Change in Sales}} = \frac{\frac{\Delta EBIT}{EBIT}}{\frac{\Delta Sales}{Sales}}$$

$$DOL = \frac{Sales - Variable Cost}{EBIT}$$

Where EBIT = Earning Before Interest and Tax or Operating Profit

2.1.8.3. Financial Leverage

The use of fixed charges sources of funds, such as debt and preference capital along with the owners' equity in the capital structure, is described as financial leverage. Financial leverage can be defined as "the extent to which fixed income securities (debt and preferred stock) are used in the firm's capital structure. (*Pandey, 1999:658*).

The possibility of the financial leverage arises when a firm goes the debt capital in its capital structure. The impact of debt financing on the earning before tax of the firm is financial leverage. Financial leverage measures the responsiveness of earning per share (EPS) to the change in earning before interest and tax (EBIT).

Financial leverage can be measured by using various tools. The most commonly used measures of financial leverage are (*Bierman, McMillan and Pandey, 1970:636*).

a. Debt ratio (The ratio of debt to total capital)

$$i.e. L_1 = \frac{B}{V} = \frac{B}{B+V}$$

Where, **B= Value of debt**

S= Value of equity

V= Value of total capital

b. Debt to equity ratio (The ratio of debt to equity)

$$i.e. L_2 = B/S \quad L_2 = \frac{B}{S}$$

c. Interest Coverage ratio

$$i.e. L_3 = \frac{EBIT}{Interest}$$

The first two measures of financial leverage can be expressed in terms of books or market value. They measure the financial leverage that is static in nature as they show the borrowing position of the company at a point of time. Thus, these measures fail to reflect the level of financial risk, which is inherent in the possible failure of the company to pay interest and repay debt.

The third measure of financial leverage, commonly known as coverage ratio, indicates the capacity of the company of the company to meet fixed financial charges.

“Financial leverage shows up as interest expenses causing additional variability in net income over and above the variability in net income that reflects financial risk” (*Weston and Brigham, 1982: 555*). When the company wants to expand its capacity, it needs more money to invest in fixed capital.

The need of large investment can be fulfilled by equity and debt. When the cost of debt is less, then the company may be profitable with debt capital investment. In this way the profitability of company, by using debt capital can be measured only with the help of financial leverage.

2.1.8.5. Measuring the Degree of Financial Leverage (DFL)

The degree of financial leverage is the numerical measure of the firm’s leverage (*Gitman, 1986: 15*). The degree of financial leverage is defined as the percentage change in earning per share that is associated with given percentage change in earning before Interest and Taxes (EBIT). (*Weston and Brigham, 707*). DFL may be calculated by using any one of the following formulas:

$$DFL = \frac{\% \text{ Change in EPS}}{\% \text{ Change in EBIT}} \quad DFL = \frac{\Delta EPS/EPS}{\Delta EBIT/EBIT} \text{ or } DFL = \frac{EBIT}{EBT}$$

DFL shows that to what extent the firm is able to bear its fixed charges. DFL of un-levered firm will be 1 and it will be greater than 1 in case of levered firm.

2.1.8.6. Combined Leverage

The combination of operating leverage and financial leverage is known as combined leverage. The leverages are combined to assess the impact of all types of fixed costs. “The combined leverage is the potential use of fixed costs both operating and financial to magnify the effort of change in sales on the firm’s earning per share (EPS) (Weston and Brigham, 1982: 555). The effect on earning per share due to total cost used by firm is described as a combined leverage. Combined leverage is also called total leverage.

“Due to inclusion of all type of fixed cost; this leverage can be viewed as the total impact of the fixed costs in the firm’s operating and financial structure; combined is used to compare changes in revenue with changes in EBT and also change in net income” (Hampton, 1994: 163). When the company has high level of operating and financial leverage, even a small change in sales volume will have dramatic effect on EPS. The operating and financial leverage together, i.e., combined leverage, is the main cause of wide fluctuation in EPS for a given change in sales volume. “But swing in EPS will be more pronounced if the company also used high amount of operating and financial leverage” (Pandey, 1999: 197).

2.1.8.7. Measuring the Degree of Combined Leverage (DCL)

The relationship between percentage change in EPS and percentage change in sales is measured by the combined leverage. The degree of combined leverage is defined as a percentage change in EPS due to given percentage change in sales. It can be found out by multiplying degree of operating leverage with degree of financial leverage.

$$\begin{aligned}
 DCL &= DOL \times DFL \\
 &= \frac{\% \text{ Change in EBIT}}{\% \text{ Change in sales}} \times \frac{\% \text{ Change in EPS}}{\% \text{ Change in EBIT}} \\
 &= \frac{\% \text{ Change in EPS}}{\% \text{ Change in sales}}
 \end{aligned}$$

or

$$DCL = \frac{\text{Sales} - \text{Variable cost}}{EBT} = \frac{CM}{EBT}$$

2.2. Review of Related Studies

2.2.1 Review of Major International Studies

According to Sharma and Rao's Study (1969), They conducted a study about leverage and values of the firm to test the M-M hypothesis by establishing the hypothesis that after allowing the two advantages from the interest paid on debt, the value of a firm is independent of its capital structure. For the study they use the sample 30 engineering companies from the Indian Engineering Industry and used the regression equation for three cross-section years 1962, 1963 and 1965. The equation model they have used in the study was as follows:

$$V/F = a_0 + a_1(X^{-t} - tR)/F + a_2 D/F + a_3 (X^{-t} tR)/F + a_4 D/F + U$$

Where,

V = Value of the firm

$X^{-t} - tR$ = Expected tax adjustment earning

$\overline{X^{-t} - tR}$ = Growth rate of tax adjustment earning calculated as a linear 5 years average growth rate of tax adjusted earnings

D = Debt

F = the fixed assets used as deflector to reduce heteroelasticity.

Calculation of variables has been done exactly the same way as that done by M-M with two expectations. They didn't follow M-M on calculation the growth rate since the growth rate of total assets may be in consistence with economic reasoning and utilized capacity growth in assets does not convey anything meaningful to the investors. On their experiment results were meaningful when fixed total assets were used as deflector. They therefore took the evening growth of earning due the both the utilization of existing capacity end to the additional of new capacity.

In their study, they have introduced debt as separate independent variables. They found that, the coefficient of the debt variables come significantly greater than zero. That shows the advantage from debt is much more than tax advantage. In conclusion, they support investors prefer corporate leverage and therefore, the value of a form rises up to leverage rate considered prudent.

According to Rao and Litzenberger (1970), Conducted a comparative study of the effect of capital structure on the cost of capital in a less developed and less efficient capital market (India) and in a highly developed and efficient capital market (United State). They used 28 Indian utilities and 77 American utilities. They chose utility industry for analysis because utilities are relatively homogeneous with respect to operating risk. The study encompasses the five cross sectional years 1962-1966 and used the following regression model to test the Modigliani Miller's independence hypothesis.

$$\frac{\overline{X}_t - tR}{V - tD} = r_0 + r_1(\text{Growth}) + r_2(\text{Leverage}) + r_3(\text{Payout}) + r_4(\text{Size}) + V$$

Where,

\overline{X}_t = The Firm's expected after tax operating earnings.

t = The marginal corporate income tax rate.

R = The firm's fixed interest charges for the cross sectional; year.

D = The market value of the firm's debt at the beginning of the cross sectional year.

Leverage = The book value of the firm's senior securities divided by the book value of the firm's long term capital (debt, preferred stock and common stock)

Growth = The average annual compound rate of growth of total assets at book value over the previous five years.

Payout = The ratio of the dividend paid during the cross sectional year and the cross sectional year's after tax earnings to a common equity.

Size = The logarithm of the book value of total assets at the close of the cross sectional year.

V = A random disturbance term.

They found that the result for the American utilities are constant to the M-M proposition that except for the advantage of debt financing. The cost of capital is independent of capital structure and the result also supported that the M-M hypothesis.

In case of Indian utilities, the results are consistent with the traditional hypothesis that the judicious use of financial leverage will lower the firm's cost of capital. This study shows that American capital market is highly developed and efficient market.

According to Booth, Aivazian, Kunt and Maksimovic's Study (2001), They conducted a comparative study on "Capital Structure in Development Countries". This study used a new data set to assess whether capital structure theory is portable across countries with different institutional structure. This paper uses a new firm level data base to examine the financial structure of firms in a sample of 10 developing countries. Those developing countries chosen for the study are: India, Pakistan, Thailand, Malaysia, Turkey, Zimbabwe, Mexico, Brazil, Jordan and Korea.

This study's focus is on answering here questions.

- ❖ Does corporate financial leverage decision differ significantly between developing and developed countries?
- ❖ Are the factors that affect cross-sectional variability in individual countries capital structures similar between developed and developing countries?
- ❖ Are the predictions of conventional capital structure models improved by knowing the nationality of the company?

This study find that the variables that are relevant for explaining capital structure in the United States and European countries are also relevant in developing countries, despite the profound differences in institutional factors across these developing countries. However, there are systematic differences in the way these ratios are affected by country factors, such as GDP growth rates, inflation rates and the development of capital markets. This finding suggests that although some of the insights from modern finance theory are portable across countries, many remains to understand the impact of different institutional features on capital structure choices.

According to Baker and Wurglern's Study (2002), They conducted a study on the topic of 'Market Timing and Capital Structure.' the main issue of this study is how market timing affects capital structure. The basic question is whether market timing has a short-run or a long-run impact. However, if firms subsequently rebalance away the influence of market timing financing decision, as normative capital structure theory recommends, then market timing financing decision, as normative capital structure theory recommends, then market timing would have no persistent impact on capital structure. The significantly of market timing for capital structure is therefore an empirical issue.

Results from this study are consisted with the hypothesis that market timing has large, persistent effects on capital structure. The main findings is that low leverage forms are those that raised fund when their market valuations were high , as measured by the market to book ratio , while high leverage firms are those that raised market valuations were low.

2.2.2 Review of Related Studies in the Context of Nepal

Ramesh R. Aryal (1991), in the study "An Evolution of Capital Structure of Bottlers Nepal Ltd." He has found that the long-term debt of BNL is increasing year by year because the company has borrowed more long-term debt. Different ratio analysis shows the inefficient capital structure management of the company. He had made his analysis only for the five fiscal years period and suggested that the company has to follow good policy to set the capital structure.

The calculation of leverage indicates the bad performance of the company because it is in increasing trend. After doing all calculations like ratio, leverage, capital structure position, correlation and P/E etc. it is found that the company is facing bad situation due to inefficient capital structure. So, the company has to lower down the amount of debt and to obtain additional fund though the issue of equity share by using cheaper source of collecting fund. In order to build up public image, share must be issued to the general public. Moreover the company should think about other new products for winter season to increase good image of the company.

Yuba Nath Panta (1996), conducted a study on “On Capital Structure of Nepal Industrial Development Corporation”. This thesis is based on the composition factors of capital and assets structure of the corporation. This can be revealed only after the analysis of composition and trend of the various components of its balance sheet. The capital asset of the corporation is composed of share capital, reserve and surplus, loan/borrowings and capital liabilities. Among these components loan/borrowings and share capital is the major portion. The total income of the corporation was highly influenced by the interest earned and total expenditure by the interest payment. The rate of increase of income is less than the rate of increase of total expenditure.

Shanti Raj Prashai (1999), in the study “Capital Structure of Nepal Bank Ltd” analyzed the interrelationship and trends among the component parts of capital structure and assets structure. The statistical tools like ratio, percentage, index, average and coefficient of correlation have been used to analyze the facts in this study. This study explains that the deposit is the main source of capital. The total assets of the banks are the composition of loans and advances, cash investment and other assets. Loans and advances cover the major portion of the assets. The interrelationship of the components is fluctuating. The average growth rate of total deposit and other liabilities is higher than the average growth rate of total investment. The growth rate of total income is lower than the growth rate of net profit and higher than the growth rate of total expenses. The total income and total expenses are not under the control of the bank. It is suggested that the bank should control all of the aspects and variables of its capital structure. So, the bank needs to reduce its expenses and control fluctuation in the earning per share to improve its market price per share.

Shambhu Prasad Parajuli (2001), conducted a study on “Capital Structure and its Impact on Profitability of Nepal Lever Ltd.” He has analyzed that the appropriate mix of capital keeps a firm sound and healthy. In the long-term, liquidity may depend on the profitability of a firm but to survive to achieve long run profitability, it has to depend on its capital structure to some extent. He has used hypothesis to measure the significant relationship between debt and equity.

The NLL’s long run debt seems very high at the time of its establishment. But later on, there is no long-term debt at all. Thus it can be said that the company’s management is reluctant toward employing long-term loans. From Du-Point analysis, it is found that the profit margin and equity multiplier are in decreasing trend, which causes continuous decrease in ROE. Now, it appears that ROE can be levered up by increasing the amount of debt in the firm. According to different calculations, he has found that performance of NLL is not at satisfactory level. He has recommended the maintenance of a proper capital structure by including the long-term debt.

Bishnu Raj Budhathoki (2003), in the study entitled "A comparative analysis on capital structure management of Nepal Lever Ltd. and Nepal Lube Oil Ltd." has applied different aspects of capital structure on his study. He has used men, standard deviation, correlation coefficient as a statistical tools and ratio analysis, Debt-Equity ratio, Long-term debt to total assets ratio, average return on shareholders equity and profitability ratio as financial tools.

He found in the study that: NLOL has got more risk than NLL, NLL is able to earn the reasonable profit for its investors than NLOL. Net worth ratio of NLL is near of standard so it's better than NLOL, NLOL is able to use proper amount of LTD to maximize shareholder return, NLOL can maintain the LTD and the company's equity

capital is sufficient to support the acquisition of the assets, NLOL has lower risk than NLL, NLOL shareholders' have greater claim on firm's assets, NLOL has lower total debt proportion than NLL, NLOL can able to cover the interest expenses by it's operating efficiently than NLL, NLOL has perfectly utilized of fixed assets than NLL, NLL has high profitability position than the NLOL, NLL has greater average EPS than NOLL.

Nibedan Baidhya (2004), in the study "Capital Structure of Manufacturing Companies in NEPSE" he suggested that the company should increase the equity proportion in financing its assets to be safe mode against liquidation and the company should try to streamline their sales. BNL and UNL should try to access longer source of debt, which will be costly for them rather than relying in short term loans.

Poonam Bhattarai (2005), in the study "Capital Structure of Manufacturing Companies in Nepal" conducted that companies do not always plan capital structure and it develops as a result of the financial decisions taken be the financial manager without any formal planning. Moreover, some industries even should not meet the interest and other expenses from the income. So, they increase loan (debt) and become more levered.

Suravi Baral (2006), in the study "Capital structure of selected Nepalese manufacturing companies in Nepal" analyzed five manufacturing companies. The main objectives of her study are to analyze the composition of the capital structure of industry to make the long-term solvency of the selected companies, to evaluate the debt-servicing capacity of the selected companies, to analyze the relation between the variables affecting capital structure.

The methods of analysis employed in this study, consist of two types of analytical tool and technique that are financial and statistical tools. The financial tools employed in this study basically represent ratio analysis, leverage analysis, EBIT-EPS analysis and others. In the trend analysis, various variable shows clear picture of its movement for the study period. Correlation analysis and 't' – test analysis has been made to determine the degree of relationship between two variables. She had found that total debt to net worth ratio of five manufacturing companies is considerable but JSM have negative ratio. The interest coverage ratio of these five companies is very low. So, the companies are unable to pay their interest from the EBIT. The amount of total capitalization is not sufficient to finance long-term assets of these companies. Profitability ratio of the manufacturing companies is low. As a result, profitability of manufacturing companies is unsatisfactory. These companies are unable to earn the profit, excess of the accumulated loss. Once, the equity of five companies is to be born by the debt holder. There is no safety margin to the debt holder. Moreover, their investment are being devalues year by year. Therefore, they may force the company to liquidate and redeem their investment at any times.

2.3 Research Gap

All the above studies are apprehensive with the research title "Capital Structure". Some researchers have chosen various companies for the research and some have determined in only one organization. But this study includes only five manufacturing companies to cover the analytical part and fulfill the objectives of the study. This thesis work has covered the period of study till 2005/06, where as the previous thesis work covered only up to 2004/05.

It has used all possible financial and statistical tools to cover the objectives of this study. It has analyzed the Du-Pont system of analysis. With the help of the Du-Pont system, the result of the return on equity can be justified by explanation of the covers behind thesis. It has also analyzed regression analysis which is a statistical method for

investing relationship between the variables by the establishment of an approximate functional between them. In this study, by the use of regression analysis, the strength of relationship between two variables (e.g. long term debt on shareholders equity, total debt on long term debt, EBIT on interest and net profit on sales) have determined.

Hence, this study is considerably different from previous study. Attempt on this particular subject will be found correctly true and it will be known as valuable study in this particular subject.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The financial manager generally faces a lot of problems in the organization setting due to the causes of the external and internal variables of dynamic relationships. These problems may be either general that can be solved by the existing stock of knowledge or specific requiring special incremental knowledge to search the solution in the scientific method. Research methodology is the way by which such type of problems can be resolved. Hence, the idea of research methodology is important in analyzing and interpreting the variables to satisfy the objectives of the study.

Research Methodology is the investigation tools of any certain area and it means clearly observation of certain objective. Research is a systematic and organized effort to investigate a specific problem that needs a solution This process of investigation involves a series of well through out activities of gathering, recording analysis and interpreting the data with the purpose of finding answers to the problem. (*Seltiz and others, 1962: 50*)

3.2 Research Design

The main objective of this study is to analyze and evaluate the relationship between debt and shareholders' equity of the manufacturing companies to make the balanced capital structure, which minimizes the cost and maximizes the returns to the shareholders and provide suggestions on the basis of the evaluation. To meet this objective, descriptive and exploratory designs are chosen as appropriate.

In this research, the debt and equity positions in the capital structure of the manufacturing companies like BNL, UNL, NLOL, JSML and RJML are critically scrutinized. Mostly the secondary data have been used for the research study. The data are collected from the websites, personal visits, economic surveys and the annual reports of selected manufacturing companies etc.

Hence, the research design is made by collection of information from different sources and the data have been tabulated and analyzed by using various financial and statistical tools. The financial analysis includes the ratio calculations, capital structure theories and their interpretations. Similarly the statistical analysis includes the average or mean, standard deviation, coefficient of variation correlation coefficient, probable error, regression analysis and their interpretations. This study tries to make comparison and establish relationship between two or more variables. At the end the summary, conclusions and recommendation are set for the purpose of the study.

The study is based on certain research design. This study emphasizes on descriptive and exploratory designs.

3.3 Nature and Sources of Data

The nature of the data that are collected for the research purpose are as follows:

- Most of the data are numerically expressed.
- Secondary data are used in the study.
- The data are the aggregates of facts.
- All the data are purposeful for the research.
- Data are in systematic form.
- Data are synthesized, set, tabulated, graphed and calculated.
- The data are useful for the study.

The main source of the data collected is the secondary source. The secondary sources of data are as follows:

- The official website of the “Nepal Stock Exchange Limited”
- Security Board
- Personal visits
- Economic surveys and reports
- Brochure and annual reports of listed manufacturing companies

3.4 Population and Sample

For the purpose of the study of the capital structure of the manufacturing companies, the samples of the manufacturing companies are taken by the judgment and convenient sampling method. It is difficult to study the population of manufacturing companies which are about 38 in number listed in Nepal Stock Exchange Ltd. Hence only five companies out of them are chosen as the sample for the analysis, interpretation and representation of the population of the manufacturing companies. The samples of five manufacturing companies, which are judged for the convenience, are as follows:

- Bottlers Nepal Limited (BNL)
- Unilever Nepal Limited (UNL)
- Nepal Lube Oil Limited (NLOL)
- Jyoti Spinning Mills Limited (JSML)
- Raghupati Jute Mills Limited (RJML)

3.5 Analytical Tools

After collection of data, it should be properly edited and organized in the form of tables or graphs. This would help the researcher in finding out the silent features of the data. So, different kinds of analytical tools are used in financial statements with the help of financial transactions, which have placed during the financial year. But information provided by the financial statements is not enough and end itself. Companies cannot get the meaningful conclusion form these statements alone. The information provided by the financial statements is useful in making decisions through analysis and interpretation. Comparative evaluation of capital structure of five firms is a part of financial analysis and same like that different types of tools can be used. The analysis of the data is the most important according to the research design. This can be possible by using the appropriate analytical tools. These tools are financial as well as statistical tools. These two tools have been used for analyzing capital structure management of Nepalese manufacturing companies.

3.5.1 Financial Tools

Financial analysis is the process of identifying the financial strength and weakness of the company by properly establishing relationships between the items of the financial statements. Each type of analysis has a purpose that determines the different relationships emphasized in the analysis. But this study is based on capital structure this financial tools that help to analyze the capital structure are used. In the process of capital structure decision making of the manufacturing companies, the components of the capital structure should be well analyzed described and evaluated. These components are mostly the shareholders' equity capital and the debt capital. For this purpose, the financial tool is the most appropriate one. This helps to calculate the relationship between two variables in ratio and percentage basis.

Hence, financial tools are the major instrument that can be used in financial analysis. Financial analysis includes the leverage analysis. And the leverage analysis is the fundamental basis for the study of the capital structure. Hence the financial tools for the financial analysis are necessary instruments for the study of the dynamics of the difference sources of the capital in the capital structure for the decision making process to minimize cost and maximizing shareholders' wealth. So, the financial tools that should be used for this purpose are as follows:

1. Ratio Analysis

a) *Debt Equity Ratio in terms of Long-term Debt and Shareholders' Equity*

$$= \frac{\text{Long Term Debt}}{\text{Shareholders' Equity}}$$

b) *Long term Debt as a percentage of Total Debt*

$$= \frac{\text{Long Term Debt}}{\text{Total Debt}}$$

c) *Total Debt to Net worth Ratio*

$$= \frac{\text{Total Debt}}{\text{Net Worth}}$$

d) *Interest Coverage Ratio*

$$= \frac{\text{Earning Before Interest and Tax (EBIT)}}{\text{Interest Charges (I)}}$$

e) *Return on Assets (ROA)*

$$= \frac{\text{Net Profit}}{\text{Total Assets}} \times 100\%$$

f) *Net Profit Margin*

$$= \frac{\text{Net Profit}}{\text{Sales}} \times 100\%$$

g) DU-PONT Analysis

Return on Equity = Profit Margin × Total Assets Turnover × Equity Multiplier

$$= \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

h) Capital Structure Theories

(I) Overall Cost of Capital (K_o)

$$= \frac{\text{Net Income (EBIT)}}{\text{Value of the Company}}$$

(II) Equity Capitalization Rate (K_e)

$$= \frac{\text{Net Income (EBT)}}{\text{Market Value of Shares}}$$

2. Degree of Leverage

a) Degree of Financial Leverage (DFL)

$$= \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in EBIT}} \quad \text{Or} \quad = \frac{\text{EBIT}}{\text{EBT}}$$

These financial tools help the research study to reach to the conclusion by the analysis of the dynamics of the variables in the capital structure.

3.5.2 Statistical Tools

In the course of the study of the capital structure, the shareholders' equity and the debt capital are the most common variables. The relationships between them are the important subject for the analysis to determine the balanced capital structure. Hence the statistical tools are also used to analyze the capital structure for its effectiveness. The various types of statistical tools have been used for this purpose:

1. Average or Mean

It can be defined as the sum of the observations divided by the number of observations in the selected sample.

$$\text{Average/Mean } (\bar{X}) = \frac{\text{Sum of Observations}}{\text{Number of Observations}} = \frac{\sum X}{N}$$

Where,

X is any variable under observation.

N is the number of observation of the variables.

\bar{X} is the mean value/average of the variables under observations.

2. Standard Deviation (S.D.)

The standard deviation is used to measure the risk. It shows the deviation of actual mean with average mean. The standard deviation measures the absolute dispersion of variability of a distribution. The greater the variability or dispersion the greater would be the magnitude of the deviation of the value from their mean. The smaller the dispersion or variability, smaller would be the standard deviation. Hence, the standard deviation is useful in judging the representativeness of the mean. The formula of standard deviation is as follows:

$$\text{Standard Deviation } (\sigma) = \sqrt{\frac{\sum (X - \bar{X})^2}{N}}$$

Where,

X is the variables.

\bar{X} is the mean variable.

N is the number of variables under observation.

σ is the symbol to represent standard deviation.

3. Coefficient of Variation (C.V.)

Coefficient of Variance is the corresponding relative measure of dispersion. The series for which the coefficient of variation is greater is said to be more variable or conversely less consistent or less uniform. The formula of coefficient of variance is as follows:

$$C.V = \frac{S.D}{\bar{X}} \times 100\%$$

Where,

S.D. is the standard deviation

\bar{X} is the mean or average value of the variables

4. Correlation Coefficient (r)

There are different types of sources of capital in the capital structure of the manufacturing companies. The shareholders' equity capital and debt capital are the mostly used variables in the capital structure of the Nepalese manufacturing companies. The analysis, description and evaluation of these two variables can be done by the statistical tool called correlation analysis. Correlation coefficient measures the relationship between two and more variables, it shows the extend relationship between them. The relationship may be direct or inverse. If the both variables show similar change there is direct or positive relationship between them and vice versa. Or it indicates the direction of relationship among variables. A method of measuring correlation so called Pearson's coefficient of correlation. It is denoted by 'r'.

The relationship between two or more variables can be measured by the correlation coefficient. Hence, the correlation called “Correlation Coefficient” can be summarized in one figure, the degree and direction of movement (Bajracharya, 2000:250).

There are different types of the correlation, out of which simple correlation has been used in the analysis of the variables of the capital structure of manufacturing companies. Simple correlation is the degree of relationship between two variables. In calculating the coefficient of correlation, Karl Pearson Correlation Coefficient has been widely used. But for the sake of easiness product moment formula is also used, which can be expressed as follows:

$$r = \frac{n \sum XY - \sum X \sum Y}{\sqrt{n \sum X^2 - (\sum X)^2} \sqrt{n \sum Y^2 - (\sum Y)^2}}$$

Where,

X is the one variable

Y is the other variable

N is number of pairs of observations

Assumptions:

If $r = 1$, there is positively perfect correlation between two variables.

If $r = -1$, there is negatively perfect correlation between two variables.

If $r = 0$, the variables are uncorrelated.

The nearer the value of r to $+1$, the closer will be the relationship between two variables and nearer the value of r to zero, the lesser will be the relation (Bajracharya, B.C., 2000:256-257).

(E) Probable Error (P.E.)

Probable error is an old measure of ascertaining the reliability of the Pearsonian coefficient of correlation. If r is the calculated correlation coefficient in a sample of n pairs of observations, then its standard error, usually denoted by $S.E.(r)$ is given by

$$S.E.(r) = \frac{1-r^2}{\sqrt{n}}$$

Probable error of the coefficient of correlation can also be calculated from $S.E.$ of the coefficient of correlation by the following formula.

$$P.E. (r) = 0.6745 \times S.E.(r)$$

$$= 0.6745 \frac{(1-r^2)}{\sqrt{n}}$$

Hence it helps to interpret its value and is the measure of testing the reliability of correlation coefficient. The probable error is used to test whether the calculated value of sample correlation coefficient is significant or not. A few rules for the interpretation of the significance of correlation coefficient are as follows:

- ❖ If $r < P.E. (r)$, then the value of r is not significant, i.e., insignificant
- ❖ If $r > 6 \times P.E. (r)$, then r is definitely significant
- ❖ In other situations, nothing can be calculated with certainty.

The probable error may lead to fallacious conclusions particularly when n , the number of pairs of observation is small.

Also, the probable error of correlation coefficient may be used to determine the limits within which the population correlation coefficient may be expected to lie.

Limits for population correlation coefficient are $r \pm P.E. (r)$.

(F) Regression Analysis

Average relationship between two variables (x, y) is called regression. Estimation of unknown value of variable with the help of known value of variable is called regression analysis. Where known value of variable is called independent variable and unknown value of variable is called dependant variable. The concept of regression was first introduced by Francis Galton. Regression refers to an analysis, which is involving the fitting of an equation to a set of data points, generally by the method of least square. In other words, the regression is a statistical method for investing relationships between the variables by the establishment of an approximate functional between them. It is considered as a useful tool for determining the strength of relationship between two (Simple Regression) or more (Multiple regression) variables. It helps to predict or estimate the value of one variable when the value of other variables is known.

1. Simple regression

The analysis, which is used to explain the average relationship between two variables, is known as simple linear regression analysis. The formula for the calculation is

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$
$$a = \frac{\sum Y - b(\sum X)}{n}$$

The equation of regression line is $Y = a + bX$

Where,

$Y =$ Dependent variable

$X =$ Independent variable

$b =$ Slope of the regression or Regression coefficient

$a =$ Regression constant

$n =$ No. of observations

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

The overall background, basic objective and signification of the study have been already mentioned in the first introduction chapter. The overall background of the five manufacturing companies like Bottlers Nepal Limited, Unilever Nepal Limited, Jyoti Spinning Mills Limited, Nepal Lube Oil Limited and Raghupati Jute mills are mentioned. In second chapter various related books Journals, other publications as well as unpublished master level dissertations have been reviewed. In the third chapter comprehensive analysis of relevant variables is undertaken. As such several tools and technique employed for analysis and presentation of data have been defined.

In this chapter effort has been made to analyze the capital structure of the manufacturing companies. For this, presentation of data of the organization and classification of the data for analysis has been done. The data collected is to be presented for the detail analysis by examining it in tables and graphs. This chapter proceeds with financial analysis and tabulation and then with statistical analysis. The financial analysis is done through presentation of data and calculating various financial ratios that reflect the relationship of variables affecting capital structure. The major variable and the variable affecting capital structure used for analysis are long term debt, total debt, equity capital, EBIT, interest, sales total assets, net worth current liabilities and current assets. Other related variable are also used when they are felt necessary.

Given these variables, following relationship of relevant variable for empirical testing are analyzed to know how the above mentioned manufacturing companies have been able to maintain their capital structure positions. The variables used for analysis of empirical relationship are given below:-

- Analysis of long term debt and shareholder's equity
- Analysis of long term debt to total capital ratio
- Analysis of Total debt to Net worth Ratio
- Analysis of Interest Coverage Ratio
- Analysis of Return on Total Assets Ratio
- Analysis of Profit Margin Ratio
- Analysis of Return on Equity (ROE) by using DU – Pont system.
- Analysis of Capital structure
 - (a) Overall Capitalization Rate
 - (b) Equity Capitalization Rate
- Analysis of Financial Leverage
- Analysis of co-relation between long debt and net worth capital of each company
- Regression analysis of LTD on shareholder's equity
- Regression analysis of Total Capital on LTD
- Regression analysis of Interest on EBIT
- Regression analysis of Net Profit on Sales

4.2 Leverage Ratio

Leverage ratio is also known as capital structure ratio. The capital structure ratio judges the long term financial position of the firm. This ratio indicates funds provided by owner and lenders. As the general rule there should be an appropriate mix of debt and owners' equity while financing the firm's assets. Leverage ratios have a number of implications. First, is between the debt and shareholders equity. The company has legal obligation to pay the interest to debtors. Second, shareholders have advantages in employment of debt in two ways.

- a. They can retain control of company with the limited shop, and
- b. Their return is magnified, if the company's interest rate on debt is lower than rate of return on total capital employed. Shareholders' return can be magnified through employment of debt on the other hand if the cost of debt is higher than rate of return on overall capital employed, shareholders' return is reduced in employment of debt and there is threat of insolvency. By using debt shareholders' return is magnified as well as the risk of liquidation. Third creditors treat equity as margin of safety, if owner have provided only a small proportion of total financing. The creditors risk will be high and company will face difficulties in raising funds in future from creditors and financial risk and the ability of company in closing debt, for the benefit of shareholders.

Leverage ratio may be calculated from the balance sheet item and determined to which borrowed fund have been used to finance the company. Leverage ratios from the income statement measure the risk of debt. Leverage ratio can be analyzed on the following way:

4.2.1 Analysis of Long Term Debt and Shareholder's Equity

The ratio of borrowed funds and owner's capital is a popular measure of the long term financial solvency of the firm. In usual version, the debt/equity is the ratio of long term debt to total equity. Although, short term debt and accruals provide leverage just as long term debt, current liabilities are usually omitted. From the ratio, the firm is assumed to be able to adjust the short term part of capital structure rapidly, when the rate of return on assets decline. Thus, the debts consider here is exclusive of current liabilities. Thus, in the following table long term debt to equity ratio presented in quantitative term it show the movement of the trend from the year 2001/02 to 2005/06 of five manufacturing companies.

**Table No. 4.1
Debt Equity Ratio**

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	-	-	-	2.731	0.426
2002/03	-	-	-	2.960	0.422
2003/04	-	-	-	3.170	0.313
2004/05	-	-	-	3.063	0.329
2005/06	0.369	-	-	3.167	0.129
Average	0.369	-	-	3.018	0.3238
S.D ()	0	-	-	0.16	0.1077
C.V (%)	0	-	-	5.44	33.26

Source: Appendix - 6

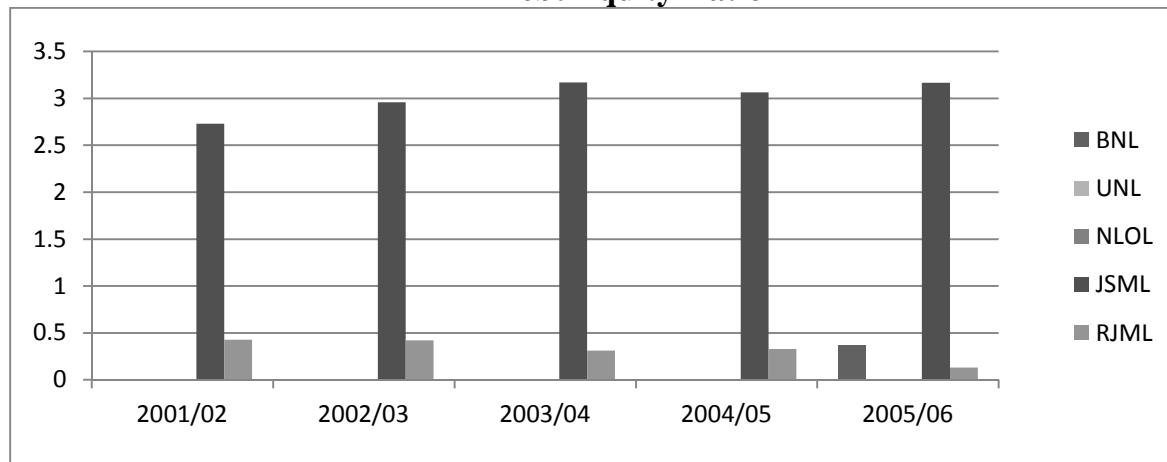
Above table shows that debt equity ratio of UNL and NLOL are zero. These companies are highly unlevered. They do not like to take any kinds of risk. To earn maximum profit, they have to increase in long term debt.

The debt equity ratios of BNL have, 0.369 in the year 2005/06 respectively. These debt equity ratios indicate that BNL has low long term debt. This company is levered in nature. This company has to reduce the long term debt to make standard position. S.D and C.V are 0 and 0%. This shows that debt equity ratio of BNL is inconsistent in nature.

The debt equity ratios of JSML have, 2.731, 2.960, 3.170, 3.063 and 3.167 in the year 2001/02 to 2005/06 respectively. These debt equity ratios indicate that the JSML has higher long term debt. This company is levered in nature. This company has to reduce the long term debt to make standard position. S.D and C.V are 0.16 and 5.44%. This shows that debt equity ratio of JSML is consistent in nature.

Debt equity ratios of RJML during the period of 2001/02 to 2005/06 are, 0.426, 0.422, 0.313, 0.329 and 0.129 respectively. It shows that the debt equity ratios are very low during other study period. This company has to increase the long term debt to make standard position. S.D and C.V of this company are 0.1077 and 33.26% respectively. This value shows that debt equity ratio of RJML is consistent in nature.

Figure No. 4.1
Debt Equity Ratio



4.2.2 Analysis of Long Term Debt to Total Capital Ratio

This ratio is computed by simply dividing the long term debt of the firm by its permanent capital. Permanent capital here represents the shareholder's equity capital plus long term debt. The long term debt to permanent capital ratio of five manufacturing companies are calculated and presented on the following table.

Table No. 4.2
Long term Debt to Total Capital Ratio

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	-	-	-	0.732	0.299
2002/03	-	-	-	0.747	0.297
2003/04	-	-	-	0.760	0.239
2004/05	-	-	-	0.754	0.248
2005/06	0.2698	-	-	0.760	0.114
Average	0.2698	-	-	0.7506	0.239
S.D ()	0	-	-	0.014	0.065
C.V (%)	0	-	-	1.865	27.20

Source: Appendix – 7

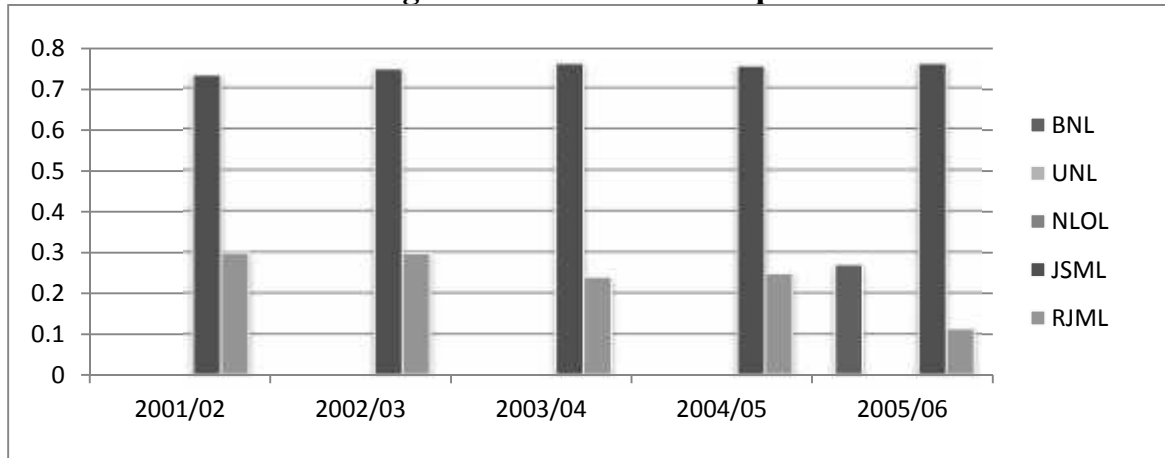
Above table shows that long term debt to total capital ratio of UNL and NLOL are zero because long term debt of these two companies have zero. These companies are highly unlevered. These three companies must be increasing their long term debt to earn maximum profit.

The long term debt to total capital ratio of BNL during the study period 2005/06 are 0.2698 respectively. This value shows that equity value of BNL is low long term debt. Low long term debt means the company has to take low risk. So, BNL should increase long term debt to make standard position.. S.D and C.V of BNL are 0 and 0%. This value shows that long term debt to total capital ratio of BNL is inconsistent in nature.

The long term debt to total capital ratio of JSML during the study period 2001/02 to 2005/06 are 0.732, 0.747, 0.760, 0.754 and 0.760 respectively. This value shows that equity value of JSML is higher and lowered long term debt. More long term debt means the company has to take more risk. So, JSML should decrease the long term debt and should increase the shareholder's equity. S.D and C.V of JSML are 0.014 and 1.865%. This value shows that long term debt to total capital ratio of JSML is consistent in nature.

The long term debt to total capital ratios of RJML in 2001/02 to 2005/06 are 0.299, 0.297, 0.239, 0.248 and 0.114 respectively. This value shows that long term debt is lower than total shareholder's equity. RJML should increase long term debt to make standard position. S.D and C.V of this company during the study period are 0.065 and 27.20% respectively. This value shows that long term debt to total capital ratio of this company during the study period is highly consistent in nature.

Figure No. 4.2
Long term Debt to Total Capital Ratio



4.2.3 Total Debt to Net Worth Ratio

This ratio is also known as debt equity ratio. The relationship between lender's contributions is shown by debt equity ratio and it reflects the relative claims of creditors and shareholders against the assets of the company. This ratio is calculated by dividing total debt by net worth.

Net worth consist the entire share capital, reserve and surplus of the company and total debt consists of all types of long term debt and current liabilities. This total debt to net worth ratio is computed by using following formula.

$$\text{Debt to Net Worth Ratio} = \frac{\text{Total Debt}}{\text{Net Worth}}$$

Table No. 4.3
Debt to Net Worth Ratio

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	0.489	0.641	1.937	4.480	0.747
2002/03	0.472	1.190	2.655	4.454	0.668
2003/04	0.239	1.373	1.867	4.397	0.626
2004/05	0.300	4.066	2.144	3.870	0.677
2005/06	0.447	3.300	2.580	3.560	1.559
Average	0.389	2.114	2.2366	4.0556	0.855
S.D ()	0.1	1.3258	0.3257	0.9646	0.353
C.V (%)	25.757	62.71	14.562	23.78	41.28

Source: Appendix - 8

A high ratio shows the large share of financing by creditors as compare to that of owners. This means creditors would suffer more in times of distress than the owner. The total debt to net worth ratio represent in the above table. The total debt to net worth ratio of BNL is very low. It has used only short term debt. The ratios of BNL from the year 2003/04 to 2004/05 are lower than the average of ratio 0.389. Therefore we can conclude that this company has not been able to maintain its average ratio of total debt to net worth for two years. The ratio suggests that BNL must be increased in debt.

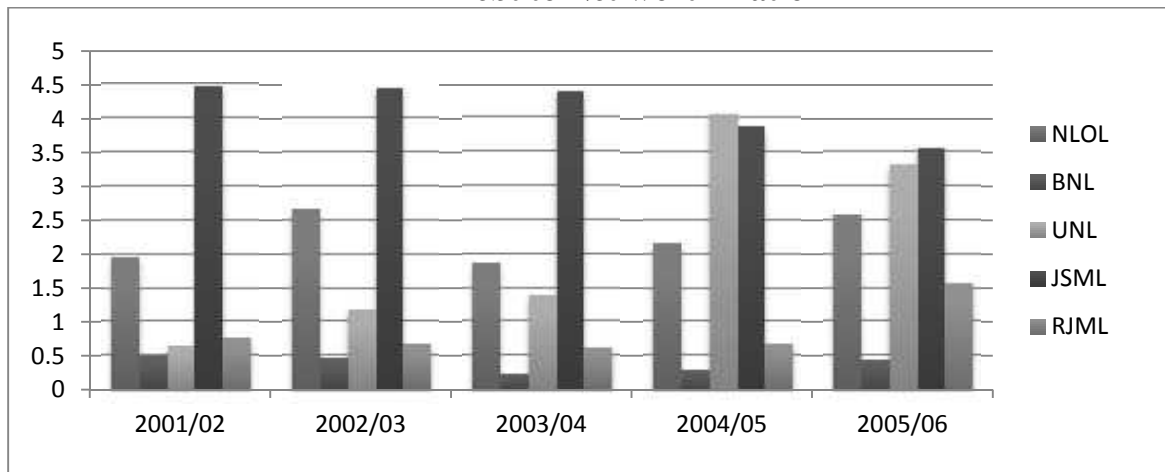
The total debt to net worth ratio of UNL is also low. In the year 2001/02, the ratio is very lower than average but in the year 2004/05, the ratio is very higher than average. So that, the company should use both long term debt and short term debt instead of using only short term debt. Average total debt to net worth ratio during the study period is only 2.114. This company must be increase in debt. S.D and C.V are 0.1 and 25.75% respectively. This value indicates that total debt to net worth ratio during the study period is consistent in nature.

Average total debt to net worth ratio of NLOL is 2.2366. In the year 2001/02, 2003/04 and 2004/05 the ratios are lower than the average of ratio. So the company should try to maintain its total debt to net worth ratio. S.D and C.V are 0.3257 and 14.562% which indicates that the total debt to net worth ratio is consistent in nature.

The total debt to net worth ratio of JSML is very high which means that the company has used more debt. By using more debt in capital structure, the company should bear more financial risk. So, the company must decrease the debt. Average total debt to net worth ratio during the study period is 4.0556. S.D and C.V of the company are 0.9646 and 23.78%. This value indicates that total debt to net worth ratio during the study period is consistent in nature.

In the case of RJML, the total debt to net worth ratio is very low. So the company should increase its debt capital to make standard combination of capital and it leads the company to earn maximum profit. Average total debt to net worth ratio of RJML is 0.855. S.D and C.V are 0.353 and 41.28%. This value indicates that total debt to net worth ratio of RJML during the study period is consistent in nature.

Figure No. 4.3
Debt to Net worth Ratio



4.2.4 Analysis of Interest Coverage Ratio

Interest coverage ratio is designed to relate the interest charge of a firm to its ability to service them. It is simply the ratio of earning before interest and taxes for a particular reporting period to the amount of interest charge for the period.

This ratio measures the debt servicing capacity of a company. It is computed by dividing net profit before interest and tax by interest.

$$\text{Interest Coverage Ratio} = \frac{\text{Net Profit Before Interest and Tax}}{\text{Interest}}$$

This ratio is also known as time interest earn ratio. A high ratio is a sign of low burden in business and lower utilization of borrowing capacity. The large the coverage is the greater the ability of the company to make the payment of interest to creditors. The comparative picture of manufacturing companies for interest coverage ratio has been presented in the following table.

Table No. 4.4
Interest Coverage Ratio

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	87.689	5.487	3.087	0.521	1.749
2002/03	105.841	48.672	2.826	0.935	1.641
2003/04	11253	109.440	1.115	1.146	2.044
2004/05	166.57	145.872	2.639	1.421	1.665
2005/06	24.29	172.295	1.695	0.299	-3.831
Average	2327.478	96.353	2.272	0.867	0.654
S.D ()	4462.991	62.002	0.708	0.407	2.247
C.V (%)	191.752	64.349	31.18	47.15	343.76

Source: Appendix - 9

The interest coverage ratios of five manufacturing companies during the study period are presented in the above table. The interest coverage ratios of BNL in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 are 87.689, 105.841, 11253, 166.57 and 24.29 respectively. This ratio is high because BNL is levered. This company uses the long term debt in year 2005/06. So, its value shows low in year 2005/06. It is better for the smooth operation in the figure. S.D and C.V of BNL are 4462.991 and 191.752%, which indicates that the interest coverage ratio of BNL is highly inconsistent.

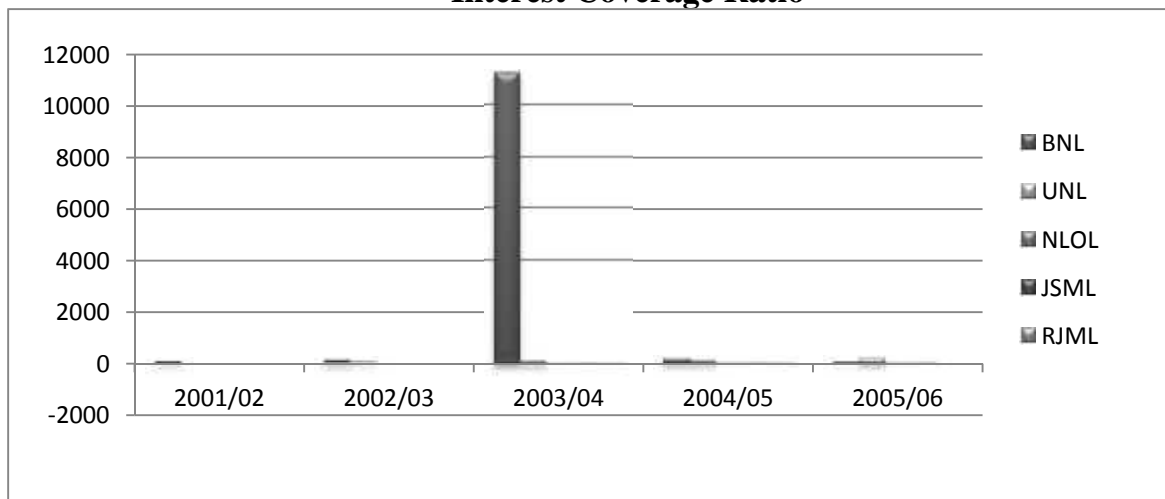
The interest coverage ratio of UNL during the study period is 5.487, 48.672, 109.440, 145.872 and 172.295 respectively. The ratio in 2001/02 and 2002/03 is very low but in other three periods, it is very high. It is not better sign. S.D and C.V are 62.002 and 64.349%, which indicates that the ratio is inconsistent.

The interest coverage ratio of NLOL during the study period is low. The average interest coverage ratio is 2.272. It must be increased its EBIT. S.D and C.V are 0.708 and 31.18%, which indicates that the interest coverage ratio of NLOL is consistent during the study period.

The interest coverage ratio of JSML is very low it uses large amount of long term debt as compare to equity share. The firm must maintain its debt equity position and C.V shows that interest coverage ratio of JSML is consistent in nature.

The interest coverage ratio of RJML is also very low as compare to standard value. The average value of interest coverage ratio is 0.654. This company also tries to increase its EBIT. S.D and C.V are 2.247 and 343.76% which indicates that the interest coverage ratio of RJML is inconsistent in nature.

Figure No. 4.4
Interest Coverage Ratio



4.3 Analysis of Return on Total Assets Ratio

Return on total assets is computed simply by dividing earning after tax by total assets on after tax basis. But, earning after tax (EAT) represents only residual income for shareholder.

Therefore, it is conceptually on sound to use EAT to calculate return on total assets. Thus, here after tax on interest expense is added to EAT for the numerator of the ratio. This ratio measures the profitability of the total funds of manufacturing company. Thus, the ratio of return on total assets is calculated by taking five year balance sheet and P/L account of five manufacturing company as given below.

Table No. 4.5
Return on Total Assets Ratio

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	0.047	0.074	0.055	-0.064	0.017
2002/03	0.025	0.119	0.029	-0.007	0.016
2003/04	0.043	0.150	0.003	0.011	0.023
2004/05	0.036	0.172	0.024	0.034	0.015
2005/06	0.024	0.246	0.012	-0.055	-0.039
Average	0.035	0.152	0.0246	-0.0162	0.0064
S.D ()	0.0077	0.057	0.094	0.038	0.0231
C.V (%)	22.00	37.79	381.33	-234.24	360.76

Source: Appendix - 10

Above table shows the return on total assets ratio of five manufacturing companies. The return on total assets ratios of BNL are 0.047, 0.025, 0.043, 0.036 and 0.024 in the year 2001/02 to 2005/06 respectively. This ratio clearly shows that net profit of the company is very low as compare to total assets. This company must increase in profit. S.D and C.V are 0.0077 and 22.00%, which indicates that the ratio is consistent in nature.

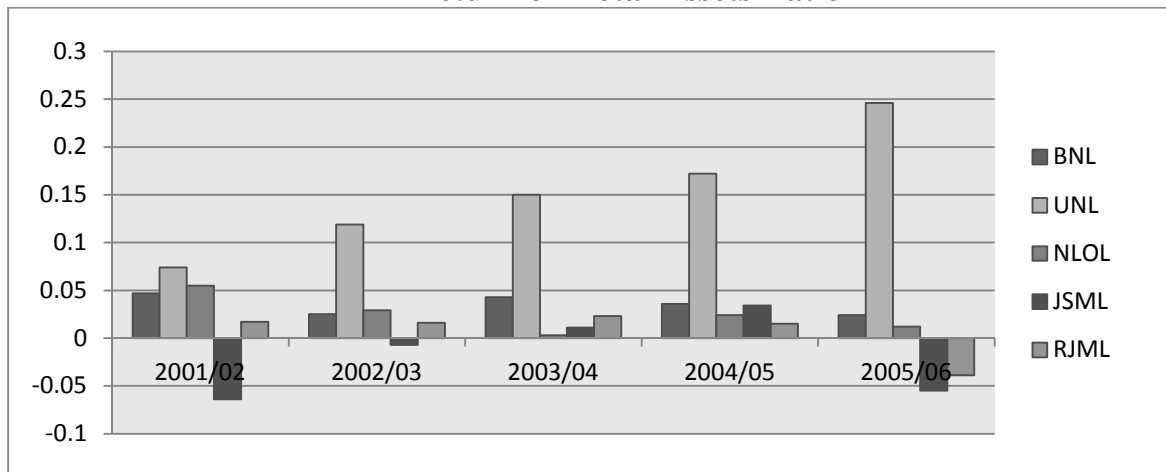
The average return on total assets ratio of UNL is 0.152. This is also not good condition of the firm. S.D and C.V represent the ratio is consistent in nature.

The average return on total assets ratio of NLOL is 0.0246. There is no sufficient profit in other period. This is not better position of the company. Its S.D and C.V are 0.094 and 381.33%, which indicates that the ratio is not consistent in nature.

The average return on total assets ratio is negative. So, the financial condition of JSML is not better. This company is suffering from loss in 2001/02, 2002/03 and 2005/06. This company's S.D and C.V are 0.038 and -234.24% which is very low and this ratio is not consistent in nature.

Return on total assets ratio of RJML in 2001/02 to 2005/06 are 0.017, 0.016, 0.023, 0.015 and -0.039 respectively. Besides in 2001/02, the firm's profits are slightly same in the period of 2002/03 to 2004/05. After in 2005/06, the firm's financial condition is becoming not good and its S.D and C.V are 0.0231 and 360.76%, which indicates that the ratio is inconsistent in nature.

Figure No. 4.5
Return on Total Assets Ratio



4.4 Analysis of Profit Margin Ratio

Net profit margin on sales is computed simply by dividing Net profit after tax by amount of sales. Net profit is obtained by subtracting operating expenses and income tax. From the gross profit net profit after tax is given on the profit and loss account of each manufacturing company. This ratio of profit margin on sales indicates the firm's capacity to with stand adverse economic condition.

A manufacturing company with a high profit margin ratio would be advantageous position to service in the face of falling selling prices, rising cost of production or declining demand for the product and vice-versa. Though to analyze the position of profit margin on sales of the manufacturing companies, the following table is constructed:

Table No. 4.6
Profit Margin Ratio

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	0.091	0.034	0.046	-0.078	0.013
2002/03	0.042	0.075	0.035	-0.007	0.013
2003/04	0.060	0.092	0.004	0.012	0.019
2004/05	0.056	0.128	0.026	0.030	0.010
2005/06	0.040	0.162	0.012	-0.055	-0.038
Average	0.0578	0.098	0.0246	-0.0196	0.0034
S.D ()	0.019	0.042	0.0152	0.0402	0.0208
C.V (%)	33.72	42.75	61.78	-205.35	611.76

Source: Appendix – 11

The average profit margin ratio of BNL is 0.0578 which is very low. The company must try to increase its profit. BNL has insufficient management of debt capital to increase the sales revenue for increasing the net profit. S.D and C.V are 0.019 and 33.72%. From this value, we can say that profit margin ratio of BNL is slightly consistent.

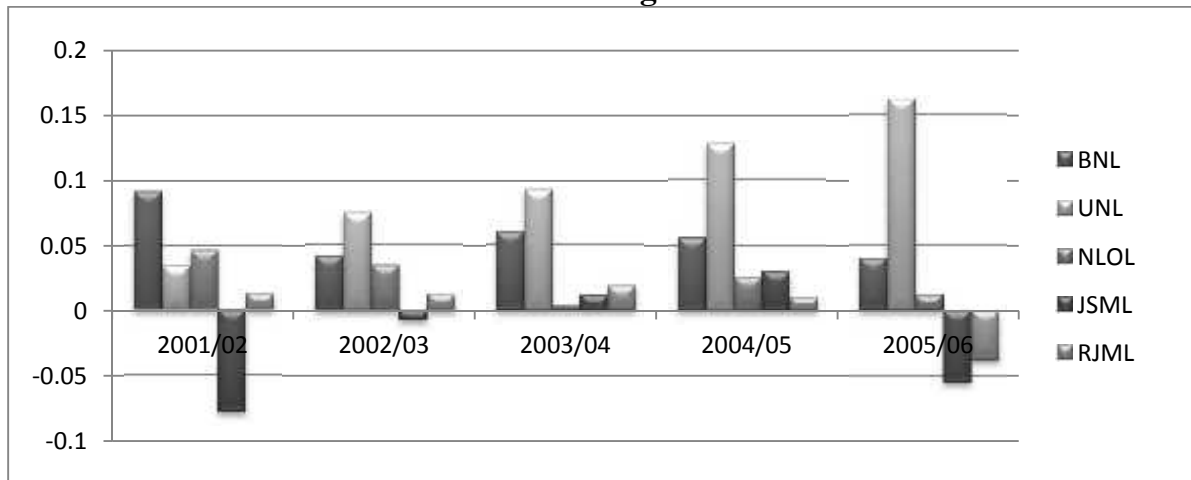
In the case of UNL, average profit margin ratio is 0.098, which is also very low. From the year 2001/02 to 2005/06, the profit margin ratio is increasing slightly but it is not sufficient. The company must increase its long term debt to increase the profit margin. S.D and C.V are 0.042 and 42.75%, which indicates that the profit margin ratio of UNL is slightly consistent in nature.

The average profit margin ratio of NLOL is 0.0246 which indicates that the financial condition of NLOL is not better. S.D and C.V are 0.0152 and 61.78%, which indicates that the profit margin ratio of NLOL is consistent in nature.

The average profit margin ratio of JSML is negative, which indicates that company's financial position is pliable during the study period. The negative profit margin ratio of JSML shows that it is the worst company which is running in loss among five manufacturing companies. S.D is 0.0402 and C.V is -205.35%, which clearly shows that the profit margin ratio of JSML is inconsistent in nature.

The average profit margin ratio of RJML is 0.00346, which is also not good. The company has tried to increase its profit from 2003/04. S.D and C.V of RJML are 0.0208 and 611.76%, which indicate that the profit margin ratio of RJML is slightly consistent in nature.

Figure No. 4.6
Profit Margin Ratio



4.5 Analysis of Return on Equity (ROE) by the use of Du – Pont System

The earning of the company is to be expended to the compulsory payments. After satisfying all of the stakeholders, the remaining of the earning is the return to the equity shareholders. This return is generally indicated by the return on equity ratio by the use of the Du – Pont system. The Du – Pont system is used in the financial analysis for the first time by Du – Pont Corporation, USA. According to Du – Pont system, return on equity is the product of the profit margin, total assets turnover and the equity multiplier. With the help of the Du – Pont system, the result of the return on equity can be justified by explanation of the causes behind this. Hence the return on equity can be calculated as follows:

ROE = Profit margin × Total Assets turnover × Equity multiplier

$$= \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

Table No. 4.7
Return on Equity (ROE)

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	0.250	0.456	0.308	-0.260	0.030
2002/03	0.131	1.014	0.205	-0.026	0.026
2003/04	0.195	1.524	0.017	0.044	0.040
2004/05	0.176	2.059	0.151	0.134	0.027
2005/06	0.128	2.585	0.088	-0.211	-0.100
Average	0.176	1.528	0.1538	-0.064	0.0046
S.D ()	0.044	0.750	0.100	0.150	0.051
C.V (%)	24.77	49.11	65.02	-234.375	1108.69

Source: Appendix - 12

The average ROE of BNL are 0.250, 0.131, 0.195, 0.176 and 0.128 during the study period of 2001/02 to 2005/06 respectively. There is slightly fluctuation during the study period. There is the satisfactory result to the return to the equity share holders. The equity share holders are highly benefited in the fiscal year 2001/02.

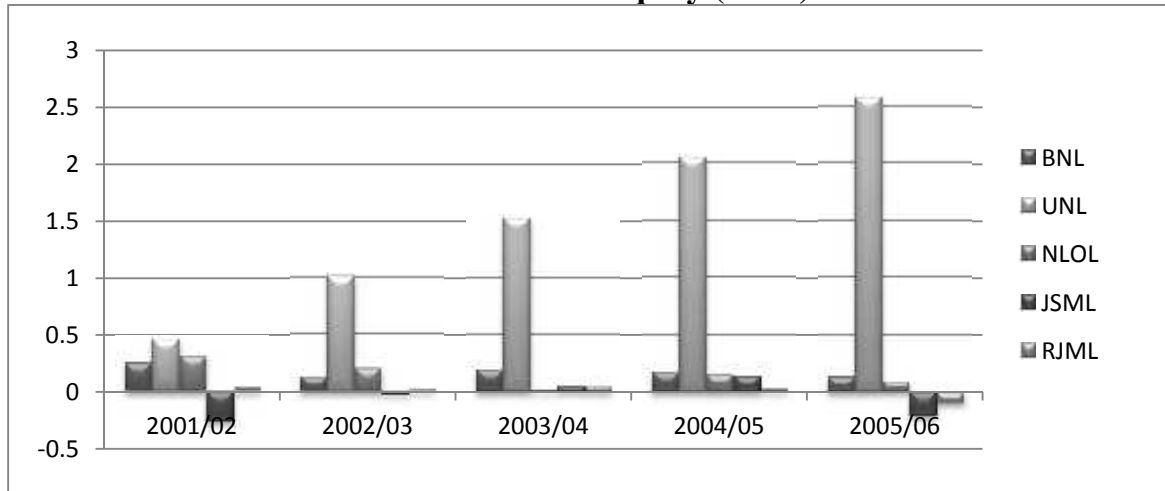
The higher ROE of UNL is 2.585 in the fiscal year 2005/06 but lowest ROE is 0.456 in the fiscal year 2001/02. After 2001/02, there is increasing rate in ROE which shows the satisfactory improvement to the return to the equity share holders. In 2005/06, the equity share holders are highly benefited. S.D and C.V are 0.044 and 24.77%, which indicates that ROE is consistent in nature.

The average ROE of NLOL are 0.308, 0.205, 0.07, 0.151 and 0.088 during the study period of 2001/02 to 2005/06 respectively. After 2003/04, there is increasing rate in ROE on 2004/05, which shows the satisfactory improvement to the return to the equity share holders. NLOL is not able to give enough return to the equity share holders.

The ROE of JSML are negative in the study period of 2001/002, 2002/03 and 2005/06, which is the worst situation for the equity shareholders. The company is able to give the return to the equity shareholders in the last two study of period. S.D and C.V are 0.150 and -234.375, which indicates that ROE is inconsistent in nature.

The average ROE of RJML is 0.0046 which shows that the company is also unable to give return to the equity shareholders. The equity shareholders are highly benefited in the fiscal year 2003/04 than other study period. S.D and C.V are 0.051 and 1108.69% which indicates that ROE is inconsistent in nature.

Figure No. 4.7
Return on Equity (ROE)



4.6 Analysis of Capital Structure

This study is about the capital structure under net income approach. This approach considers measuring total overall capitalization rate and equity capitalization rate of five manufacturing companies which are as follows:

Net Income Approach

The total market value of manufacturing companies is simply obtained by adding the market value of debt and market value of equity. Here only fixed capital is taken for calculation.

However, actual value of the company may not be applicable by considering only fixed capital. The manufacturing company has taken loan from difference time at difference rate; as a result it is very difficulties to calculate cost of debt.

One of the crucial assumptions of net income approach is the "The use of debt does not change the risk perception of investor; as a result the equity capitalization rate, ' K_e ' and debt capitalization rate ' K_i ' remain constant with change in leverage."

Overall Capitalization Rate (K_o)

According to this approach the higher use of cheaper debt lower the overall capitalization rate of the firm consequently increases the total value. Now by considering this implication in manufacturing companies, the overall capitalization rate is calculated and presented as follows:

Table No. 4.8
Overall Capitalization Rate

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	29.831	75.182	56.086	7.551	5.517
2002/03	15.423	137.554	41.977	10.018	5.189
2003/04	23.096	212.413	18.860	8.540	5.849
2004/05	22.649	279.639	31.411	11.033	5.130
2005/06	12.099	334.784	27.153	2.16	-12.016
Average	20.584	207.914	35.097	7.86	1.934

Source: Appendix - 13

From the above table, the overall capitalization rates of BNL are 29.831, 15.423, 23.096, 22.649 and 12.099 during the study period of 2001/02 to 2005/06 respectively. It shows that the BNL's overall capitalization rate is lower in the study period of 2005/06 in comparison with other study periods.

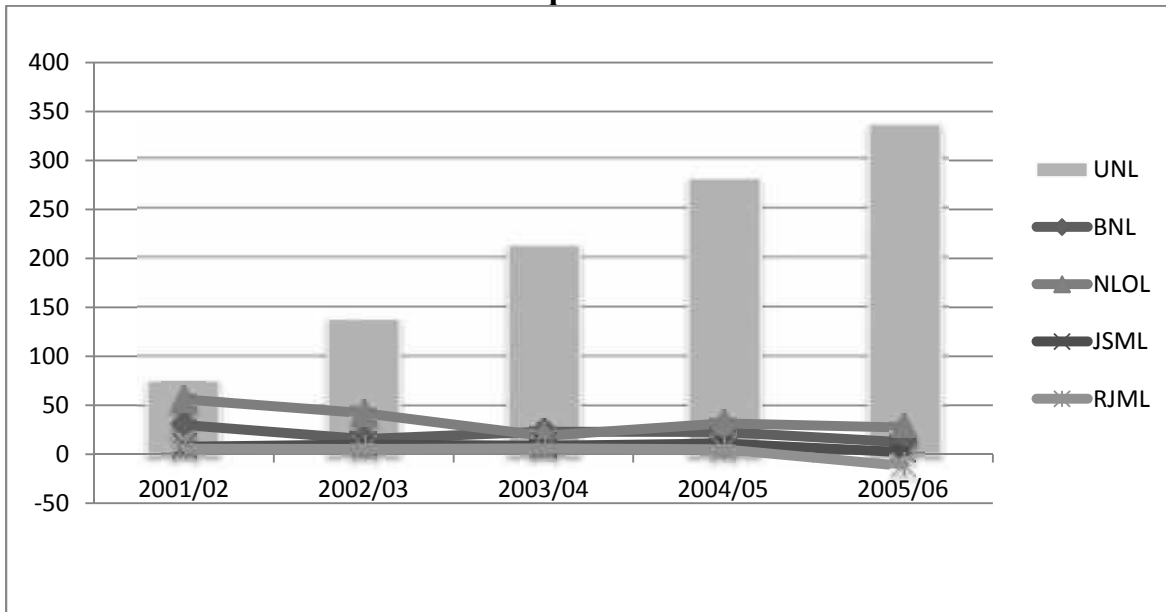
The overall capitalization rates of UNL are 75.182, 137.554, 212.413, 279.639 and 334.784 during the study period of 2001/02 to 2005/06 respectively. Besides in 2001/02, the above table shows that the overall capitalization rate of BNL is increasing.

The overall capitalization rates of NLOL are 56.086, 41.977, 18.860, 31.411 and 27.153 during the study period of 2001/02 to 2005/06. The above data shows that the overall capitalization rate of NLOL is less in 2003/04, but other year NLOL has highly increased its overall capitalization rate which is 56.086. Then its overall capitalization rate is being ups and downs.

The overall capitalization rate of JSML is less in comparison with other three manufacturing companies like BNL, UNL and NLOL during the study period of 2001/02 to 2005/06. The overall capitalization rates of JSML are 7.551, 10.018, 8.540, 11.033 and 2.16 during the study period of 2001/02 to 2005/06 respectively.

The overall capitalization rate of RJML is lower than the other four manufacturing companies like BNL, UNL, NLOL and JSML. The overall capitalization rates of RJML are 5.517, 5.189, 5.849, 5.130 and -12.016 during the period of 2001/02 to 2005/06.

Figure No. 4.8
Overall Capitalization Rate



Equity Capitalization Rate (K_e)

Equity is one of the sources of capital, which has its own cost and it is known as cost of Equity (K_e). A large amount of equity means the higher amount of K_e . In this study equity capitalization rate is calculated as EBT divided by the market value of shares as shown in the following table.

Table No. 4.9
Equity Capitalization Rate

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	29.491	61.481	37.916	-25.906	3.369
2002/03	15.278	134.728	27.124	-2.730	2.885
2003/04	23.094	210.472	1.946	4.546	3.967
2004/05	22.513	277.722	19.510	13.294	2.773
2005/06	11.601	332.841	11.137	-21.079	-10.024
Average	20.395	203.449	19.527	-6.375	0.594

Source: Appendix - 14

The above table shows that the equity capitalization rate of BNL are 29.491, 15.278, 23.094, 22.513 and 11.601 during the study period of 2001/02 to 2005/06 respectively. The average equity capitalization rate of BNL is 20.395. The above values show the equity capitalization rate in the year 2005/06 is lower than average.

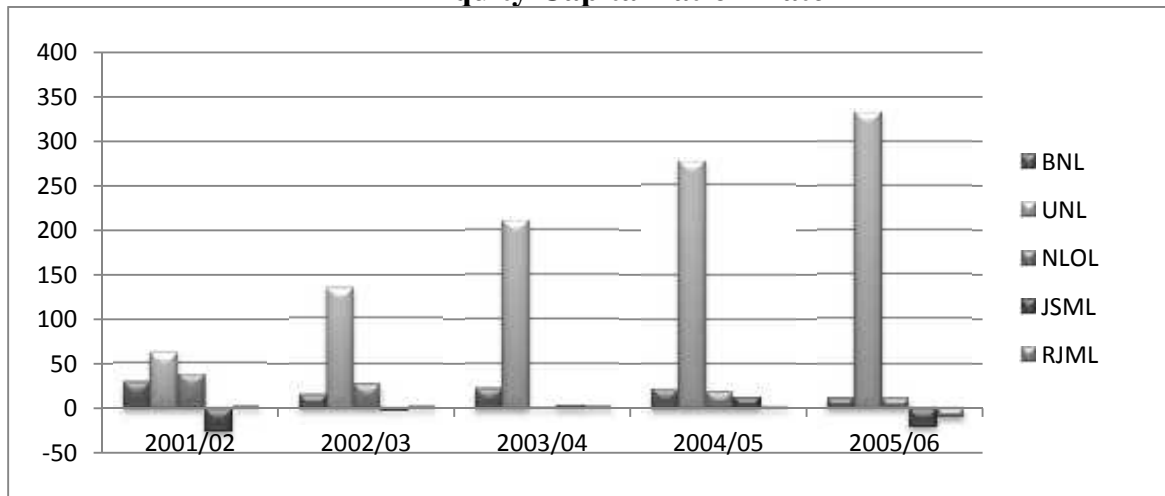
The equity capitalization rate of UNL is very high. The rates are 61.481, 134.728, 210.472, 277.722 and 332.841 during the study period of 2001/02 to 2005/06 respectively. The above values show that there is increasing rate of equity capitalization rate except in 2001/02.

The equity capitalization rate of NLOL in 2003/04 is very low due to the value of EBT. The equity capitalization rates of NLOL are 37.916, 27.124, 1.946, 9.510 and 11.137 during the study period of 2001/02 to 2005/06.

The equity capitalization rates of JSML are negative during the study period of 2001/02, 2002/03 to 2005/06 due to the negative value of EBT.

The equity capitalization rates of RJML are 3.369, 2.885, 3.967, 2.773 and -10.024 during the study period of 2001/02 to 2005/06 respectively. The above values show that the equity capitalization rates of RJML are being slightly ups and downs.

Figure No. 4.9
Equity Capitalization Rate



4.7 Analysis of Financial Leverage Ratio

As already mention in chapter two, financial leverage result from the presence of fixed cost in the firm's income stream. It is the use of another person's money in return for a fixed payment and promise to return money. Thus, degree of financial leverage of five manufacturing company is calculated simply dividing EBIT by EBT and presented in the following table.

Table No. 4.10
Degree of Financial Leverage

Year	BNL	UNL	NLOL	JSML	RJML
2001/02	1.011	1.223	1.479	-1.087	2.335
2002/03	1.009	1.021	1.548	-14.527	2.561
2003/04	1.000	1.009	9.689	7.834	1.957
2004/05	1.006	1.007	1.610	3.372	2.503
2005/06	1.043	1.006	1.695	-0.427	1.353
Average	1.0138	1.0532	3.2042	-0.967	2.1418
S.D ()	0	0.085	3.243	7.489	0.447
C.V (%)	0	8.06	101.22	-774.51	20.88

Source: Appendix - 15

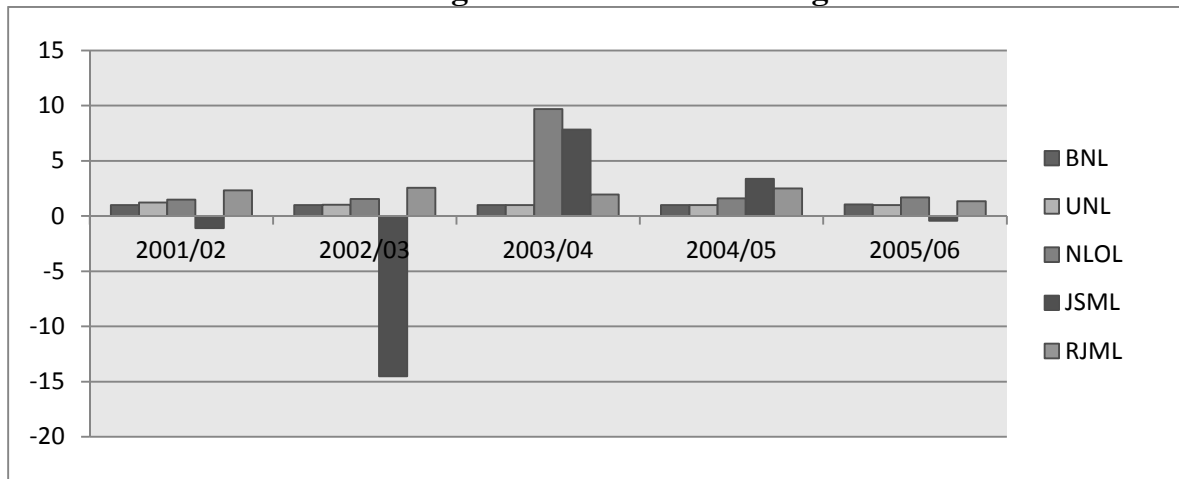
Above table shows the degree of financial leverage of five manufacturing companies. The financial leverage of BNL is 1:1 ratio through a study period. The company has used the long term debt in year 2005/06. So, its financial leverage is irregular. C.V of this company also reflects the highly consistent in nature. Its average degree of financial leverage and C.V are 0 and 0% respectively.

Similarly the degree of financial leverage of UNL has slightly constant. This company has also not used the long term debt. Its average ratio and C.V are 0.085 and 8.06% which indicates that the degree of financial leverage of UNL is consistent in nature. The degree of financial leverage of NLOL has highly fluctuated during the study period. NLOL has also not used the long term debt. The average ratio is 1.0532 while C.V has 101.22%. This C.V clearly shows the degree of financial leverage of NLOL is inconsistent in nature.

The degree of financial leverage of JSML is highly fluctuated. Its average ratio is - 0.967 and its C.V is -774.51%. This value also clearly shows that the ratio is inconsistent.

The average degree of financial leverage of RJML is 2.1418 and C.V has 20.88%. This value shows that the degree of financial leverage of RJML is inconsistent in nature.

Figure No. 4.10
Degree of Financial Leverage



4.8 Correlation Analysis

Correlation is a useful tool in determining the degree of relationship between two variables. In other word, correlation analysis is the statistical tool, generally used to describe the degree of own variable, which is related to another. The relationship of own variable is usually assumed to be linear ones.

1. Karl Pearson's Coefficient of correlation measures the relationship between two variables. It is denoted by ' r '. In the present context, the coefficient is used to examine the relationship between two variables.
2. Probable Error: The probable error of coefficient of correlation helps in interpreting the value and measures the reliability of the coefficient of correlation.

When the value of ' r ' is less than probable error, then it is not evidence of correlation and if the value of correlation ' r ' is greater than probable error there is evidence of correlation. Karl Pearson's coefficient of correlation and probable error of long term debt and net worth is used for the analysis of correlation coefficient. The calculation is presented on the following table.

Table No. 4.11
Correlation Coefficient

	BNL	UNL	NLOL	JSML	RJML
R	0	-	-	-0.36	-0.1182
Probable Error	0.302	-	-	0.262	0.297
6 × P.E	1.812	-	-	1.575	1.782

Source: Appendix -16

From the above table, we can say that correlation coefficient and PE of UNL and NLOL are zero. There is no long term debt in two companies. So, we can not calculate the correlation coefficient and PE between long term debt and net worth.

The correlation coefficient for the BNL is 0. This means that there is low degree of relationship. The increase in long term debt of BNL decreases the net worth of BNL by 0% and vice-versa. Since 'r' is less than 6 times PE, the value of 'r' is insignificant.

The correlation coefficient for the JSML is -0.36. This means that there is low degree of negative relationship. The increase in long term debt of JSML decreases the net worth of JSML by 36% and vice-versa. Since 'r' is less than 6 times PE, the value of 'r' is insignificant.

Similarly, the correlation coefficient of RJML is -0.1182 which indicates that there is also low degree of negative relationship. The increase in long term debt of RJML decreases the net worth of RJML by 11.82% and vice-versa. Since 'r' is less than 6 times PE, the value of 'r' is insignificant.

4.9 Regression Analysis

The concept of regression was first introduced by Francis Galton. Regression refers to an analysis, which is involving the fitting of an equation to a set of data points, generally by the method of least square.

In other words, the regression is a statistical method for investigating relationships between the variables by the establishment of an approximate functional between them. It is considered as a useful tool for determining the strength of relationship between two (Simple Regression) or more (Multiple regression) variables. It helps to predict or estimate the value of one variable when the value of other variables is known.

(I) Simple regression

The analysis, which is used to explain the average relationship between two variables, is known as simple linear regression analysis. In this study, the following simple regression has been analyzed.

4.9.1 Regression Analysis of Long term Debt to Shareholder's Equity

Table No. 4.12
Regression Analysis of Long term Debt to Shareholder's Equity

Company	No. of observation (n)	Constant (a)	Regression Coefficient (b)
BNL	1	72	0
JSML	5	1841.564	-6.549
RJML	5	-20.746	0.436

Source: Appendix -17

The above table depicts the output of simple regression analysis of LTD on Shareholder's Equity of three companies' viz. BNL, JSML and RJML. In three companies, beta coefficients are 0, -6.549 and 0.436 respectively. In case of JSML, beta coefficient is -6.549, which indicates that one million increase in Shareholder's equity (independent variable) leads to about 6.549 million decrease in LTD, (dependent variable), holding other variables constant. The constant (a) 1841.564, which means that if shareholder's equity is zero and the estimate LTD, will be 1841.564.

In case of BNL, the beta coefficient is 0, which indicates one million increase in Shareholder's equity leads to an average about 0 million decrease in LTD, holding other variables constant. The constant (a) is 72, which means that if the Shareholder's equity is zero, and then the estimated LTD will be 72.

In case of RJML, the beta coefficient is 0.436, which indicates one million increases in Shareholder's equity leads to an average about 4.36 million decrease in LTD, holding other variables constant. The constant (a) is -20.746, which means that if the Shareholder's equity is zero, and then the estimated LTD will be 20.476.

4.9.2 Regression Analysis of Total Debt to Long term Debt

Table No. 4.13
Regression Analysis of Total Debt to Long term Debt

Company	No. of observation (n)	Constant (a)	Regression Coefficient (b)
BNL	1	266.89	0
JSML	5	204.67	0.979
RJML	5	183.229	1.032

Source: Appendix -18

The above table is the collection of major output of simple regression analysis of total capital on LTD of three companies. Regression coefficient in the case of BNL is zero. Which indicates that one million increase in LTD leads to an average of about 0 million increase in total capital, holding other variable constant. The constant (a) is 266.89, which means that if LTD is zero, and then the estimated total capital will be 266.89.

Regression coefficient in the case of JSML is 0.979, which indicates that one million increase in LTD leads to an average of about 0.997 million increase in total capital, holding other variable constant. The constant (a) is 204.67, which means that if LTD is zero, and then the estimated total capital will be 204.67.

Similarly, regression coefficient of RJML is 1.032, which indicates that one million increase in LTD leads to an average of about 1.032 million increases in total capital, holding other variable constant. The constant (a) is 183.229, which means that if the LTD is zero, and then the estimated total capital will be 183.229.

4.9.3 Regression Analysis of Earning before Interest and Tax (EBIT) on Interest

Table No. 4.14
Regression Analysis of Earning before Interest and Tax (EBIT) on Interest

Company	No. of observation (n)	Constant (a)	Regression Coefficient (b)
BNL	5	44.248	-4.558
UNL	5	253.789	-15.155
NLOL	5	1.83	1.673
JSML	5	52.48	0.1119
RJML	5	-114	16.18

Source: Appendix -19

The table above depicts the major output of simple regression analysis of EBIT on Interest of the concerned companies.

As far the regression of EBIT on Interest is concerned, the regression coefficient (beta coefficient) of BNL is -4.558. It indicates that one million increase in Interest leads to an average of 4.558 million increases in EBIT, holding other variable constant. The constant (a) is 44.248, which means that if Interest is zero, and then the estimated EBIT will be 44.248.

In case of UNL, the beta coefficient is -15.155, which indicates that one million increase in Interest leads to an average of 15.155 million decreases in EBIT, holding other variable constant. The constant (a) is 253.789, which means that if the Interest is zero, and then the estimated value of EBIT will be 253.789.

In case of NLOL, the beta coefficient is 1.673, which indicates that one million increase in Interest leads to an average of 1.673 million decreases in EBIT, holding other variables constant. The constant (a) is 1.83, which means that if the Interest is zero, and then the estimated value of EBIT will be 1.83.

In case of JSML, the beta coefficient is 0.1119, which indicates that one million increase in Interest leads to an average of 0.1119 million decreases in EBIT, holding other variables constant. The constant (a) is 52.48, which means that if the Interest is zero, and then the estimated value of EBIT will be 52.48.

Similarly the beta coefficient of RJML is 16.18, which indicates that one million increase in Interest leads to 16.18 million decreases in EBIT, holding other variables constant. The constant (a) is -114, which means that if the Interest is zero, and then estimated value of EBIT will be -114.

4.9.4 Regression Analysis of Net Profit on Sales

Table No. 4.15
Regression Analysis of Net Profit on Sales

Company	No. of observation (n)	Constant (a)	Regression Coefficient (b)
BNL	5	122.89	-0.147
UNL	5	-471.43	0.440
NLOL	5	-2.588	0.047
JSML	5	-249.81	0.323
RJML	5	48.58	-0.112

Source: Appendix -20

With respect to the above regression result of net profit on sales, the beta coefficient is -0.147 in the case of BNL. It indicates that one million increase in sales leads to an average of 0.147 million decrease in net profit. The constant (a) is 122.89, which means that if the sales are zero, and then the estimated net profit will be 122.89.

In the case of UNL, the beta coefficient is 0.440 which indicates that one million increase in sales leads to an average of 0.440 million increase in net profit. The constant (a) is -471.43, which means that if the value of sales is zero, the estimated net profit will be -471.43.

The beta coefficient is 0.047 in the context of NLOL. It indicates that one million increase in sales leads to an average of 0.047 million increase in net profit. The constant (a) is -2.588, which means that if the sales are zero, the estimated net profit will be -2.588.

In the case of JSML, the beta coefficient is 0.323, which indicates that one million increase in sales leads to an average of 0.323 million increase in net profit. The constant (a) is -249.81, which means that if the value of sales is zero, the estimated net profit will be -249.81

Similarly, the beta coefficient of RJML is -0.112, which indicates that one million increase in sales leads to an average of 0.112 million increase in net profit. The constant (a) is 48.58, which means that if the sales are zero, and then the estimated net profit will be 48.58.

4.10 Major Findings of the Study

- Debt Equity ratio analysis shows that debt equity ratio of UNL and NLOL are zero. These companies are highly unlevered. The average of debt equity ratio of BNL is 0.369 which indicate that BNL has lower long term Debt and the average debt equity ratio of JSML is 3.018 which indicates that JSML has higher long term debt and the average debt equity ratio of RJML is 0.3238 which indicates that RJML has lower long term debt.. At the same time C.V analysis helps us to conclude that three companies have consistent debt equity ratio.

- As far as Long term Debt to Total Capital ratio, UNL and NLOL have zero. The average value is 0.2698 which shows that equity value of BNL is lower long term debt. It means BNL is facing low risk. The average value is 0.7506 which shows that equity value of JSML is lower and higher long term debt. It means JSML is facing more risk. But in the case of RJML, the average value i.e. 0.239 shows that RJML, is using more equity than long term debt. C.V analysis concludes that JSML is more consistent than RJML and BNL.

- The data of Debt to Net worth ratio shows that average debt to net worth ratio of BNL is 0.389 which is very low. It has used only short term debt. Similarly UNL and NLOL have used only short term debt. C.V of BNL and NLOL shows its ratio is consistent in nature but the C.V of UNL shows consistent in nature. The average debt equity ratio of JSML (4.0556) is very high but of RJML (0.855) is very low. C.V shows that debt equity ratio of both companies are consistent in nature.

- On the basis of Interest coverage ratio, the average interest coverage ratio of BNL, UNL, NLOL, JSML and RJML are 2327.478, 96.353, 2.272, 0.867 and 0.654 respectively. The interest coverage ratio of BNL is very high in comparison with other four manufacturing companies. C.V analysis shows that BNL and UNL are more consistent in nature and other NLOL, JSML and RJML are also consistent in nature.

- Return on total assets ratio shows that the average ratio of JSML (-0.0162), which indicates that the financial condition of JSML is the worst among five manufacturing companies. C.V analysis also shows that the ratio is more inconsistent in nature. Rest of four manufacturing companies has also low return on total assets ratio which indicates that other companies have also not good financial condition. C.V analysis shows that BNL, UNL and RJML are consistent in nature but NLOL is more inconsistent in nature.

- The average profit margin ratio of BNL, UNL, NLOL and RJML are 0.0578, 0.098, 0.0246 and 0.0034 respectively which are very low. Therefore BNL, UNL and NLOL have to increase its LTD to increase their profit. JSML has negative (-0.0196) profit margin ratio which indicates worst condition of company among five companies. C.V analysis shows that BNL, UNL and RJML are consistent in nature but NLOL and JSML are inconsistent in nature.

- The average return on equity of UNL (1.528) is the highest among five manufacturing companies. BNL and NLOL have almost satisfactory result to the return to the equity share holders. But RJML (0.0046) has low return on equity. JSML has negative (-0.064) return on equity which indicates that the shareholders of JSML are facing worst situation. C.V analysis shows that BNL, UNL and RJML are consistent in nature but NLOL and JSML are inconsistent in nature.

- As far as overall Capitalization rate is concerned, data related to UNL shows that its average overall capitalization rate is very high i.e. 334.784. BNL, NLOL, JSML and RJML have low overall capitalization rate.

- The data of Equity capitalization analysis shows that average equity capitalization rate of UNL is very high (277.722) but JSML and RJML has negative (-21.079 & -10.024) equity capitalization rate. The other three BNL and NLOL also have low equity capitalization rate.

- The average of financial leverages of UNL and NLOL are 1.0532 and 3.2042 respectively. These two companies have not used long term debt and hence they have not been able to get the advantage of leverage firm. BNL has used the long term debt in year 2006/06. JSML has negative financial leverage which has high proportion of long term debt and short term debt. C.V analysis shows that BNL and UNL are consistent in nature but NLOL, JSML and RJML are inconsistent in nature.

- UNL and NLOL have not long term debt, so we can not calculate the correlation and Probable error between long term debt and net worth. The data of correlation coefficient of BNL between Long term debt and net worth is 0, which shows that there is low degree of relationship and insignificant. The data of correlation coefficient of JSML between Long term debt and net worth is -0.36, which shows that there is low degree of negative relationship and insignificant. Similarly, the correlation coefficient between long term debt and net worth is -0.1182 which indicates that correlation between long term debt and net worth is low degree of negative relationship and insignificant.

- As far as the simple regression analysis of BNL, long term debt on shareholders equity is concerned beta coefficient is zero. The simple regression analysis of JSML, long term debt on shareholders equity is concerned beta coefficient is negative. Similarly for RJML, beta coefficient of long term debt on shareholders equity indicates that long term debt decreases with the increase of shareholders equity.
- With respect to regression analysis of total debt on long term debt, the beta coefficients of BNL, JSML and RJML are 0, 0.979 and 1.032 respectively. The positive beta coefficients indicate that total debt increases with the increase of long term debt.
- From the regression analysis of EBIT on interest, beta coefficient of NLOL, JSML and RJML have positive but BNL and UNL has negative. The positive beta coefficient of EBIT on interest of, NLOL, JSML and RJML indicate that increase in interest leads to increase in EBIT but in the case of BNL and UNL increase in interest leads to decrease in EBIT.
- According to simple regression analysis of net profit on sales, the beta coefficient of BNL is negative which indicates that net profit decreases with the increase of sales. But the beta coefficient of UNL, NLOL, JSML and RJML have positive which indicates that increase in sales leads to increase in net profit.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

Financial matter is at the center of each and every organization whether it is trading concern or an industry, the combination of sources of financing structure and cost of capital are the major factor affecting the calculation of profitability and its financial strength. Capital structure management is the capital part of the optimum capital structure of the firm. The appropriate proportion of their different sources of financing in the capital structure of a firm that result in minimum cost of capital and maximum value is known as optimum cost of capital structure.

Considering time and resources constraint only five manufacturing companies namely BNL, UNL, NLOL, JSML and RJML have been selected as sample manufacturing companies in my study to fulfill the objectives of studying capital structure. The study period covers only last five fiscal years from 2001/02 to 2005/06. The available secondary data have been analyzed using various financial and statistical tools in this study. Therefore, the reliability of the conclusions of this study is determined on the accuracy of secondary data.

By this study, it is obvious that all five manufacturing companies namely BNL, UNL, NLOL, JSML and RJML are facing excess leverage ratio, low profitability and heavy accumulated loss. The researcher has taken problem as the capital structure problem and has undertaken the analysis of capital structure of five manufacturing companies.

5.2 Conclusion

The main conclusions of the study in respects of capital structure of the manufacturing companies are as follows.

- As the manufacturing companies has low debt equity ratio, it implies greater claims of owner than creditors. UNL and NLOL have no long term debt. Total financing is done by equity shares and short term debt. A high portion of equity provides a large margin of safety for them. BNL have low debt equity ratio. JSML have more debt equity ratio. From the shareholders point of view, it is not better. RJML has low debt equity ratio. It means that there is a disadvantage during the good economic position.
- Long term debt to total capital ratio of UNL and NLOL are zero. They have not used long term debt but they have been taking risk by using the short term debt only. BNL has used low long term debt. JSML has used more long term debt but RJML has used lower long term debt. From the findings of three companies, They have no sound financial condition.
- The debt to net worth ratio of UNL and NLOL are very low because of using short term debt only. It is very difficult to operate the company. BNL has low debt to net worth. JSML has high debt to net worth ratio but RJML has low which shows that all five manufacturing companies have not standard proportion of debt capital and equity capital.
- Average interest coverage ratio of BNL is very high which indicates that it is able to pay their interest from the EBIT. UNL's interest coverage ratio indicates that there is still the debt bearing capacity of the company. But, NLOL, JSML and RJML have very low interest coverage ratio due to the low operating profit. So, they are unable to pay their interest from the EBIT.

- Return on total assets of JSML is negative which indicates that interest on debt exceeds net profit. It has happened due to high proportion of long term debt. Other four manufacturing companies have very low return on total assets ratio, which indicates that these companies have been gaining low profit in comparison with their total assets.
- Profit margin ratio of BNL, UNL, NLOL and RJML are very low. These four companies are unable to get more profit from their sales. JSML has negative profit margin ratio which means that it is suffered from loss.
- The average return on equity of UNL is highest among five manufacturing companies which show that UNL have been paying well return to the equity share holders. BNL, NLOL and RJML have low return on equity but JSML has negative return on equity and the equity shareholders of JSML are suffered from no return.
- All companies have higher overall capitalization rate and equity capitalization rate than return on equity and return on assets which indicates that it is not better and efficient to increase profitability of these companies.
- Due to the no use of long term debt, UNL and NLOL have not been able to get the advantage of leverage firm. The negative financial leverage of JSML indicates that debt is not adequate to generate extra profit through the leverage advantage.
- The correlation between long term debt and net worth is negative for JSML and RJML. It means that debt to net worth moves in opposite direction. Other three have no long term debt, so there is no any relationship between long term debt and net worth.

- The regression analysis of long term debt on shareholders equity show that long term debt decreases with the increase of shareholder's equity in both JSML and RJML. But, with respect to the regression analysis of total debt on long term debt show that increase in long term debt leads to increase in total debt.
- The regression analysis of EBIT on interest, the negative beta coefficient indicates that increase in interest leads to decrease in EBIT in four manufacturing companies i.e. NLOL, JSML and RJML but in the case of BNL and UNL, EBIT will increase due to the increase of interest.
- According to the regression analysis of net profit on sales, the positive beta coefficient of UNL, BNL, JSML and RJML, net profit can be increased due to the increase of sales but in the case of BNL, it will decrease with the increase of sales.

5.3 Recommendation

In this section of the study it activities to recommend some points that can be helpful to stakeholders as well as to the BNL, UNL, NLOL, JSML and RJML, company which are based on the above done calculations and drawn conclusions. These recommendations are guidelines, which would be helpful in taking prompt and be proved milestone for the future handling and improvement of the companies.

- All five manufacturing companies have fluctuating capital structure. So that it is recommended that they should try to make consistency in capital structure.
- All five manufacturing companies should go for expansion by researching the profitable opportunities and increasing the capital in the capital structure.

- Nepalese manufacturing companies should be designed be appropriate capital structure in order to maximize shareholders wealth and minimize the cost of capital.
- Among five manufacturing companies, UNL and NLOL do not use long term debt. For the operation of a manufacturing company, long term debt is required. These two companies have to use long term debt. BNL has lower long term debt. This company should increase the long term debt. JSML has maximum long term debt. Financial risk will be created by long term debt. So, this company has to reduce in long term debt. RJML has lower long term debt. This company should increase the long term debt.
- Coefficient of variation of different ratios of these five manufacturing companies is high. It indicates that there is a greater risk under the industrial sector. Manufacturing companies must minimize the industrial risk.
- These five manufacturing companies have very low net profit; it is not better sign of industrial sector. They should increase the financial management expertise, efficiency, effectiveness, and skills to utilize the debt for the better performance to increase the profit by the debt management.
- These five companies are failed to pay interest from the EBIT. Interest charge is very high as compare to their EBIT. So, these companies try to finance from low interest financial sector.
- BNL, UNL, NLOL and RJML should try to increase leverage position of the company but JSML should try to maintain leverage position.

- These five manufacturing companies should seek low cost debt in order to minimize the interest charge and increase debt servicing capacity.
- Proper analysis and evaluation of capital mix decision should be required for these three companies.
- Expansion and investment should be done by the debt capital with the lower cost and risk to increase the return to equity shareholders.
- Capital investment should be increased to increase the production and the return to equity shareholders by employing the debt capital for the return to be greater than overall cost of capital.
- All manufacturing companies should search and find profitable, sound and potential investment opportunities.
- Nepal has become the full member of WTO. Therefore, Nepal has to adopt various norms and values of international trade as specified by WTO. The liberal terms and conditions of international trade and tariff must be followed by Nepal as a member of WTO. This condition will create many challenges that should be faced by the Nepalese industries. Therefore, BNL, UNL, NLOL, JSML and RJML should make their management efficient and tactful to cope with the perspective challenges and grasp the opportunities.

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APPENDIX 1**BOTTLERS NEPAL LIMITED****'In million'**

Year (A.D)	2001/02	2002/03	2003/04	2004/05	2005/06
Year (B.S)	2058/59	2059/60	2060/61	2061/62	2062/63
Equity	194.89	194.89	194.89	194.89	194.89
Long term debt	-	-	-	-	72.00
Current Liabilities	340.11	332.849	174.022	228.989	275.483
Total Debt (LTD+CL)	340.11	332.849	174.022	228.989	347.483
Fixed Assets	529.618	494.225	438.724	422.107	612.308
Current Assets	506.425	544.183	447.831	553.157	436.045
Total Assets (FA + CA)	1036.04	1038.41	886.55	975.264	1048.353
EBIT	58.138	30.059	45.012	44.141	32.292
Interest	0.663	0.284	0.004	0.265	1.329
EBT	57.475	29.775	45.008	43.876	30.963
Profit	48.610	25.672	37.800	34.735	24.962
Net Worth	695.931	705.559	727.154	761.889	776.57
Sales	535.494	609.654	632.114	614.739	621.827
Shareholder's Fund	695.931	705.559	727.154	761.889	776.570

APPENDIX 2**UNILEVER NEPAL LIMITED****'In million'**

Year (A. D)	2001/02	2002/03	2003/04	2004/05	2005/06
Year (B.S)	2058/59	2059/60	2060/61	2061/62	2062/63
Equity	92.07	92.07	92.07	92.07	92.07
Long term debt	-	-	-	-	-
Current Liabilities	223.210	426.450	543.705	882.022	742.232
Total Debt (LTD+CL)	223.210	426.450	543.705	882.022	742.232
Fixed Assets	172.20	194.996	215.474	207.544	225.54
Current Assets	399.136	589.884	724.244	891.414	741.61
Total Assets (FA + CA)	571.33	784.88	939.72	1098.95	967.15
EBIT	69.22	126.646	195.569	257.464	308.236
Interest	12.614	2.602	1.787	1.765	1.789
EBT	56.606	124.044	193.782	255.699	306.447
Profit	42.60	93.16	140.78	189.20	238.156
Net Worth	348.125	358.43	396.013	216.933	224.914
Sales	1236.052	1244.73	1524.901	1481.560	1469.68
Shareholder's Fund	348.125	358.43	396.013	216.933	224.914

APPENDIX 3**NEPAL LUBE OIL LIMITED****'In million'**

Year (A.D)	2001/02	2002/03	2003/04	2004/05	2005/06
Year (B.S)	2058/59	2059/60	2060/61	2061/62	2062/63
Equity	20.292	20.292	20.292	20.292	20.292
Long term debt	-	-	-	-	-
Current Liabilities	74.765	105.400	76.092	87.401	105.66
Total Debt (LTD+CL)	74.765	105.400	76.092	87.401	105.66
Fixed Assets	18.348	20.253	18.613	17.040	15.32
Current Assets	93.484	123.078	96.493	110.153	130.09
Total Assets (FA + CA)	111.833	143.331	115.107	127.195	145.41
EBIT	11.381	8.518	3.827	6.374	5.51
Interest	3.687	3.014	3.432	2.415	3.25
EBT	7.694	5.504	0.395	3.959	2.26
Profit	6.216	4.238	0.305	3.058	1.74
Net Worth	38.600	39.696	40.757	40.771	40.946
Sales	136.004	119.151	84.712	118.103	148.75
Shareholder's fund	38.600	39.696	40.757	40.771	40.946

APPENDIX 4**JYOTI SPINNING MILLS LIMITED****'In million'**

Year (A.D)	2001/02	2002/03	2003/04	2004/05	2005/06
Year (B.S)	2058/59	2059/60	2060/61	2061/62	2062/63
Equity	193.844	193.844	193.844	190.784	190.185
Long term debt	529.469	573.735	614.476	584.377	602.378
Current Liabilities	339.043	289.671	237.910	153.913	74.71
Total Debt (LTD+CL)	868.512	863.406	852.386	738.29	677.088
Fixed Assets	548.499	508.041	482.313	456.476	443.22
Current Assets	240.078	264.236	278.561	291.352	278.49
Total Assets (FA+CA)	788.577	772.277	760.874	747.828	721.71
EBIT	54.615	76.879	69.03	85.523	17.13
Interest	104.832	82.171	60.218	60.160	57.22
EBT	-50.217	-5.292	8.812	25.363	-40.09
Profit	-50.217	-5.292	8.812	25.363	-40.09
Net Worth	193.844	193.844	193.844	190.784	190.18
Sales	646.743	725.037	718.949	855.324	730.879
Shareholder's fund	193.844	193.844	193.844	190.784	190.18

APPENDIX 5**RAGHUPATI JUTE MILLS LIMITED****'In million'**

Year (A.D)	2001/02	2002/03	2003/04	2004/05	2005/06
Year (B.S)	2058/59	2059/60	2060/61	2061/62	2062/63
Equity	180.696	180.696	180.696	180.696	180.67
Long term debt	76.949	76.622	59.209	63.833	23.28
Current Liabilities	58.041	44.742	59.075	67.362	258.52
Total Debt (LTD+CL)	134.99	121.364	118.284	131.195	281.8
Fixed Assets	231.417	226.631	227.006	224.500	320.897
Current Assets	80.510	76.410	80.125	100.553	136.654
Total Assets (FA+CA)	311.927	303.041	307.131	325.053	457.551
EBIT	14.215	13.353	14.033	12.545	-24.507
Interest	8.127	8.139	6.864	7.534	6.397
EBT	6.088	5.214	7.169	5.011	-18.11
Profit	5.337	4.740	7.169	5.011	-18.11
Net Worth	180.696	181.676	188.846	193.857	180.67
Sales	422.386	366.663	382.384	482.443	477.86
Shareholder's fund	180.696	181.676	188.846	193.857	180.67

APPENDIX – 6

Calculation of Debt Equity Ratio of BNL

Year	Long term debt	Shareholder's equity	Ratio
2005/06	72.00	194.89	0.369

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2005/06	0.369	0.136
	$\sum X = 0.369$	$\sum X^2 = 0.136$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.369}{1} = 0.369$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.136}{1} - \left(\frac{0.369}{1}\right)^2} = \sqrt{0.136 - 0.136} = 0$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0}{0.369} \times 100\% = 0\%$$

Calculation of Debt Equity Ratio of JSML

Year	Long term debt	Shareholder's equity	Ratio
2001/02	529.469	193.844	2.731
2002/03	573.735	193.844	2.960
2003/04	614.476	193.844	3.170
2004/05	584.377	190.784	3.063
2005/06	602.378	190.185	3.167

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	2.731	7.458
2002/03	2.960	8.762
2003/04	3.170	10.049

2004/05	3.063	9.382
2005/06	3.167	10.029
	$\sum X = 15.091$	$\sum X^2 = 45.68$

$$\bar{X} = \frac{\sum X}{n} = \frac{15.091}{5} = 3.018$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{45.68}{5} - \left(\frac{15.091}{5}\right)^2} = \sqrt{9.136 - 9.109} = 0.16$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.16}{3.018} \times 100\% = 5.44\%$$

Calculation of Debt Equity Ratio of RJML

Year	Long term debt	Shareholder's equity	Ratio
2001/02	76.949	180.696	0.426
2002/03	76.622	181.676	0.422
2003/04	59.209	188.846	0.313
2004/05	63.833	193.857	0.329
2005/06	23.28	180.67	0.129

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.426	0.181
2002/03	0.422	0.178
2003/04	0.313	0.098
2004/05	0.329	0.108
2005/06	0.129	0.017
	$\sum X = 1.619$	$\sum X^2 = 0.582$

$$\bar{X} = \frac{\sum X}{n} = \frac{1.619}{5} = 0.3238$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.582}{5} - \left(\frac{1.619}{5}\right)^2} = \sqrt{0.1164 - 0.1048} = 0.1077$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.1077}{0.3238} \times 100\% = 33.26\%$$

APPENDIX - 7

Calculation of long term debt to Total Capital Ratio - BNL

Year	Long term debt	Total Capital	Ratio
2005/06	72.00	266.89	0.2698

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X²
2005/06	0.2698	0.0728
	$\sum X = 0.2698$	$\sum X^2 = 0.0728$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.2698}{1} = 0.2698$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0728}{1} - \left(\frac{0.2698}{1}\right)^2} = \sqrt{0.0728 - 0.0728} = 0$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0}{0.2698} \times 100\% = 0\%$$

Calculation of long term debt to Total Capital Ratio - JSML

Year	Long term debt	Total Capital	Ratio
2001/02	529.469	723.313	0.732
2002/03	573.735	767.579	0.747
2003/04	614.476	808.320	0.760
2004/05	584.377	775.161	0.754
2005/06	602.378	792.563	0.760

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X²
2001/02	0.732	0.536
2002/03	0.747	0.558
2003/04	0.760	0.578
2004/05	0.754	0.568
2005/06	0.760	0.578
	$\sum X = 3.753$	$\sum X^2 = 2.818$

$$\bar{X} = \frac{\sum X}{n} = \frac{3.753}{5} = 0.7506$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{2.818}{5} - \left(\frac{3.753}{5}\right)^2} = \sqrt{0.5636 - 0.5634} = 0.014$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.014}{0.7506} \times 100\% = 1.865\%$$

Calculation of long term debt to Total Capital Ratio - RJML

Year	Long term debt	Total Capital	Ratio
2001/02	76.949	257.645	0.299
2002/03	76.622	258.298	0.297
2003/04	59.209	248.055	0.239
2004/05	63.833	257.69	0.248
2005/06	23.28	203.95	0.114

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.299	0.089
2002/03	0.297	0.088
2003/04	0.239	0.057
2004/05	0.248	0.061
2005/06	0.114	0.013
	$\sum X = 1.197$	$\sum X^2 = 0.308$

$$\bar{X} = \frac{\sum X}{n} = \frac{1.197}{5} = 0.239$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.308}{5} - \left(\frac{1.197}{5}\right)^2} = \sqrt{0.0616 - 0.0573} = 0.023$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.065}{0.239} \times 100\% = 27.20\%$$

APPENDIX – 8

Calculation of Total Debt to Net worth Ratio – BNL

Year	Total Debt	Net worth	Ratio
2001/02	340.11	695.931	0.489
2002/03	332.849	705.559	0.472
2003/04	174.022	727.154	0.239
2004/05	228.989	761.889	0.300
2005/06	347.483	776.57	0.447

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.489	0.239
2002/03	0.472	0.223
2003/04	0.239	0.057
2004/05	0.300	0.090
2005/06	0.447	0.199
	∑ X = 1.947	∑ X ² = 0.808

$$\bar{X} = \frac{\sum X}{n} = \frac{1.947}{5} = 0.389$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.808}{5} - \left(\frac{1.947}{5}\right)^2} = \sqrt{0.1616 - 0.1516} = 0.1$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.1}{0.389} \times 100\% = 25.707\%$$

Calculation of Total Debt to Net worth Ratio - UNL

Year	Total Debt	Net worth	Ratio
2001/02	223.210	348.125	0.641
2002/03	426.450	358.430	1.190
2003/04	543.705	396.013	1.373
2004/05	882.022	216.933	4.066
2005/06	742.232	224.914	3.300

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.641	0.411

2002/03	1.190	1.416
2003/04	1.373	1.885
2004/05	4.066	16.532
2005/06	3.300	10.89
	$\sum X = 10.57$	$\sum X^2 = 31.134$

$$\bar{X} = \frac{\sum X}{n} = \frac{10.57}{5} = 2.114$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{31.134}{5} - \left(\frac{10.57}{5}\right)^2} = \sqrt{6.2268 - 4.4689} = 1.3258$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{1.3258}{2.114} \times 100\% = 62.71\%$$

Calculation of Total Debt to Net worth Ratio - NLOL

Year	Total Debt	Net worth	Ratio
2001/02	74.765	38.600	1.937
2002/03	105.400	39.696	2.655
2003/04	76.092	40.757	1.867
2004/05	87.401	40.771	2.144
2005/06	105.66	40.946	2.580

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	1.937	3.752
2002/03	2.655	7.049
2003/04	1.867	3.486
2004/05	2.144	4.597
2005/06	2.580	6.656
	$\sum X = 11.183$	$\sum X^2 = 25.54$

$$\bar{X} = \frac{\sum X}{n} = \frac{11.183}{5} = 2.2366$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{25.54}{5} - \left(\frac{11.183}{5}\right)^2} = \sqrt{5.1085 - 5.0024} = 0.3257$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.3257}{2.2366} \times 100\% = 14.562\%$$

Calculation of Total Debt to Net worth Ratio - JSML

Year	Total Debt	Net worth	Ratio
2001/02	868.512	193.844	4.480
2002/03	863.406	193.844	4.454
2003/04	852.386	193.844	4.397
2004/05	738.29	190.784	3.870
2005/06	677.088	190.18	3.560

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	4.480	20.070
2002/03	4.454	19.838
2003/04	4.397	19.334
2004/05	3.870	14.977
2005/06	3.560	12.673
	Σ X = 20.278	Σ X ² = 86.892

$$\bar{X} = \frac{\sum X}{n} = \frac{20.278}{5} = 4.0556$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{86.892}{5} - \left(\frac{20.278}{5}\right)^2} = \sqrt{17.3784 - 16.4478} = 0.9646$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.9646}{4.0556} \times 100\% = 23.78\%$$

Calculation of Total Debt to Net worth Ratio – RJML

Year	Total Debt	Net worth	Ratio
2001/02	134.99	180.696	0.747
2002/03	121.364	181.676	0.668
2003/04	118.284	188.846	0.626
2004/05	131.195	193.857	0.677
2005/06	281.8	180.67	1.559

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
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2001/02	0.747	0.558
2002/03	0.668	0.446
2003/04	0.626	0.392
2004/05	0.677	0.458
2005/06	1.559	2.430
	$\sum X = 4.277$	$\sum X^2 = 4.284$

$$\bar{X} = \frac{\sum X}{n} = \frac{4.277}{5} = 0.855$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{4.284}{5} - \left(\frac{4.277}{5}\right)^2} = \sqrt{0.8568 - 0.7317} = 0.353$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.353}{0.855} \times 100\% = 41.28\%$$

APPENDIX - 9

Calculation of Interest Coverage Ratio - BNL

Year	EBIT	Interest	Ratio
2001/02	58.138	0.663	87.689
2002/03	30.059	0.284	105.841
2003/04	45.012	0.004	11253
2004/05	44.141	0.265	166.57
2005/06	32.292	1.329	24.29

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	87.689	7689.361
2002/03	105.841	11202.317
2003/04	11253	126630009
2004/05	166.57	27745.565
2005/06	24.29	590.004
	$\sum X = 11637.39$	$\sum X^2 = 126677236.247$

$$\bar{X} = \frac{\sum X}{n} = \frac{11637.39}{5} = 2327.478$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{126677236.247}{5} - \left(\frac{11637.39}{5}\right)^2}$$

$$= \sqrt{25335447.249 - 5417153.840} = 4462.991$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{4462.991}{2327.478} \times 100\% = 191.752\%$$

Calculation of Interest Coverage Ratio - UNL

Year	EBIT	Interest	Ratio
2001/02	69.22	12.614	5.487
2002/03	126.646	2.602	48.672
2003/04	195.569	1.787	109.440
2004/05	257.464	1.765	145.872
2005/06	308.236	1.789	172.295

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	5.487	30.107
2002/03	48.672	2368.963
2003/04	109.440	11977.114
2004/05	145.872	21278.640
2005/06	172.295	29685.567
	$\sum X = 481.766$	$\sum X^2 = 65340.391$

$$\bar{X} = \frac{\sum X}{n} = \frac{481.766}{5} = 96.353$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{65340.391}{5} - \left(\frac{481.766}{5}\right)^2} = \sqrt{13128.078 - 9283.707} = 62.002$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{62.002}{96.353} \times 100\% = 64.349\%$$

Calculation of Interest Coverage Ratio – NLOL

Year	EBIT	Interest	Ratio
2001/02	11.381	3.687	3.087
2002/03	8.518	3.014	2.826
2003/04	3.827	3.432	1.115

2004/05	6.374	2.415	2.639
2005/06	5.51	3.25	1.695

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	3.087	9.529
2002/03	2.826	7.986
2003/04	1.115	1.243
2004/05	2.639	6.964
2005/06	1.695	2.873
	$\sum X = 11.362$	$\sum X^2 = 28.325$

$$\bar{X} = \frac{\sum X}{n} = \frac{11.362}{5} = 2.272$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{28.325}{5} - \left(\frac{11.362}{5}\right)^2} = \sqrt{5.665 - 5.163} = 0.708$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.708}{2.272} \times 100\% = 31.18\%$$

Calculation of Interest Coverage Ratio – JSML

Year	EBIT	Interest	Ratio
2001/02	54.615	104.832	0.521
2002/03	76.879	82.171	0.935
2003/04	69.03	60.218	1.146
2004/05	85.523	60.160	1.421
2005/06	17.13	57.22	0.299

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.521	0.271
2002/03	0.935	0.874
2003/04	1.146	1.313
2004/05	1.421	2.019
2005/06	0.299	0.089
	$\sum X = 4.322$	$\sum X^2 = 4.566$

$$\bar{X} = \frac{\sum X}{n} = \frac{4.322}{5} = 0.864$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{4.566}{5} - \left(\frac{4.322}{5}\right)^2} = \sqrt{0.913 - 0.747} = 0.407$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.407}{0.864} \times 100\% = 47.15\%$$

Calculation of Interest Coverage Ratio – RJML

Year	EBIT	Interest	Ratio
2001/02	14.215	8.127	1.749
2002/03	13.353	8.139	1.641
2003/04	14.033	6.864	2.044
2004/05	12.545	7.534	1.665
2005/06	-24.507	6.397	-3.831

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	1.749	3.059
2002/03	1.641	2.693
2003/04	2.044	4.178
2004/05	1.665	2.772
2005/06	-3.831	14.676
	$\sum X = 3.268$	$\sum X^2 = 27.378$

$$\bar{X} = \frac{\sum X}{n} = \frac{3.268}{5} = 0.6536$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{27.378}{5} - \left(\frac{3.268}{5}\right)^2} = \sqrt{5.4756 - 0.4272} = 2.247$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{2.247}{0.6536} \times 100\% = 343.76\%$$

APPENDIX - 10

Calculation of Return on Total Assets Ratio - BNL

Year	Net Profit	Total Assets	Ratio
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2001/02	48.610	1036.04	0.047
2002/03	25.672	1038.41	0.025
2003/04	37.800	886.55	0.043
2004/05	34.735	975.264	0.036
2005/06	24.962	1048.353	0.024

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.047	0.0022
2002/03	0.025	0.0006
2003/04	0.043	0.0018
2004/05	0.036	0.0013
2005/06	0.024	0.0005
	$\sum X = 0.175$	$\sum X^2 = 0.0064$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.175}{5} = 0.035$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0064}{5} - \left(\frac{0.175}{5}\right)^2} = \sqrt{0.00128 - 0.00122} = 0.0077$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0077}{0.035} \times 100\% = 22\%$$

Calculation of Return on Total Assets Ratio - UNL

Year	Net Profit	Total Assets	Ratio
2001/02	42.60	571.336	0.074
2002/03	93.16	784.88	0.119
2003/04	140.78	939.718	0.150
2004/05	189.20	1098.958	0.172
2005/06	238.156	967.15	0.246

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.074	0.0055
2002/03	0.119	0.0142
2003/04	0.150	0.0225
2004/05	0.172	0.0296
2005/06	0.246	0.0606

	$\sum X = 0.761$	$\sum X^2 = 0.1324$
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$$\bar{X} = \frac{\sum X}{n} = \frac{0.761}{5} = 0.152$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.1324}{5} - \left(\frac{0.761}{5}\right)^2} = \sqrt{0.0265 - 0.0232} = 0.057$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.057}{0.152} \times 100\% = 37.79\%$$

Calculation of Return on Total Assets Ratio - NLOL

Year	Net Profit	Total Assets	Ratio
2001/02	6.216	111.833	0.055
2002/03	4.238	143.331	0.029
2003/04	0.305	115.107	0.003
2004/05	3.058	127.195	0.024
2005/06	1.74	145.41	0.0119

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.055	0.003
2002/03	0.029	0.001
2003/04	0.003	0.000009
2004/05	0.024	0.0006
2005/06	0.0119	0.0001
	$\sum X = 0.1229$	$\sum X^2 = 0.0047$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.1229}{5} = 0.0246$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0047}{5} - \left(\frac{0.1229}{5}\right)^2} = \sqrt{0.00094 - 0.0006} = 0.094$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.094}{0.0246} \times 100\% = 381.33\%$$

Calculation of Return on Total Assets Ratio - JSML

Year	Net Profit	Total Assets	Ratio
2001/02	-50.217	788.577	-0.064
2002/03	-5.292	772.277	-0.007
2003/04	8.812	760.874	0.011
2004/05	25.363	747.828	0.034
2005/06	-40.09	721.71	-0.055

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	-0.064	0.004
2002/03	-0.007	0.000049
2003/04	0.011	0.000121
2004/05	0.034	0.001156
2005/06	-0.055	0.0031
	$\sum X = -0.081$	$\sum X^2 = 0.0084$

$$\bar{X} = \frac{\sum X}{n} = \frac{-0.081}{5} = -0.0162$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0084}{5} - \left(\frac{-0.081}{5}\right)^2} = \sqrt{0.0017 - 0.00026} = 0.038$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.038}{-0.0162} \times 100\% = -234.24\%$$

Calculation of Return on Total Assets Ratio - RJML

Year	Net Profit	Total Assets	Ratio
2001/02	5.337	311.927	0.017
2002/03	4.740	303.041	0.016
2003/04	7.169	307.131	0.023
2004/05	5.011	325.053	0.015
2005/06	-18.11	457.551	-0.039

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.017	0.000289
2002/03	0.016	0.000256
2003/04	0.023	0.000529

2004/05	0.015	0.000225
2005/06	-0.039	0.00157
	$\sum X = 0.032$	$\sum X^2 = 0.00287$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.032}{5} = 0.0064$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.00287}{5} - \left(\frac{0.032}{5}\right)^2} = \sqrt{0.000574 - 0.0000409} = 0.0231$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0231}{0.0064} \times 100\% = 360.76\%$$

APPENDIX - 11
Calculation of Profit Margin Ratio - BNL

Year	Net Profit	Sales	Ratio
2001/02	48.610	535.494	0.091
2002/03	25.672	609.654	0.042
2003/04	37.800	632.114	0.060
2004/05	34.735	614.739	0.056
2005/06	24.962	621.827	0.040

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.091	0.008
2002/03	0.042	0.002
2003/04	0.060	0.004
2004/05	0.056	0.003
2005/06	0.040	0.0016
	$\sum X = 0.289$	$\sum X^2 = 0.0186$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.289}{5} = 0.0578$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0186}{5} - \left(\frac{0.289}{5}\right)^2} = \sqrt{0.00372 - 0.00334} = 0.019$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.019}{0.0578} \times 100\% = 33.72\%$$

Calculation of Profit Margin Ratio - UNL

Year	Net Profit	Sales	Ratio
2001/02	42.60	1236.052	0.034
2002/03	93.16	1244.73	0.075
2003/04	140.78	1524.901	0.092
2004/05	189.20	1481.560	0.128
2005/06	238.156	1469.68	0.162

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.034	0.001
2002/03	0.075	0.006
2003/04	0.092	0.008
2004/05	0.128	0.016
2005/06	0.162	0.026
	$\sum X = 0.491$	$\sum X^2 = 0.057$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.491}{5} = 0.098$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.057}{5} - \left(\frac{0.491}{5}\right)^2} = \sqrt{0.0114 - 0.00964} = 0.0419$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0419}{0.098} \times 100\% = 42.75\%$$

Calculation of Profit Margin Ratio – NLOL

Year	Net Profit	Sales	Ratio
2001/02	6.216	136.004	0.046
2002/03	4.238	119.151	0.035
2003/04	0.305	84.712	0.004
2004/05	3.058	118.103	0.026
2005/06	1.74	148.75	0.012

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.046	0.002
2002/03	0.035	0.001
2003/04	0.004	0.00002
2004/05	0.026	0.001

2005/06	0.012	0.00014
	$\sum X = 0.123$	$\sum X^2 = 0.00416$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.123}{5} = 0.0246$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.00416}{5} - \left(\frac{0.123}{5}\right)^2} = \sqrt{0.00083 - 0.00060} = 0.0152$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0152}{0.0246} \times 100\% = 61.78\%$$

Calculation of Profit Margin Ratio – JSML

Year	Net Profit	Sales	Ratio
2001/02	-50.217	646.743	-0.078
2002/03	-5.292	725.037	-0.007
2003/04	8.812	718.949	0.012
2004/05	25.363	855.324	0.030
2005/06	-40.09	730.879	-0.055

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	-0.078	0.00608
2002/03	-0.007	0.00005
2003/04	0.012	0.00014
2004/05	0.030	0.0009
2005/06	-0.055	0.00302
	$\sum X = -0.098$	$\sum X^2 = 0.010$

$$\bar{X} = \frac{\sum X}{n} = \frac{-0.098}{5} = -0.0196$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.010}{5} - \left(\frac{-0.098}{5}\right)^2} = \sqrt{0.002 - 0.00038} = 0.0402$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0402}{-0.0196} \times 100\% = -205.35\%$$

Calculation of Profit Margin Ratio – RJML

Year	Net Profit	Sales	Ratio
2001/02	5.337	422.386	0.013
2002/03	4.740	366.663	0.013
2003/04	7.169	382.384	0.019
2004/05	5.011	482.443	0.010
2005/06	-18.11	477.86	-0.038

Calculation of Standard Deviation (S.D) and C.V

Year	Ratio(X)	X ²
2001/02	0.013	0.000169
2002/03	0.013	0.000169
2003/04	0.019	0.000361
2004/05	0.010	0.0001
2005/06	-0.038	0.00144
	Σ X = 0.017	Σ X ² = 0.002239

$$\bar{X} = \frac{\sum X}{n} = \frac{0.017}{5} = 0.0034$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.002239}{5} - \left(\frac{0.017}{5}\right)^2} = \sqrt{0.000448 - 0.0000116} = 0.0208$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0208}{0.0034} \times 100\% = 611.76\%$$

APPENDIX - 12

Calculation of Return on Equity (ROE) – BNL

Year	Profit Margin	Total Assets Turnover	Equity Multiplier	ROE
2001/02	0.091	0.517	5.316	0.250
2002/03	0.042	0.587	5.328	0.131
2003/04	0.060	0.713	4.549	0.195
2004/05	0.056	0.630	5.004	0.176
2005/06	0.0401	0.593	5.379	0.128

Calculation of S.D and C.V of BNL

Year	ROE (X)	X ²
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2001/02	0.250	0.062
2002/03	0.131	0.017
2003/04	0.195	0.038
2004/05	0.176	0.031
2005/06	0.128	0.016
	$\Sigma X = 0.88$	$\Sigma X^2 = 0.164$

$$\bar{X} = \frac{\Sigma X}{n} = \frac{0.88}{5} = 0.176$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2} = \sqrt{\frac{0.164}{5} - \left(\frac{0.88}{5}\right)^2} = \sqrt{0.0328 - 0.0309} = 0.0436$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.0436}{0.176} \times 100\% = 24.77\%$$

Calculation of Return on Equity (ROE) – UNL

Year	Profit Margin	Total Assets Turnover	Equity Multiplier	ROE
2001/02	0.034	2.163	6.205	0.456
2002/03	0.075	1.586	8.525	1.014
2003/04	0.092	1.623	10.206	1.524
2004/05	0.128	1.348	11.936	2.059
2005/06	0.162	1.519	10.504	2.585

Calculation of S.D and C.V of UNL

Year	ROE (X)	X ²
2001/02	0.456	0.208
2002/03	1.014	1.028
2003/04	1.524	2.322
2004/05	2.059	4.239
2005/06	2.585	6.682
	$\Sigma X = 7.638$	$\Sigma X^2 = 14.479$

$$\bar{X} = \frac{\Sigma X}{n} = \frac{7.638}{5} = 1.528$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2} = \sqrt{\frac{14.479}{5} - \left(\frac{7.638}{5}\right)^2} = \sqrt{2.896 - 2.333} = 0.750$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.750}{1.528} \times 100\% = 49.11\%$$

Calculation of Return on Equity (ROE) – NLOL

Year	Profit Margin	Total Assets Turnover	Equity Multiplier	ROE
2001/02	0.046	1.216	5.511	0.308
2002/03	0.035	0.831	7.063	0.205
2003/04	0.004	0.736	5.672	0.017
2004/05	0.026	0.928	6.268	0.151
2005/06	0.012	1.023	7.166	0.088

Calculation of S.D and C.V of NLOL

Year	ROE (X)	X ²
2001/02	0.308	0.095
2002/03	0.205	0.042
2003/04	0.017	0.0003
2004/05	0.151	0.023
2005/06	0.088	0.008
	$\sum X = 0.769$	$\sum X^2 = 0.168$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.769}{5} = 0.1538$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.168}{5} - \left(\frac{0.769}{5}\right)^2} = \sqrt{0.0336 - 0.0236} = 0.1$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.1}{0.1538} \times 100\% = 65.02\%$$

Calculation of Return on Equity (ROE) – JSML

Year	Profit Margin	Total Assets Turnover	Equity Multiplier	ROE
2001/02	-0.078	0.820	4.068	-0.260
2002/03	-0.007	0.939	3.984	-0.026
2003/04	0.012	0.945	3.925	0.044
2004/05	0.030	1.144	3.920	0.134
2005/06	-0.055	1.013	3.795	-0.211

Calculation of S.D and C.V of JSML

Year	ROE (X)	X ²
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2001/02	-0.260	0.068
2002/03	-0.026	0.001
2003/04	0.044	0.002
2004/05	0.134	0.018
2005/06	-0.211	0.044
	$\sum X = -0.319$	$\sum X^2 = 0.133$

$$\bar{X} = \frac{\sum X}{n} = \frac{-0.319}{5} = -0.064$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.133}{5} - \left(\frac{-0.319}{5}\right)^2} = \sqrt{0.0266 - 0.0041} = 0.15$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.15}{-0.064} \times 100\% = -234.375\%$$

Calculation of Return on Equity (ROE) – RJML

Year	Profit Margin	Total Assets Turnover	Equity Multiplier	ROE
2001/02	0.013	1.354	1.726	0.030
2002/03	0.013	1.210	1.677	0.026
2003/04	0.019	1.245	1.700	0.040
2004/05	0.010	1.484	1.799	0.027
2005/06	-0.038	1.044	2.532	-0.100

Calculation of S.D and C.V of RJML

Year	ROE (X)	X ²
2001/02	0.030	0.0009
2002/03	0.026	0.000676
2003/04	0.040	0.0016
2004/05	0.027	0.000729
2005/06	-0.100	0.010090
	$\sum X = 0.023$	$\sum X^2 = 0.0135$

$$\bar{X} = \frac{\sum X}{n} = \frac{0.023}{5} = 0.0046$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{0.0135}{5} - \left(\frac{0.023}{5}\right)^2} = \sqrt{0.0027 - 0.00002116} = 0.051$$

$$C.V = \frac{S.D}{X} \times 100\% = \frac{0.051}{0.0046} \times 100\% = 1108.69\%$$

APPENDIX – 13

Calculation of Overall Capitalization Rate of BNL

Year	EBIT	Value of the Firm	K ₀
2001/02	58.138	194.89	29.831
2002/03	30.059	194.89	15.423
2003/04	45.012	194.89	23.096
2004/05	44.141	194.89	22.649
2005/06	32.292	266.89	12.099

Calculation of Overall Capitalization Rate of UNL

Year	EBIT	Value of the Firm	K ₀
2001/02	69.22	92.07	75.182
2002/03	126.646	92.07	137.554
2003/04	195.569	92.07	212.413
2004/05	257.464	92.07	279.639
2005/06	308.236	92.07	334.784

Calculation of Overall Capitalization Rate of NLOL

Year	EBIT	Value of the Firm	K ₀
2001/02	11.381	20.292	56.086
2002/03	8.518	20.292	41.977
2003/04	3.827	20.292	18.860
2004/05	6.374	20.292	31.411
2005/06	5.51	20.292	27.153

Calculation of Overall Capitalization Rate of JSML

Year	EBIT	Value of the Firm	K ₀
2001/02	54.615	723.313	7.551
2002/03	76.879	767.579	10.018
2003/04	69.030	808.320	8.540
2004/05	85.523	775.161	11.033
2005/06	17.13	792.563	2.16

Calculation of Overall Capitalization Rate of RJML

Year	EBIT	Value of the Firm	K ₀
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2001/02	14.215	257.645	5.517
2002/03	13.353	257.318	5.189
2003/04	14.033	239.905	5.849
2004/05	12.545	244.529	5.130
2005/06	-24.507	203.95	-12.016

APPENDIX - 14

Calculation of Equity Capitalization Rate of BNL

Year	EBT	Value of the Equity	K_e
2001/02	57.475	194.89	29.491
2002/03	29.775	194.89	15.278
2003/04	45.008	194.89	23.094
2004/05	43.876	194.89	22.513
2005/06	30.963	266.89	11.601

Calculation of Equity Capitalization Rate of UNL

Year	EBT	Value of the Equity	K_e
2001/02	56.606	92.07	61.481
2002/03	124.044	92.07	134.728
2003/04	193.782	92.07	210.472
2004/05	255.699	92.07	277.722
2005/06	306.447	92.07	332.841

Calculation of Equity Capitalization Rate of NLOL

Year	EBT	Value of the Equity	K_e
2001/02	7.694	20.292	37.916
2002/03	5.504	20.292	27.124
2003/04	0.395	20.292	1.946
2004/05	3.959	20.292	19.510
2005/06	2.26	20.292	11.137

Calculation of Equity Capitalization Rate of JSML

Year	EBT	Value of the Equity	K_e
2001/02	-50.217	193.844	-25.906
2002/03	-5.292	193.844	-2.730
2003/04	8.812	193.844	4.546
2004/05	25.363	190.784	13.294

2005/06	-40.09	190.185	-21.079
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Calculation of Equity Capitalization Rate of RJML

Year	EBT	Value of the Equity	K_e
2001/02	6.088	180.696	3.369
2002/03	5.214	180.696	2.885
2003/04	7.169	180.696	3.967
2004/05	5.011	180.696	2.773
2005/06	-18.11	180.670	-10.024

APPENDIX - 15

Calculation of Degree of Financial Leverage Ratio of BNL

Year	EBIT	EBT	Ratio
2001/02	58.138	57.475	1.011
2002/03	30.059	29.775	1.009
2003/04	45.012	45.008	1.000
2004/05	44.141	43.876	1.006
2005/06	32.292	30.963	1.043

Calculation of Standard Deviation and C.V of BNL

Year	Ratio (X)	X^2
2001/02	1.011	1.022
2002/03	1.009	1.018
2003/04	1.000	1.000
2004/05	1.006	1.012
2005/06	1.043	1.088
	$\sum X = 5.069$	$\sum X^2 = 5.14$

$$\bar{X} = \frac{\sum X}{n} = \frac{5.069}{5} = 1.0138$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{5.14}{5} - \left(\frac{5.069}{5}\right)^2} = \sqrt{1.028 - 1.028} = 0$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0}{1.0138} \times 100\% = 0\%$$

Calculation of Degree of Financial Leverage Ratio of UNL

Year	EBIT	EBT	Ratio
2001/02	69.220	56.606	1.223
2002/03	126.646	124.044	1.021
2003/04	195.569	193.782	1.009
2004/05	257.464	255.699	1.007
2005/06	308.236	306.447	1.006

Calculation of Standard Deviation and C.V of UNL

Year	Ratio (X)	X ²
2001/02	1.223	1.496
2002/03	1.021	1.042
2003/04	1.009	1.018
2004/05	1.007	1.014
2005/06	1.006	1.012
	$\sum X = 5.266$	$\sum X^2 = 5.582$

$$\bar{X} = \frac{\sum X}{n} = \frac{5.266}{5} = 1.0532$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{5.582}{5} - \left(\frac{5.266}{5}\right)^2} = \sqrt{1.1164 - 1.1092} = 0.085$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.085}{1.0532} \times 100\% = 8.06\%$$

Calculation of Degree of Financial Leverage Ratio of NLOL

Year	EBIT	EBT	Ratio
2001/02	11.381	7.694	1.479
2002/03	8.518	5.504	1.548
2003/04	3.827	0.395	9.689
2004/05	6.374	3.959	1.610
2005/06	5.51	3.25	1.695

Calculation of Standard Deviation and C.V of NLOL

Year	Ratio (X)	X ²
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2001/02	1.479	2.187
2002/03	1.548	2.396
2003/04	9.689	93.877
2004/05	1.610	2.592
2005/06	1.695	2.874
	$\Sigma X = 16.021$	$\Sigma X^2 = 103.926$

$$\bar{X} = \frac{\Sigma X}{n} = \frac{16.021}{5} = 3.2042$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2} = \sqrt{\frac{103.926}{5} - \left(\frac{16.021}{5}\right)^2} = \sqrt{20.7852 - 10.2669} = 3.243$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{3.243}{3.2042} \times 100\% = 101.22\%$$

Calculation of Degree of Financial Leverage Ratio of JSML

Year	EBIT	EBT	Ratio
2001/02	54.615	-50.217	-1.087
2002/03	76.879	-5.292	-14.527
2003/04	69.03	8.812	7.834
2004/05	85.523	25.363	3.372
2005/06	17.13	-40.09	-0.427

Calculation of Standard Deviation and C.V of JSML

Year	Ratio (X)	X ²
2001/02	-1.087	1.181
2002/03	-14.527	211.034
2003/04	7.834	61.371
2004/05	3.372	11.370
2005/06	-0.427	0.1823
	$\Sigma X = -4.835$	$\Sigma X^2 = 285.1383$

$$\bar{X} = \frac{\Sigma X}{n} = \frac{-4.835}{5} = -0.967$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2} = \sqrt{\frac{285.1383}{5} - \left(\frac{-4.835}{5}\right)^2} = \sqrt{57.0277 - 0.9351} = 7.489$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{7.489}{-0.967} \times 100\% = -774.51\%$$

Calculation of Degree of Financial Leverage Ratio of RJML

Year	EBIT	EBT	Ratio
2001/02	14.215	6.088	2.335
2002/03	13.353	5.214	2.561
2003/04	14.033	7.169	1.957
2004/05	12.545	5.011	2.503
2005/06	-24.507	-18.11	1.353

Calculation of Standard Deviation and C.V of RJML

Year	Ratio (X)	X ²
2001/02	2.335	5.452
2002/03	2.561	6.559
2003/04	1.957	3.830
2004/05	2.503	6.265
2005/06	1.353	1.831
	$\sum X = 10.709$	$\sum X^2 = 23.937$

$$\bar{X} = \frac{\sum X}{n} = \frac{10.709}{5} = 2.1418$$

Using formula,

$$S.D(\dagger) = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2} = \sqrt{\frac{23.937}{5} - \left(\frac{10.7091}{5}\right)^2} = \sqrt{4.7874 - 4.5873} = 0.447$$

$$C.V = \frac{S.D}{\bar{X}} \times 100\% = \frac{0.447}{2.1418} \times 100\% = 20.88\%$$

APPENDIX – 16

Calculation of Correlation Coefficient using Karl Pearson's Coefficient of Correlation

Correlation of Coefficient between Long term Debt and Net worth of BNL

Here, Let

Long term Debt = X and Net Worth = Y

Year	X	Y	XY	X ²	Y ²
2005/06	72.00	776.57	55913.04	5184	603060.96

	$\Sigma X =$ 72.00	$\Sigma Y =$ 776.57	$\Sigma XY =$ 55913.04	$\Sigma X^2 =$ 15184	$\Sigma Y^2 =$ 603060.96
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$$r = \frac{N \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N \Sigma X^2 - (\Sigma X)^2} \sqrt{N \Sigma Y^2 - (\Sigma Y)^2}}$$

$$= \frac{1 \times 55913.04 - 72.00 \times 776.57}{\sqrt{1 \times 15184 - (72.00)^2} \sqrt{1 \times 603060.96 - (776.57)^2}} = \frac{0}{0} = 0$$

$$r^2 = 0$$

$$P.E = 0.6745 \times \frac{1-r^2}{\sqrt{N}} = 0.6745 \times \frac{(1-0)}{\sqrt{5}} = 0.302$$

$$6 \times P.E = 6 \times 0.302 = 1.812$$

Calculation of Correlation Coefficient using Karl Pearson's Coefficient of Correlation

Correlation of Coefficient between Long term Debt and Net worth of JSML

Here, Let

Long term Debt = X and Net Worth = Y

Year	X	Y	XY	X ²	Y ²
2001/02	529.469	193.844	102634.389	280337.422	37575.496
2002/03	573.735	193.844	111215.087	329171.850	37575.496
2003/04	614.476	193.844	119112.486	377580.755	37575.496
2004/05	584.377	190.784	111489.782	341496.478	36398.535
2005/06	602.378	190.18	114560.248	362859.255	36168.432
	$\Sigma X =$ 2904.435	$\Sigma Y =$ 962.496	$\Sigma XY =$ 559011.992	$\Sigma X^2 =$ 1691445.76	$\Sigma Y^2 =$ 185293.455

$$r = \frac{N \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N \Sigma X^2 - (\Sigma X)^2} \sqrt{N \Sigma Y^2 - (\Sigma Y)^2}}$$

$$= \frac{5 \times 559011.992 - 2904.435 \times 962.496}{\sqrt{5 \times 1691445.76 - (2904.435)^2} \sqrt{5 \times 185293.455 - (962.496)^2}} = \frac{-447.11}{1241.394} = -0.36$$

$$r^2 = 0.1296$$

$$P.E = 0.6745 \times \frac{1-r^2}{\sqrt{N}} = 0.6745 \times \frac{(1-0.1296)}{\sqrt{5}} = 0.262$$

$$6 \times P.E = 6 \times 0.262 = 1.575$$

Correlation of Coefficient between Long term Debt and Net worth of RJML

Here, Let

Long term Debt = X and Net Worth = Y

Year	X	Y	XY	X ²	Y ²
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2001/02	76.949	180.696	13904.376	5921.149	32651.044
2002/03	76.622	181.676	13920.378	5870.931	33006.169
2003/04	59.209	188.846	11181.383	3505.706	35662.812
2004/05	63.833	193.857	12374.474	4074.652	37580.536
2005/06	23.28	180.67	4205.998	541.958	32641.649
	$\Sigma X =$ 299.893	$\Sigma Y =$ 925.745	$\Sigma XY =$ 55586.609	$\Sigma X^2 =$ 19914.396	$\Sigma Y^2 =$ 171542.210

$$r = \frac{N \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N \Sigma X^2 - (\Sigma X)^2} \sqrt{N \Sigma Y^2 - (\Sigma Y)^2}}$$

$$= \frac{5 \times 55586.609 - 299.893 \times 925.745}{\sqrt{5 \times 19914.396 - (299.893)^2} \sqrt{5 \times 171542.210 - (925.745)^2}} = \frac{-308.6}{2610.573} = -0.1182$$

$$r^2 = (-0.1182)^2 = 0.0139$$

$$P.E = 0.6745 \times \frac{1-r^2}{\sqrt{N}} = 0.6745 \times \frac{(1-0.0139)}{\sqrt{5}} = 0.297$$

$$6 \times P.E = 6 \times 0.297 = 1.782$$

APPENDIX – 17

Calculation of Regression Analysis

Regression Analysis of LTD on Shareholder's Equity – BNL

Here, Let
Shareholder's Equity = X and LTD = Y

Year	X	Y	XY	X ²	Y ²
2005/06	194.89	72.00	14032.08	37982.112	5184
	∑ X =	∑ Y =	∑ XY =	∑ X ² =	∑ Y ² =
	194.89	72	14032.08	37982.112	5184

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{1 \times 14032.08 - 194.89 \times 72}{1 \times 37982.112 - (194.89)^2} = \frac{0}{0} = 0$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{72 - (0)(194.89)}{1} = \frac{72}{1} = 72$$

Calculation of Regression Analysis

Regression Analysis of LTD on Shareholder's Equity – JSML

Here, Let
Shareholder's Equity = X and LTD = Y

Year	X	Y	XY	X ²	Y ²
2001/02	193.844	529.469	102634.389	37575.496	280337.422
2002/03	193.844	573.735	111215.087	37575.496	329171.850
2003/04	193.844	614.476	119112.486	37575.496	377580.755
2004/05	190.784	584.377	111489.782	36398.535	341496.478
2005/06	190.18	602.378	114560.248	36168.432	362859.255
	∑ X =	∑ Y =	∑ XY =	∑ X ² =	∑ Y ² =
	962.496	2904.435	559011.992	185293.455	1691445.76

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 559011.992 - 962.496 \times 2904.435}{5 \times 185293.455 - (962.496)^2} = \frac{-447.109}{68.725} = -6.549$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{2904.435 - (-6.549)(962.496)}{5} = \frac{9207.821}{5} = 1841.564$$

Regression Analysis of LTD on Shareholder's Equity – RJML

Here, Let
Shareholder's Equity = X and LTD = Y

Year	X	Y	XY	X ²	Y ²
2001/02	180.696	76.949	13904.376	32651.044	5921.149
2002/03	181.676	76.622	13920.378	33006.169	5870.931
2003/04	188.846	59.209	11181.383	35662.812	3505.706
2004/05	193.857	63.833	12374.474	37580.536	4074.652
2005/06	180.67	23.28	4205.998	32641.649	541.958
	$\sum X =$ 925.745	$\sum Y =$ 299.893	$\sum XY =$ 55586.609	$\sum X^2 =$ 171542.210	$\sum Y^2 =$ 19914.396

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 55586.609 - 925.745 \times 299.893}{5 \times 171542.210 - (925.745)^2} = \frac{308.599}{707.245} = 0.436$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{299.893 - (0.436)(925.745)}{5} = \frac{-103.732}{5} = -20.746$$

APPENDIX – 18

Regression Analysis of Total Capital on LTD – BNL

Here, Let
LTD = X and Total Capital = Y

Year	X	Y	XY	X²	Y²
2005/06	72.00	266.89	19216.08	5184	71230.272
	$\Sigma X =$	$\Sigma Y =$	$\Sigma XY =$	$\Sigma X^2 =$	$\Sigma Y^2 =$
	72	266.89	19216.08	5184	71230.272

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{1 \times 19216.08 - 72.00 \times 266.89}{1 \times 5184 - (72.00)^2} = \frac{0}{0} = 0$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{266.89 - (0)(72)}{1} = \frac{266.89}{1} = 266.89$$

Regression Analysis of Total Capital on LTD – JSML

Here, Let
LTD = X and Total Capital = Y

Year	X	Y	XY	X²	Y²
2001/02	529.469	723.313	382971.811	280337.422	523181.696
2002/03	573.735	767.579	440386.938	329171.850	589177.521

2003/04	614.476	808.320	496693.240	377580.755	653381.222
2004/05	584.377	775.161	452986.26	341496.478	600874.576
2005/06	602.378	792.563	477422.51	362859.255	628156.109
	$\Sigma X =$ 2904.435	$\Sigma Y =$ 3866.936	$\Sigma XY =$ 2250460.759	$\Sigma X^2 =$ 1691445.76	$\Sigma Y^2 =$ 2994771.124

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 2250460.759 - 2904.435 \times 3866.936}{5 \times 1691445.76 - (2904.435)^2} = \frac{21039.534}{21486.131} = 0.979$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{3866.936 - (0.979)(2904.435)}{5} = \frac{1023.494}{5} = 204.67$$

Regression Analysis of Total Capital on LTD – RJML

Here, Let

LTD = X and Total Capital = Y

Year	X	Y	XY	X ²	Y ²
2001/02	76.949	257.645	19825.525	5921.149	66380.946
2002/03	76.622	258.298	19791.309	5870.931	66717.857
2003/04	59.209	248.055	14687.088	3505.706	61531.283
2004/05	63.833	257.69	16449.126	4074.652	66404.136
2005/06	23.28	203.95	4747.956	541.958	41595.602
	$\Sigma X =$ 299.893	$\Sigma Y =$ 1225.638	$\Sigma XY =$ 75501.004	$\Sigma X^2 =$ 19914.396	$\Sigma Y^2 =$ 302629.824

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 75501.004 - 299.893 \times 1225.6381}{5 \times 19914.396 - 299.893^2} = \frac{9944.733}{9636.168} = 1.032$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{1225.638 - (1.032)(299.893)}{5} = \frac{916.148}{5} = 183.229$$

APPENDIX - 19

Regression Analysis of EBIT on Interest – BNL

Here, Let
Interest = X and EBIT = Y

Year	X	Y	XY	X ²	Y ²
2001/02	0.663	58.138	38.545	0.439	3380.027
2002/03	0.284	30.059	8.537	0.081	903.543
2003/04	0.004	45.012	0.180	0.000016	2026.080
2004/05	0.265	44.141	11.697	0.070	1948.428
2005/06	1.329	32.292	42.916	1.7662	1042.773
	∑ X = 2.545	∑ Y = 209.642	∑ XY = 101.875	∑ X ² = 2.356	∑ Y ² = 9300.851

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 101.875 - 2.545 \times 209.642}{5 \times 2.356 - (2.545)^2} = \frac{-24.164}{5.301} = -4.558$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{209.6421 - (-4.558)2.545}{5} = 44.248$$

Regression Analysis of EBIT on Interest – UNL

Here, Let
Interest = X and EBIT = Y

Year	X	Y	XY	X ²	Y ²
2001/02	12.614	69.22	873.141	159.113	4791.408
2002/03	2.602	126.646	329.533	6.770	16039.209
2003/04	1.787	195.569	349.482	3.193	38247.234
2004/05	1.765	257.464	454.423	3.115	66287.711
2005/06	1.789	308.236	551.434	3.200	95009.432
	$\sum X =$ 20.557	$\sum Y =$ 957.135	$\sum XY =$ 2558.013	$\sum X^2 =$ 175.391	$\sum Y^2 =$ 220372.994

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 2558.013 - 20.557 \times 957.135}{5 \times 175.391 - (20.557)^2} = \frac{-6885.759}{454.365} = -15.155$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{957.135 - (-15.155)(20.557)}{5} = 253.789$$

Regression Analysis of EBIT on Interest – NLOL

Here, Let
Interest = X and EBIT = Y

Year	X	Y	XY	X ²	Y ²
2001/02	3.687	11.381	41.962	13.594	129.527
2002/03	3.014	8.518	25.673	9.084	72.556
2003/04	3.432	3.827	13.134	11.779	14.646
2004/05	2.415	6.374	15.393	5.832	40.628
2005/06	3.25	5.51	17.907	10.562	30.360

	$\Sigma X =$ 15.798	$\Sigma Y =$ 35.607	$\Sigma XY =$ 114.069	$\Sigma X^2 =$ 50.851	$\Sigma Y^2 =$ 287.717
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$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 114.069 - 15.798 \times 35.607}{5 \times 50.851 - (15.798)^2} = \frac{7.826}{4.678} = 1.673$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{35.607 - (1.673)15.798}{5} = 1.83$$

Regression Analysis of EBIT on Interest – JSML

Here, Let

Interest = X and EBIT = Y

Year	X	Y	XY	X ²	Y ²
2001/02	104.832	54.615	5725.400	10989.748	2982.798
2002/03	82.171	76.879	6317.224	6752.073	5910.381
2003/04	60.218	69.03	4156.848	3626.207	4765.141
2004/05	60.160	85.523	5145.064	3619.226	7314.183
2005/06	57.22	17.13	980.179	3274.128	293.437
	$\Sigma X =$ 364.601	$\Sigma Y =$ 303.177	$\Sigma XY =$ 22324.715	$\Sigma X^2 =$ 28261.382	$\Sigma Y^2 =$ 21265.94

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 22324.715 - 364.601 \times 303.177}{5 \times 28261.382 - (364.601)^2} = \frac{1048.937}{9373.021} = 0.1119$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{303.177 - (0.1119)(364.601)}{5} = 52.48$$

Regression Analysis of EBIT on Interest – RJML

Here, Let

Interest = X and EBIT = Y

Year	X	Y	XY	X ²	Y ²
2001/02	8.127	14.215	115.525	66.048	202.066
2002/03	8.139	13.353	108.680	66.243	178.303
2003/04	6.864	14.033	96.322	47.114	196.925
2004/05	7.534	12.545	94.514	56.761	157.377
2005/06	6.397	-24.507	-156.771	40.922	600.593
	∑ X = 37.061	∑ Y = 29.639	∑ XY = 258.27	∑ X ² = 277.088	∑ Y ² = 1335.264

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 258.27 - 37.061 \times 29.639}{5 \times 277.088 - (37.061)^2} = \frac{192.899}{11.922} = 16.18$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{29.639 - 16.18(37.061)}{5} = -114$$

APPENDIX - 20

Regression Analysis of Net Profit on Sales – BNL

Here, Let

Sales = X and Net Profit = Y

Year	X	Y	XY	X²	Y²
2001/02	535.494	48.610	26030.363	286753.824	2362.932
2002/03	609.654	25.672	15651.037	371678.000	659.051
2003/04	632.114	37.800	23893.909	399568.109	1428.84
2004/05	614.739	34.735	21352.959	377904.038	1206.520
2005/06	621.827	24.962	15522.045	386668.818	623.101
	$\Sigma X =$ 3013.828	$\Sigma Y =$ 171.419	$\Sigma XY =$ 102450.313	$\Sigma X^2 =$ 1822572.789	$\Sigma Y^2 =$ 6280.444

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 102450.313 - 3013.828 \times 171.419}{5 \times 1822572.789 - (3013.828)^2} = \frac{-4378.817}{29704.731} = -0.147$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{171.419 - (-0.147)(3013.828)}{5} = 122.89$$

Regression Analysis of Net Profit on Sales – UNL

Here, Let

Sales = X and Net Profit = Y

Year	X	Y	XY	X²	Y²
2001/02	1236.052	42.60	52655.815	1527824.547	1814.76
2002/03	1244.73	93.16	115959.047	1549352.773	8678.786
2003/04	1524.901	140.78	214675.563	2325323.06	19819.008
2004/05	1481.560	189.20	280311.152	2195020.034	35796.64
2005/06	1469.68	238.156	350013.11	2159959.302	56718.28
	$\Sigma X =$ 6956.923	$\Sigma Y =$ 703.896	$\Sigma XY =$ 1013614.687	$\Sigma X^2 =$ 9757479.716	$\Sigma Y^2 =$ 122827.474

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 1013614.678 - 6956.923 \times 703.896}{5 \times 9757479.716 - (6956.923)^2} = \frac{171123.118}{388620.952} = 0.440$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{703.896 - (0.440)(6956.923)}{5} = -471.43$$

Regression Analysis of Net Profit on Sales – NLOL

Here, Let

Sales = X and Net Profit = Y

Year	X	Y	XY	X ²	Y ²
2001/02	136.004	6.216	845.401	18497.088	38.639
2002/03	119.151	4.238	504.962	14196.961	17.961
2003/04	84.712	0.305	25.837	7176.123	0.093
2004/05	118.103	3.058	361.159	13948.319	9.351
2005/06	148.75	1.74	258.825	22126.562	3.028
	$\sum X =$ 606.72	$\sum Y =$ 15.557	$\sum XY =$ 1996.184	$\sum X^2 =$ 75945.053	$\sum Y^2 =$ 69.072

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

$$= \frac{5 \times 1996.184 - 606.72 \times 15.557}{5 \times 75945.053 - (606.72)^2} = \frac{542.177}{11616.107} = 0.047$$

$$a = \frac{\sum Y - b(\sum X)}{n} = \frac{15.575 - (0.047)(606.72)}{5} = -2.588$$

Regression Analysis of Net Profit on Sales – JSML

Here, Let

Sales = X and Net Profit = Y

Year	X	Y	XY	X ²	Y ²
2001/02	646.743	-50.217	-32477.493	418276.508	2521.747
2002/03	725.037	-5.292	-3836.896	525678.651	28.005
2003/04	718.949	8.812	6335.378	516887.665	77.651

2004/05	855.324	25.363	21693.583	731579.145	643.282
2005/06	730.879	-40.09	-29300.939	534184.113	1607.208
	$\Sigma X =$ 3676.832	$\Sigma Y =$ -61.424	$\Sigma XY =$ -37586.367	$\Sigma X^2 =$ 2726606.082	$\Sigma Y^2 =$ 4877.893

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times -37586.367 - 3676.832 \times -61.424}{5 \times 2726606.082 - (3676.832)^2} = \frac{37913.894}{117245.8} = 0.323$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{-61.424 - (0.323)(3676.832)}{5} = -249.81$$

Regression Analysis of Net Profit on Sales – RJML

Here, Let

Sales = X and Net Profit = Y

Year	X	Y	XY	X ²	Y ²
2001/02	422.386	5.337	2254.274	178409.933	28.483
2002/03	366.663	4.740	1737.983	134441.756	22.468
2003/04	382.384	7.169	2741.311	146217.523	51.394
2004/05	482.443	5.011	2417.522	232751.248	25.110
2005/06	477.86	-18.11	-8654.0445	228350.179	327.972
	$\Sigma X =$ 2131.736	$\Sigma Y =$ 4.147	$\Sigma XY =$ 497.0455	$\Sigma X^2 =$ 920170.639	$\Sigma Y^2 =$ 455.427

$$b = \frac{n \Sigma XY - (\Sigma X)(\Sigma Y)}{n \Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{5 \times 497.0455 - 2131.736 \times 4.147}{5 \times 920170.639 - (2131.736)^2} = \frac{-6355.082}{56554.816} = -0.112$$

$$a = \frac{\Sigma Y - b(\Sigma X)}{n} = \frac{4.147 - (-.112)(2131.736)}{5} = 48.58$$