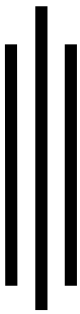
A COMPARATIVE STUDY ON DIVIDEND POLICY OF NEPALESE BANKS

A Thesis submitted to
Office of the Dean
Faculty of Management
Tribhuvan University

By
Ghanashyam Katwal
Post Graduate Campus
Biratnagar
T.U. Reg. No. : 7-1-3-492-2003



In Partial Fulfillment of the requirements for the Degree of Master of Business Studies (M.B.S.)
Biratnagar, Nepal
February 21, 2013

TRIBHUVAN UNIVERSITY
POST GRADUATE CAMPUS
Biratnagar
Morang, Nepal

Ref. No. :-

Tel. No. : 021-526327
021-522204

Recommendation

This is to certify that the thesis:

Submitted By:
Ghanashyam Katwal

Entitled
A COMPARATIVE STUDY ON DIVIDEND POLICY OF NEPALESE BANKS

has been prepared as approved by this Department in the prescribed format of Faculty of Management, This thesis is forwarded for examination

Supervisor

Signature: _____
(Dr. Arjun Baral)

Head of Department

Signature:_____
(Prof. Dr. Yadav Raj Koirala)

Campus Chief

Signature:_____
(Mr. Ballav Poudel)

Date: .....

TRIBHUVAN UNIVERSITY
POST GRADUATE CAMPUS
Biratnagar
Morang, Nepal

Ref. No. :-

Tel. No. : 021-526327
021-522204

VIVA – VOCE SHEET

We have conducted the Viva-Voce Examination of the thesis presented by

Ghanashyam Katwal

Entitled

A COMPARATIVE STUDY ON DIVIDEND POLICY OF NEPALESE BANKS

and found the thesis to be the original work of the student and written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment of the requirement for Master's Degree in Business Studies (M.B.S.)

Viva-Voice Committee

Chairperson, Research Committee:
(Prof. Dr. Yadav Raj Koirala) _____

Member (Thesis Superisor)
(Dr. Arjun Baral) _____

Member (External Expert) _____

Date:.....

ACKNOWLEDGEMENT

This thesis is a product of an active support from different individuals and institutions that are highly appreciated. The thesis is prepared and submitted to the faculty of management as partial fulfillment of the requirements for the degree of Master of Business Studies (M.B.S.)

First of all, I would like to extend my sincere gratitude to my guide teacher Dr. Arjun Baral, Lecturer of P. G. Campus, Biratnagar for providing me his valuable time and efforts to guide me for the completion of this thesis.

After this, I would like to express my gratitude to thesis advisor and head of department, Dr. Yadav Raj Koirala, professor of post graduate Campus, Biratnagar Mr. Balav Poudel, Campus chief, post Graduate campus, Biratnagar and my respected teachers of P.G. Campus Biratnagar. I would like to express who my sincere thanks to all my friends and family members who helped me to complete this research work.

At last but not least. I would also like to express my deep sense of gratitude to the staffs of Kumari Bank Ltd. Siddhartha Bank Ltd., Bank of Kathmandu and Everest Bank Ltd.

.....

Ghanashyam Katwal

Roll No. 311/2066

T.U. Reg. No. : 7-1-3-492-2003

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABBREVIATION

&	AND
ATM	Automated Teller Machine
BOK	Bank of Kathmandu Limited
B.S.	Bikram Sambat
C.V.	Coefficient of Variance
D.Y.	Dividend Yield
DPR	Dividend Payment Ratio
DPS	Dividend Per Share
e.g.	Example
EBL	Everest Bank Limited
EPS	Earning Per Share
FY	Fiscal Year
etc.	Etcetera
H_1	Alternative Hypothesis
H_0	Null Hypothesis
i.e.	That is
KBL	Kumari Bank Limited
Ltd.	Limited
MPS	Market Price per Share
MVPS	Market Value per Share
No.	Number
P/E	Price Earning
S.D.	Standard Deviation
SIDDH	Siddhartha Bank Limited
T.U.	Tribhuvan University
Viz	Namely

CHAPTER- 1

INTRODUCTION

1.1 General Background of the Study

Nepal is one of the underdeveloped countries in the world. It covers an area of 1, 47,181 sq. km. The length of east to west is 885 km and its breadth varies from 145 to 241 km north-south. It has covered 0.03 percent area of world and 0.3 percent of Asia. The country can be divided into three main geographical regions of Hilly, Mountain and Terai region. Nepal is independent, landlocked, and democratic and republic country lies on the lap of the highest mountain of the Himalayas, the highest peak of which is known throughout the world as "Mount Everest". About 81 percent of the total population is dependent upon agriculture sector.

Bank, a financial institution is playing a vital role in the economic development of the country. The functions of Banks are not only accepting deposits and granting loans but also include wide range of services to different sectors of society such as, to facilitate the growth of trade, commerce, industry and agriculture of the national economy. Nepal has a banking history of about seven decades. Nepal Bank Limited, the first Bank of the country which was established in 1994 BS. Nepal Rastra Bank was established as the second Bank in Nepal which is the Central Bank of Nepal with objectives of promoting, developing and facilitating the banking sector in Nepal.

According to Crowther, “The bankers business is to take the debts of other people to offer his own in exchange and thereby create money.” [1]

[1] Crowther, “The bankers business is to take the debts of other people to offer his own in exchange and thereby create money.”

Dividend policy is concerned with determining the proportion of firm's earnings to be distributed in the form of cash dividend and the proportion of earnings to be retained. The policy made by the company to distribute the profit to its shareholders and retention for its investment is known as dividend policy.

Dividend policy decision is crucial area of Financial Management. Dividend policy involves the decision to pay out earnings versus retaining them for re-investment in the firm. Any change in dividend policy has both favorable and unfavorable effects on the firm's stock price. Higher dividend means higher immediate cash flows to investors, which is good but lower future growth, which is bad. The dividend policy should be optimal which balances the opposing forces and maximizes stock price.

Dividend policy is a major decision for the Board of Directors (BOD) as the Board has to decide either paying out to the shareholders and keep them happy in the short-term or retain total money for investment which may be more beneficial to shareholders in the long-term. Dividend policy determines the allocation of the net profit between payments to the shareholders and re-investment in the firm. In other words, dividend policy can be defined as dividing the earning between dividend and retention. Retained earning is one of the most significant sources of fund required for the company growth. At the end of every fiscal year, management or BOD has to decide how much profit should be kept as retention and how much should be distributed as dividend to the shareholders.

Proper financial decision making is extremely important in banking transaction for efficiency and profitability. The dividend decision is

regarded as a financing decision since any cash dividend paid reduces the amount of cash available for the investment by the firm. Dividends are periodic cash payment by the company to shareholders. In our country, there is no similar way on dividend distribution. Usually, dividends are paid monthly, quarterly, semi-annually or annually. Generally, Nepalese organizations pay dividend on the annual basis. There is debate about which policy investors prefer. Firms that are growing generally pay low or no dividend. Mature firms that are no longer in a growth phase often pay high and increasing dividends. This research work will study into all relevant factors of dividend policies of selected financial institution. Nepal has already adopted liberal economic policy.

1.2 Historical Background of Banking:

In previous days, goldsmiths, merchants and money lenders were the ancient bankers of the world as well as of Nepal. In 1175 AD, 'The Bank of Venice' of Italy was established as the first Banking Association in the world. Then after that, 'The Bank of Barcelona' was established in 1401 AD in Spain. 'The Bank of Bombay' in India in 1840 AD, 'The Bank of Bengal' in 1843 AD, and 'The Bank of Madras' in 1943 AD were established. They were known as presidency bank and later on were established as 'The Imperial Bank of India' in 1921 AD. In 1955 AD 'The Imperial Bank of India' was altered and named as 'State Bank of India (SBI)'.

In 1933 BS, for a sample banking transaction during the tenure of the prime minister Ranodip Singh 'Tejarath Adda' was established in Nepal. And this was the first step that led to the institutional development of Banking in Nepal. 'Tejarath Adda' never used to collect deposit but instead it used to give loans to employees and public against the bullions. In 1994 BS, Nepal Bank Limited was established as first commercial bank in Nepal.

1.3 Development of Commercial Banks in Nepal

In the context of Nepal, Nepal Bank Limited was established as the first commercial bank in 1994 BS. It was established under Special Banking Act, 1993 having elementary functions of commercial banks. Before this, Kaushi Toshakhana, set up during the reign of Ranodip Shah, used to carry on very limited banking. There were also money lenders partially fulfilling the requirements of the general public. At that time when Nepal Bank Limited was established, because of non-existence of central bank and commercial banks in Nepal, Nepal Bank Limited had to act as its own Central Bank and used to keep enough resources in hand for meeting emergencies.

Later on, the first Central Bank was established on 2013 BS under Nepal Rastra Bank Act, 2012 with an objective of supervising, co-ordinating, monitoring, protecting and controlling the functions of commercial banks in Nepal. After that Nepal Rastra Bank concentrated its attention towards the development of banking sector by formulating relevant policies and procedures. It is an autonomous body and fully owned by the Government of Nepal, which works for the development of banking system in the country.

As time elapsed, the service of Nepal Bank Limited turned out to be inadequate as the banking requirements of the people kept on increasing. To fulfill the credit requirements of the country, the commercial bank 'Rastriya Banijya Bank' was established in 2023 BS under RBB Act, 2023 with fully government equity that of authorized capital of Rs. 10 Million and paid up capital of Rs. 2.5 Million. Until 2040 BS, there were only two commercial banks. The government then introduced 'Financial Sectors Reforms' in 2037 BS, which gave permission for the establishment of private and joint venture banks with upto a maximum of 50% equity participation. In the

process, NABIL Bank Limited was established in 2041 BS when the sixth plan was running in the country. After the liberalization of the financial sector, financial sector has made a hallmark progress both in terms of the number of financial institutions and beneficiaries of financial services. Till now, 32 commercial banks are in operation taking license from Nepal Rastra Bank. "A joint venture bank is joining of force between two or more enterprises for carrying out specific operation ".[2]

1.4 Profile of the Bank :

A. Kumari Bank Limited (KBL) :

Kumari Bank Limited came into existence as the fifteenth commercial bank of Nepal by starting its banking operations from Chaitra 21, 2057 B.S (April 03, 2001) with an objective of providing competitive and modern banking services in the Nepalese financial market. The bank has paid up capital of Rs. 1,485,000,000 of which 70% is contributed from promoters and remaining from public. It has been providing wide - range of modern banking services through 28 points of representations located in various urban and semi urban part of the country, 19 outside and 9 inside the valley. The bank is pioneer in providing some of the latest / lucrative banking services like E-Banking and SMS Banking services in Nepal. The bank always focus on building sound technology driven internal system to cater the changing needs of the customers that enhance high comfort and value. The adoption of modern Globus Software, developed by Temenos NV, Switzerland and arrangement of centralized data base system enables customer to make highly secured transactions in any branch regardless of having account with particular branch.

---

2 Gupta, D. P. *"The Banking system, Its Role in Export Development*", The Financial of Export from Developing Countries, International Trade Centre, UNCTADGATT, Geneva 1998, P15

Similarly the bank has been providing 365 days banking facilities, extended banking hours till 7 PM in

the evening, Utility Bill Payment Services, Inward and Outward Remittance services, Online remit Services and various other banking services.

B. **Everest Bank Limited (EBL) :**

Everest Bank Limited (EBL) has been one of the leading banks of the country and has been catering its services to various segments of the society since then. With clients from all walks of life, the bank has helped to develop the nation corporately, agriculturally and industrially. So one can say with all earnestly that Everest Bank Limited is truly a Nepalese bank for its excellence in banking services, it was recently awarded the "Best Bank Award 2011"amongst all banks in India by the leading corporate magazine, Business India.

C. Bank of Katmandu Limited (BOK) :

BOK started its operation in March 1995 with the objective to stimulate the Nepalese economy and take it to newer heights. BOK also aims to facilitate the nation's economy and to become more competitive globally. Bank of Katmandu Limited (BOK) has today become a landmark in the Nepalese banking sector by being among the few commercial banks which is entirely managed by Nepalese professionals and owned by the general public.

D. Siddhartha Bank Limited (SBL)

Siddhartha Bank Limited (SBL) started its operation in the year 2002, led by a group of distinguished business personalities and respected Nepali Citizens with the objectives of providing excellence and professional banking services. The promoters and public are holding 70% and 30% stake

of the Bank respectively. In a short period of nine years, SBL has been able to establish itself as a (one stop) to its customers. Customers can enjoy with basic banking in the form of loan, deposits and trade finance as well as customers can enjoy ancillary services such as remittance, cards, draft issuance, traveler's cheques and internet banking. The bank is offering saving accounts such as Normal Savings Account, Bal Bachat, Jestha Nagarik Bachat etc. similarly, customers having stable surplus of funds can go in for high yielding fixed deposits. SBL has multiple products. The loan products include Corporate Loans, Retail Loans (Home Loan, Auto Loan, Mortgage Loan etc.) and SME Loan. The Bank credit portfolio has a healthy mix of big and small loans.

1.5 Focus of the Study

Bank creates funds from clients saving and lends the same to needy persons or business organizations in terms of loans, advances and investment. So, proper financial decision is important in banking transactions for its efficiency and profitability.

Dividend refers to the portion of income of the firm that is distributed to the shareholders in the return to their investment in the share. By a dividend policy, we mean some kinds of constituent approach to the distribution, various retention decision rather than making the decision on the purely adhoc basic from period to period. So, what and how much it is desirable to pay dividend is always a controversial topic because shareholders always expect higher dividend.

Investor's intention is to get more and more return but most of the corporation of banking institution is not in good condition. Hence,

institution cannot pay more return. But, nowadays, investors are attracted towards financial institutions due to the growth of saving.

The history of Nepal shows that the government was unable to receive dividends from different public enterprises in the past. Nowadays, in some banks, we can see the trend of paying, a small number of corporations are paying regular dividends and other are not consistent in paying dividends and there are some companies that do not pay dividends.

1.6 Statement of the Problem

Numerous financial literatures, abundance of theories and feelings are available relating to dividend and dividend policy. Dividend decision is pivotal as well as controversial area of financial management. However, there are ambiguities among the financial experts regarding the impact of dividends on the valuation of the firm. In fact, the financial community has not any conclusion and simple understanding. There is contradiction and confused relationship between the market and share price and dividend per share. This is due to the fact that some financial experts hold the view that the dividends are irrelevant. So that the amount of dividends paid has to effect on the valuation of the firm. On the other hand, others consider that the dividend decision is relevant to the value of the firm. Thus, it is not easy to say whether the dividend decision affect positively or negatively. It remains the puzzle.

Modigliani and Miller (MM) approach shows that dividend have no effect on the shareholders' wealth in the world without taxes. Forror and Selwyan (1967) and Brenan (1970), suggest to pay no dividends model is associated with the houses of Rozeff (1981), Ross (1978), Bhattalnarya (1979), Mukessan (1982), Masuli's and Trueman (1988). As yet, none of these

theories is completely satisfactory but they provide guidance and also they threw light on the complicated decision problem.

In Nepal, only few companies are paying divided to shareholders. But, there is no any uniformity in dividend distribution. They are not distributing dividend in equal proportion. In this study, we are trying to get the answer of the following questions:

a. Are the selected banks paying the dividend uniformly?
b. What is the relationship between DPS and other financial indicator like EPS, DPR, P/E ratio and MVPS?
c. Does dividend policy affect the market price of the stock and value of the firm?
d. What is the dividend pattern of the selected banks?

1.7 Objectives of the Study

The main objective of the study is to identify the existing problems and to insight into comparative dividend policy analysis of sample banks and to make important suggestions and recommendations towards dividend policy of the sample banks. The main objectives of the study are as follows:

a) To make an overall comparison of dividend policy of the selected banks.
b) To study the relationship between DPS and other financial indicators such as EPS, DPR, P/E ratio and MVPS.
c) To analyze the dividend patterns.
d) To study whether DPS is affected by the EPS, MPS and Retained Earnings.
e) On the basis of the analysis, to provide recommendations and suggestions for the further improvement in the future.

1.8 Significance of the Study:

This study will be helpful to all who are interested to have knowledge in this field, especially, dividend policy. The study will be helpful to go deep into the matters of the dividend policy of the selected banks. The study helps to understand the relationship between DPS, EPS, MPS etc. and the impact of DPS on investment and shareholders. It is also important form the view point of investors. If investors are sure to get dividends from the investment in shares of the companies, they prefer to invest. The importance of the study is as follows:

a. To the management

This study will be helpful in setting suitable dividend policy of the bank. Similarly, it helps to identify the relationship and impact of DPS with other financial indicators.

b. To the government

This study will be useful for government to formulate different policies, rules and regulations regarding operations of the banks.

c. To the shareholders

The study will be helpful to the shareholders to compare the dividend patterns of the selected banks and to identify the factors that affect the dividend policy.

d. To the reader

The study is also useful to those who are interested to study dividend policy of SBL and KBL or conduct research about it.

1.9 Organization of the Study

The study is divided into 5 chapters each chapter deals some important factors of dividend patterns. The contents of each of these chapters are as follows:

Chapter 1: Introduction of the Study

This chapter contains the introductory part of the study has as already mentioned, the chapter describes on general background, statement of the problem, focus of the study, objectives of the study, significance of the study and limitations of the study.

Chapter 2: Review of Literature

This chapter contains the review of literature which deals with conceptual framework of the dividend policy. In this part, research history of dividend policy will be presented in brief. Here theoretical analysis and brief review of literature is available. It also includes discussion on the conceptual frame work and published and unpublished master degree thesis.

Chapter 3: Research Methodology

It explains about research methodology .It Includes Research design, Population and sample, Sources of data, Data collection procedure, Methodology of Analysis and definition of statistical Tools.

Chapter 4: Data Presentation and Analysis

It deals with the presentation and analysis of data to indicate qualitative factors on saving of deposit using both financial and statistics tools and techniques.

Chapter 5: Summary, Conclusion and Recommendation

It includes summary, findings, conclusion and recommendations. Also at the end of this research Bibliography and Appendices are attached.

CHAPTER-2

REVIEW OF LITERATURE

The introduction part of this study has been presented in the first chapter. in this chapter all attempts has been made to review the various relevant literature in relation to support the study to receive some ideas four developing a research design.

Research is a continuous process. The procedure of finding may change but it never ends. In literature review researcher reviews. the books, journal magazines or any other types of studies, which are related to his or her fields in order to analyze the data and to find something's new. Review of literature further helps us to identify the problem, to avoid the unintentional replication of previous studies and also helps us to interpret the significance of research results in precise manners.

This research aims to analyze the dividends policy and practice of banks viz.Kumari Bank bank Ltd. **(EBL)**. Everest Bank Limited **(EBL),** Siddhartha Bank ltd**.** and Bank of Katmandu Ltd. .For this purpose it is helpful to review related literature in this concerned area, which will also helps to get clear ideas. Opinion and other concepts.' what other have said?' what other have done? And what others have written? All these and other related question are reviewed, which has provided useful inputs in this research work. This chapter emphasizes on the literatures, which are concerned with this connection. Some of the master degree thesis has also been reviewed.

2.1 Conceptual Framework

Dividend policy is one of the most important decisions on financial management. It affects the financial structure, the flood of funds, corporate liquidity and investor attitude for an existing company. There are two

sources of financing one is internal sources (I,e. Retained earnings) and the other is external sources(I,e. Issuing share, debenture) . But the retained of profit is always widely affected by dividend policy. If the firm adopts sound dividend policy, then less money will be available. In the same way if the firm adopts tight dividend policy, the excess money will be available for financing. ("A dividend payment is distributed to the shareholder of the something's belonging the corporation and specifically to the stock holder themselves as owned by the corporation")

Dividend refers to that portion of a firm net earning which is paid out the share holders. The policy of company on the decision of its profit between distribute to share holders as a dividend and retention for its opportunity investment is known as a dividend policy distributaries of dividend to the share holder and plugging back the remaining of earning for opportunity investment is not the aim of the financial management, what and how much is desirable to pay desirable to pay dividend is always a controversial topic. Shareholder always expect higher dividend from corporation but corporation ensures toward settings aside funds for maximizing wealth. "Financial management is therefore concerned with the activities of corporation that affects the well being of shareholders. The well being can be partially measured by the dividends received. But a more accurate measure is the market value of stock."

So, dividend policy us wise policy to maintain a balance between shareholders interest with that the corporation growth from internally generated funds.

2.1.1 Major Forms of Dividend

The firm can give various types of dividends to the stockholders in the view of the objectives and policy, which they implements. Before adopting any dividends the firm must ensure the smooth growing of the firm as well

satisfy the exception of the shareholders, some of the major forms of dividends the firm can pay are discussed below.

A. Cash Dividend

Most firm pay in cash. The portion of earning paid in the form of cash to investor in proportion ti their shareholder is known as cash dividend. When cash dividend is paid, both the total assets and net worth of the firm decreases and the market price of the share drops in most cases by amount of the cash dividend paid. For the payment of cash dividend firm should have adequate balance of cash. In Nepal cash dividend is the mostly adopted by many firms.

B. Stock Dividend

If additional share are issued to existing shareholders intended of cash dividend is known as stock dividend. “A stock dividend represent a distribution of share in lieu or in additional to the cash dividend to the existing shareholder” when stock holder receives stock dividend the number of share holders increases but as it is paid to existing shareholders on their proportion of their share holding. It doesn’t affect the ownership of the company stock dividend increases number of shares as a result Eps, Dps and Mps of the company decreases.

C. Bond Dividend

Bond Dividend is a dividend that is distributed to the shareholder in form of bond. When the company generates more profit for a long time it is better to issue bonds. These are given when the company firm unable to take the burden of interest of loan. In other words, corporation declares dividends in form of its own bonds with a view to avoid cash outflows. It is issued for existing shareholders.

D. stock-split Dividend

Stock-split is also nothing more that increasing the number of outstanding shares and reducing proportionately in per value of stock. After the splitting of shares, share holders will have larger number of shares then they have before. Stock-slit has the following effect on different factors:

- Increase in number of outstanding shares.
- Return in per value and price of stock
- Constant in net worth and capital account.
- No change in proportional ownership of the share holders

E. Property Dividend

It is also known by the name of liquidity dividends. it involves a payment of assets/property in any form other than cash. Such forms of dividends may be followed whenever they are assets then they are not longer necessary in the operation of the business or in extra ordinary circumstances. Companies own product and securities of subsidiaries are the examples that have been paid as property dividends.

F. Scrip Dividend

If the company have not sufficient amount of cash for dividend payment, company may issue scrip or notes promising to pay dividend within the maturity period. So, scrip dividend is those paid in the company promised to pay instead of cash. These dividend may be interest bearing or non-interest bearing. When the company has sufficient cash then it is distributed to stock holders.

G. Interim Dividend

Generally dividend is declared in the last of financial year. This is called regular dividend. But sometimes directors can declare the dividend before the end of the financial year. This is called interim Dividend.

H. Share Re-Purchase

It is a method in which a firm buys back its own stock in case of some surplus cash. Share re-purchase is often viewed as an alternative to paying dividends. A company can reduce the number of share by re-purchasing the shares. The stock price must rise after the stock re-purchase if the price Earnings Ratio remains unchanged. When there is excess cash in the firm and insufficient investment opportunities to justify the use of those funds, then it is wise to distribute the funds either by stock re-purchase or increasing the dividend. Share price for the re-purchase or the equilibrium price is calculated from the following equation.

$$\text{Re-Purchase Price } (P^{*}) = \frac{S * P_c}{S - N}$$

Where,

S= Total no of share outstanding.
P_C = Current Market price per share.
N= Number of shares to be represented

2.1.2 Dividend Payout Scheme

1) Stability of Dividend:

Dividend stability refers to the consistency or lack dividend in steam of dividend. In other words, Stability of share means regularity I paying dividend even through the amount of dividends is considered as a desirable policy by management in most of the firms. It refers to the amount of dividends paid out regularly. All other remaining the same. Stable dividends may have a positive effect on the stock price.

According to this form of dividend policy, the fixed amount is paid per share as dividend. The fixed dividend amount would be paid year after year, irrespective of the fluctuation in the earnings. When a company follows such dividend policy it will pay dividend to the stock holders even when it suffers losses. But, the amount of dividend is increased when the firms maintained higher levels of earning and expects to maintain it.

2**) Constant Payout Ratio:**

This is nothing more than the payment of certain percentage of earnings over the life of firm. This policy is favorable for that company that has uncertain income; management may recommend this policy considering the ability of company n dividend payment.

3) **Stable rupee dividend plus extra dividend (or low regular dividend plus extra)**

The policy of paying a low regular dividend plus extra is a compromise between a stable dividend and a constant payout ratio. Under this policy, a sum of amount is paid regularly as dividend to the stock holders and in the prospective period, extra dividend is paid over and above the regular dividend. As soon as normal conditions return the firm cuts the extra dividend and pays the normal conditions return, the firm cuts the extra dividend and pays the normal dividend per share.

4) Residual Theory of dividend

Residual theory of dividend suggest that only residual earning should be distributed as dividend, which is left after accepting all the profitability investment opportunities which depends upon the investment policy of the firm. According to this theory, the dividends are distributed if there exists a balance if earning after paying fixed obligation and investment opportunities. If the firms have investment opportunities with higher return that required, then firm will invest the earnings to that project, and if there is only earnings left after accepting all the investment opportunities than it will be distributed to stock holders as cash dividend.

When the firm has opportunity of investment in profitability sectors at first, they prefer the internally generated fund (Retained earnings) rather than the

externally generated funds which is comparatively expensive due to the flotation cost and other. So, the amount of dividend fluctuated time to time in keeping with availability of acceptable investment opportunity of the firm “Although, the residual theory of dividend appears to make further analysis of dividend policy unnecessary. It is not clear that dividends are solely a mean of disbursing excess funds.

This, we can conclude that the company investment opportunity as well as the availability of internally generated funds determines the dividend amount of a firm.

2.1.3 Factors influencing Dividend Policy:

Dividends decision cannot be taken in vacant as well as in inflation rather various factors which affect the dividend policy, either directly or indirectly, must be taken into consideration which taking dividend decision. There are some factors, mentioned below to which financial manager must focus while taking dividend decision.

1) Legal Restriction

All the companies are bounded by certain legal restriction for dividend payments. These constraints are:

- Company can pay dividends from the earning of current year or past year.
- Company cannot pay dividend if the liabilities of the company exceeds assets.
- Dividends cannot be paid if the amount of dividend to be distributed exceeds net profit.
- Dividends cannot be paid from the capital invested in the firm.

2) Availability of cash or liquidity:

The liquidity position of the company influences ability to pay dividend to pay dividend payments of dividend is possible only if the firm has sufficient earnings. But, if the firm invests in fixed assets from its sufficient recent earnings, cash amount is available to make dividend payments. “Indeed, a growing firm, even a very profitable are typically has pressing need for the funds.” So, the company must have to manage adequate position as well as retained earnings.

3) Past Dividend

A firm with record of past dividend payments strive to maintain the same and the future. Dividends are habit forming. If the market does not receive its expected dosage, the stock price will suffer.

4) Inflation

In an indirect way, inflation also plays decisive role in dividend decision. Our according system is based is based on historical cost. Depreciation is charged on the basis of original cost at which assets were acquired. As a result, when a price rises, funds shared an account of depreciation would not be adequate to replace assets or the maintain capital intact. Consequently, the company may have to retain high percentage of earning to maintain the capital intact or replace equipment.

5) Control

If the company pays access cash dividend, there will be the shortage of funds to finance investment opportunities, which must be fulfilled by issuing new securities. This affects the control position of existing stock holders. So, they are not desirable to distribute to earnings as dividends which prevents them to loose the control position to the company.

6) Legal Rules

The legal rules constrain dividend payment on certain condition as follows.

- Capital impairment rules states that dividend should not be paid out of paid-up capital, which causes adverse effect on security of creditors and preference stock holders.
- The new profit rules stated that dividend must be paid from present profit and or profit- retained earnings.
- The insolvency rules states that when liabilities exceed assets, no dividend can be paid.

7) Stability of Earning

A firm that has a stable earnings trend will generally pay a larger portion of its earnings in dividend. If earnings fluctuate significantly, a larger amount of the profit may be retained to ensure that enough money in available for investment projects when needed. Therefore is a firm, which has a earning or likely to pay out a higher percentage of its earning than a firm with fluctuating earnings.

8) Tax Position of stock holders

Paying dividend is not only action of company but it also should consider the preferential need of the stock holders. The share holders with high income tax brackets prefer to receive low dividend and high income tax brackets prefer to receive low dividend and high rate 0 retention. Whereas company owned by small investors trend toward high dividend payout.

9) Investment Opportunities in the company

If the firm has future profitability investment opportunities, the firm is likely to reinvest the earnings rather than paying dividends." The more repaid the rate at the need for financing assets expansion, the great the

future need for funds, the more likely the firm is to retain earnings rather than pay them ours."

10) Other

Absence or lack of rather sources of financing also makes the firm serious to retain the earning for opportunity investment and out the dividend to the share holders. An adequate cash flow should be maintained and the payment of cash dividend should not endanger the cash flow of the corporation. A high rate of assets expansion creates a need to retain funds rather than to pay dividend. Paying back the debts to the creators also influences the availability of the cash flow to pay the dividends.

2.1.4 Payments Procedure of dividend

Firms usually pay dividends on a quarterly basis in accordance with the following payments procedures.

1) Declaration date

This is the day on which the board of directors declares the dividend. At this time they set the amount of the dividend to be paid, the holder of record data, and the payment date.

2) Holders-of-record date.

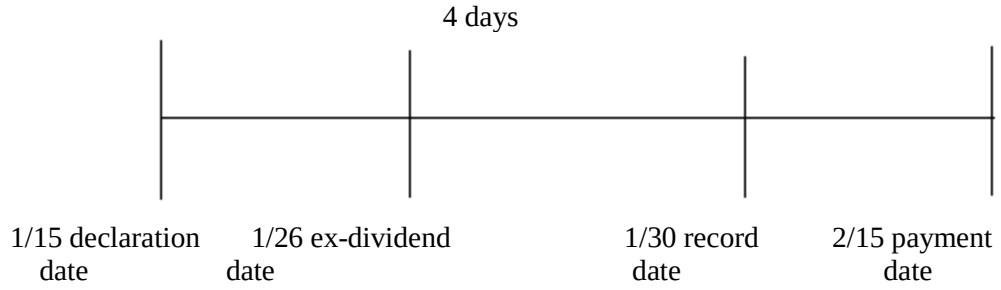
This is the date the company opens the ownership books to determine who will receive the dividends; the stock holders of record on this date receive the dividend.

3) Ex-Dividend date

This date is four days prior to the record date. Share purchases after the ex-dividend date are not entitled to the dividends. Only investors who hold the share prior to the ex-dividend date receive the dividends

4) Payments

This is the day when dividend checks are actually mailed to the holders of records.



2.1.5 Rules Regarding Dividend Practices in Nepal

There are no clear-cut legal provisions regarding dividend policy in Nepal. The responsibility to undertake required actions to protect shareholders interest in given to Nepal stock exchange which is state on the security exchanged Act 1983. But this organization has not been so able to protect share holders interest since interest and attitude of the board of directors play dominant role in management of public limited companies and they are generally in majority who are nominated be government.

According to corporation act, corporation must see aside a certain part of profit as reserves before the declaration of dividend. Moreover, the corporations have to separate the tax provision to dividend declaration.

Likewise, commercial bank Act 2031 has also made same provisions for distributing dividend. Section is of this act states about the restriction of dividends distribution. According to this section, before providing the whole expenses by bank for preliminary expenses, loss incurred in last year, capital reserve, risk beard funds, the bank shall not declare and distribute the dividend to the share holders.

Similarly, company act 1997 makes some legal provisions regarding dividends distributions, which are discussed below:

According to this act, board of directors can fix dividend payout rate but such rate should be proposed, first for the discussion and approval in the annual general meeting of share holders, the general meeting can reduce the rate determine be board of directors be can't increase. Some other legal provisions for dividend payments are made by the Nepal Company Act 1997 are as follows.

- Section (2) (m) states that bonus share means share issued in the form of additional shares to shareholders be capitalization the surplus from the profit on the reserve funds of a company. The form also denoted an increase in the paid up values of the shares after capitalizing surplus or reserve funds.
- Section (47) has prohibited company from purchasing its own shares. This section states that no company shall purchase its own shares supply loans against the security of its own shares.
- Section (137) bonus shares and sub-section(1) states that he company must inform the office before issuing bonus shares under sub-section(1), this may be done only according to a special resolution passed by the general meeting.
- Section (140) dividend and sub-section of this section are as follows.

Except in the following circumstances, dividend shall be distributed among the shareholders within 45 days from the date of decision to distribute them.

- In case of any low forbids the distribution of dividends.
- In case the right to dividends is disputed.

- In case dividends can't be distributed within the time limit mentioned above owing to circumstances beyond any one's control without any fault on the part of the company.
- In case, dividends are not distributed with in the time limit, mentioned in subsection (1) this shall be done by adding interest at the prescribed rate.
- Only the persons whose name stands registered in the register of existing share holders at the time of declining the dividend shall be entitled to it.

The above indicates that Nepalese low prohibits re-purchase of stock, which is against the theory of finance. But the reason for this kind of provision is still unknown.

Similarly, followings are decisions regarding dividend payments by the government corporations dated June 14, 1998

- Dividend should be paid in profitability years, even though there are cumulative losses, dividend is to be paid in cash flow is sufficient to distribute dividend.
- In case of in-audited accounts, interim dividend should be paid on the basis of provisional financial statements.
- Dividend rate will not be less that the interest rate on fixed deposit of commercial bank of government owned. In case of insufficiency of profit amount to distribute dividend in above mentioned rate, concerned corporation should send proposal of new distribution rate to the finance ministry through liaison ministry and should do what so ever decision is given their off.
- Those corporation operating in monopoly situation should repay all amounts of profits to the government excepts the amount of bonus, tax and the amount needed to expand and develop the business. The amount separated for the expansion and development of business will not be more than 20 percent of profit of the year and this amount will not be

more than total paid up capital. The amount so separated should all be paid as dividend if it is not used within 3 years.

- Decision regarding distribution of annual net profit shall not be made without prior acceptance of finance ministry. All incentives, excepts those to be paid by low, shall not be distributed unless the amount of dividend is not paid to government.
- Concerned BOD and top management will be held responsible for implementation of these dividend policies.
- Ministry of finance will make necessary arrangement regarding fixation of dividend percentage coordinating and concerned and ministries.

2.2 Review of Major Studies:

2.2.1 Modigliani and Major Study (Modigliani and Miller, 1961)

In their 1961, article Modigliani and Miller, for the first time in the history of finance, advocated that dividend policy does not affect the value of the firm,i.e; dividend policy has no effect on the share prices of the firm. They argued that the value of the firm depends on the firm's earnings which depend on its investment policy. Therefore, as per MM theory, a firm's value is independent of dividend policy.

Their study of irrelevancy of dividend was based on the following critical assumptions.

- The firm operates in perfect capital market.
- There are no taxes.
- The firm has a fixed investment policy is not subjects to change.
- Risk of uncertainty does not exist.

Modigliani and Miller provided the proof in support to their arguments in the following manner.

Step-1

The market price of a share in the beginning of the period is equal to the present value of dividend paid of the end of the period plus the market price of the share at the end of the period.

$$P_0 = \frac{D_1+P_1}{1+K_E}$$

Where

P_0= Marker price at the beginning or at the zero periods.
K_e= Cost of equity capital (assume constant)
D_1= Dividend per share to be received at the end of the period
P_1= Market price of the share at the end of the period.

Steps-2

Assuming that the firm does not resort to any external financing the market value of the firm can be computed as follows.

$$np_0 = \frac{n(D1+P1)}{1+Ke}$$

Where,
n= No. of shares outstanding.

Steps-3

If the firms internal sources of the financing its investment opportunities fall short of the funds required, and n is the number of new shares issued at the end of years at prices p_1, then,

$$np_{0=} = \frac{nD1+P1\ (n+\ \Delta\ n)-\ \Delta np1}{1+Ke}$$

Where,
n = No. of shares at the beginning

Δ n=No.of equity shares issued at the end of the period.

Step-4

If the firms were to finance all investment proposals, then total amount of new shares issued would be given by the following equation.

Where,

Δ nP1= The amount obtained from the sale of new shares to finance capital budget.

I= Total amount requirement of capital budget.

E=Earning of the firm during the period.

E-nD1= Retaining Earnings.

Steps-5

By substituting the valve of nP1 from equation of the step-4 to equation of step-3 the finding is:

$$nP_0 = \frac{nD1+P1\ (n + \Delta n\ )- np1}{1+Ke}$$

Or,

$$nP_0 = \frac{P1\ (n+ \Delta\ n)-I+E}{1+Ke}$$

Steps-6

Conclusion: There is no role of dividend in above equation. So Modigliani and miller concluded that dividend policy had no effect on the share price.

In this way, according to Modigliani and Miller study, It seems that under conditions or perfect capital markets, rational investors, absence of tax discrimination between dividend income and capital appreciation, given the firm's investment policy, is irrelevant is not justified, once the assumptions is modified to consider the realities of the world. In practice, every follows are kind of dividend policy depends on the age and nature of the firm. (Modigliani and Miller, 1961:32)

2.2.2 Linter's study

In 1996, J. Linter made an important study on corporation dividend policy in the American context. He made fifteen readily observation factors and characteristics that appeared to reflect or might be accepted to have an important bearing and dividend payment and policy. Then he reviewed the available information an over 600 listed well-established companies and selected 28 for dividend investigation. The objectives or the study were:

- To identify occasions when a change in dividends might have been under active consideration even though no change was made.
- To determine the factors which existed most actively into dividend decision?

Different views were collected with regard to occasion's companies' responsible officials, including president, financial Vive- president, treasures, controllers and directors. He concluded that a major portion of dividend of a firm would be expressed in following equations;

$Div * t = PEPS_t$ ……..(1)

And,

$Div\text{-}Div_{t-1} = a\text{-}b(Div * t\text{-}Div_{t-1})+et$

Where,

Div* = Earning

P = Target Payout ratio

a = Constant relating to dividend growth.

b = adjustment factors and new desired level of dividend work b<1.

The major findings of the study were:

a) Firms think in terms of proportion of earning to be pay out.

b) Investment opportunities, liquidity, funds flow are not considered for modifying the pattern of dividend.

c) Firms generally have target payout ratio in view, which determines change in dividend per share (Linter, 1956:99-113)

2.2.3 Gordon's study

Myron J. Gordon conducted a study in 1962. He has concluded policy of a firm has an effect on its value of shares even in a situation, were the returns on investment and required rate of return are equal. In this model, he explains that those investors are not indifferent between current dividends and retentions of earnings. His study concluded dividends more that that of future capital gains. His arguments in his model insisted that a price if dividend payout ratio leads to increase the stock price for the reason that investors consider the dividend yield is less risky than the expected capital gain, hence there is positive relationship between amount of dividend and stock prices.

The basic assumptions of Gordon's study are as follows.

- The firm uses equity capital only.
- The firm has perpetual life.
- Retained earnings are only one source for a new investment.
- External rate of return(r) and appropriate discount rate (Ke) are constant.
- The corporate tax does not exist.
- The retained ratio (b) is once decided upon is constant. Thus the growth rate (g) is constant forever.
- Discount rate is greater than growth rate. K>g

Based on the above assumptions, Gordon provided the following

Formula to determine the market values of shares.

$$P_0 = \frac{EPS(1-P)}{K-br} = \frac{DPS}{K-g}$$

Where,

p	= Price shares
EPS	= Earnings per share
b	= Retention Ratio = 1-D/P ratio
1-b	= Percentage of earnings distributed as dividends
EPS(1-b)	= Dividend Per share
K	= Capitalization rate or cost of capital
g	= b*r = growth rate
r	= Rate of return.

Finally, Gorden concluded that dividend and stock prices are negatively correlated in growth firms. For normal firms, share value remains constant regardless of changes in dividend policy. It means dividend in stock prices are not co-related with other in normal firms. So, r=k, for declining firms, there is a positive co-related between dividend and stock prices.(Gorden, 1962:264-272)

2.2.4 Walters study

James E. Walter, (1966), conducted a study on dividend and stock prices. He proposed model for share valuation. According to him, the dividend policy of the firm affects the value of the shares. So, the dividends are relevant. He argues that the choice of dividend policies always affect the value of enterprise.

His study shows clearly the importance of the relationship between internal rates of return (r) and its cost of capital (k) in determining the dividend policy.

The assumptions of the Walter's Model are as follows.

- Firms finance all investment through retained earning. The external funds (i.e debt, new equity) are not used for new investment
- All earning on the firm's investment (r) and the cost of capital (k) are constant.
- All earnings are either distributed as dividend or reinvested internally.
- The value of EPS and DPS are assumed to remain constant forever in determining a given value.
- The firm has a perpetual or infinite life.

Based on these above assumption, Walter has given following formula of valuation of equity share.

$$P = \frac{DPS}{Ke} + \frac{\frac{r}{Ke(EPS-DPS)}}{Ke}$$

Where,

P= Market value of an equity share (Market price per share)

DPS= Dividend Per share

EPS= Earning per share

r = Rate of return on the firms' investment

Ke= Cost of capital/Capitalization rate.

According to Walters Model, the optimum dividend policy depends upon the relationship between the firm's internal rate of return and its cost of capital Walter suggested different dividend policy for different types of firm. There are three conditions, these are:

a) Growth firm (r>k)

If the internal rate of return (r) is higher than the firms cost of capital (K) these firms are said to be growth firm. I will better to remain all net profit(r) exceeds to (k) indicate that the firm is very capable to earn more than that which the share holders could be re-invested, if the earnings are paid to them. The market value per share increases by decreasing rate, the dividend in such a situation the market value of per share will be in maximum at zero dividends. For such firm optional dividend payout rate is zero. The correlation between dividend and stock price is negative.

b) Normal firm(r=k)

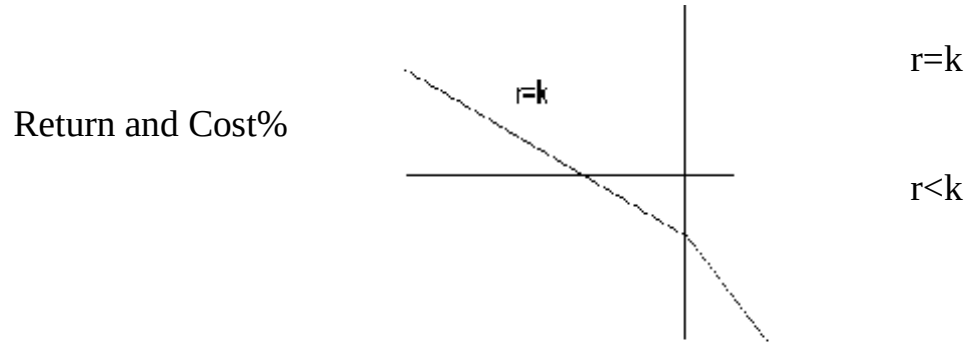
The firm having equal internal rate of return (r) and cost of capital (k) is known as normal firm. If the internal rate of return(r) is equal to the cost of capital (k) then the dividend payout does not affect the value of shares. In such a situation, the market price of shares will remains constant for all dividend payout ratios from 0 to 100. This type of firm is called as normal firm. There is no optimum dividend policy for such a firm.

c) Decreasing firm(r>k)

If the internal rate of return (r) if the firm is less than he cost of capital(k) it indicated that the share holders can earn higher return by investing elsewhere, the market value per share will increase by increasing rate, the dividend in such a situation. Such types if firm is called a declining firm. By distributing the entire earning as dividend, the value of the share will be at optimum level. This dividend payout ratio of 100% would be an optimum dividend policy

Figure:2.1

Walter Study



Earning, investment and new financing

Conclusion:

According to Walter, when the internal rate of return (r) is greater than cost of capital(k) then the dividends is negatively with stock prices, when the internal rate of return(r) and cost of capital (k) of the firm is equal than there is no relationship between dividends and stick prices. i.e. Dividend is different to variation in market price of shares (Walter, 1996:29-41)

2.2.5 Van Horne and MI Donald's study

Van Horne and MI Donald concluded a comprehensive study of 86 electric utility firms and 39 electronics and electric components industries by using cross sectional regression model in 1968 to know the combined effect of dividend policy and new equity financing decision on the market value of the firm's common stock.

From their study they concluded that the market price of shares was not affected by new equity financing In presence of cash dividend except for these in the highest new issue group and it made new equity more costly from of financing then retention of earning. They also indicate that the payment of dividend through excessive equity financing reduces the market price of shares.(Van Horne and Donalds, 1971:25-27)

2.2.6 Chawala And Shrinivasan's study

This study is also focused on the impact of dividend and retention market price of stock. They estimated cross sectional relationship of 18 chemical and 13 sugar industries for the year 1963 to 1973. The basis objectives of the study are:

- To set a model which explains the relationship between share price, dividend and retained earning?
- To set the dividend, retained earning hypothesis.
- To examine the structural changes in the estimated relations overtime.

To achieve above objectives, they used simultaneous equation model as developed by friend and puckeet in 1964.

The unspecified from the model in as follows.

Price function,

$P_t = F (D_t, R_t, P/E_{t-1}$

Dividend supply Function.

$D_t = F(E_t, D_{t-1}, P/E_{t-1})$

Identity, $E_t = D_t + R_t$

Where,

P = Market price of shares

D = Dividend per Shares

R = Retained Earning per share

E = Deviation from the sample, Average of price earning ratio.

P/E = Deviation from the sample, Average of price earning ratio

t = Subscript for time.

They used two stage least square techniques for estimation. They found that the estimated coefficient had a correct figure and coefficient of determination of all equation was higher in case chemical industry, which

implies that the stock price and dividend paid variation can be explained by their independent variables, but in case of sugar industry the sign for retained earning in negative.

From their study concluded that both dividend and retained earnings significantly explains the variation in share price of the industry.(Chawala and shrinivasan's 1987:14).

2.3 Review of journal and articles

Monohar K. Shrestha Study

An article, "public enterprises; Have they dividend paying ability?" was published in 1981 by D.r. Manohar Krishana, which gives short glimpse of the dividend performance of some enterprises of that time in Nepal.

D.r. Shrestha has highlighted following issues in his articles:

- NG Expects two things from the public enterprises:
  1) They should be in a position to pay minimum dividend.
  2) The public enterprises should be self supporting in financial matters in future years to come, but non of these two objectives are achieved by the public enterprises.
- One reasons for this efficiency is caused by excessive government interference in day- to day affairs. On the other hand, high- ranking officials of the HMG appointed on directors of board do nothing but simple shows their bureaucratic personalities. Bureaucracy has been the enemy of efficiency and Lead Corporation to face losses. Losing Corporation therefore not in position to pay dividend to government.
- Another reason is the lack of self-criticism and self-consciousness. The lack of favorable leaders is one of the biggest constrains to institution building moreover corporate leadership comes manager of corporations have not been able to identify themselves regarding what they can contribute as manager of Corporations. So HMG must be in a position to

drop a financial target in corporate investment by imposing financial obligation.

- The article point out irony of government bias well that government has not allowed banks to follow an independent dividend policy and HMG is focused to have pressurized on dividend payment in case of Nepal Bank from dividend obligation in spite of considerable profit.
- Need of criteria -suggested by Dr. Shrestha are:
  1) Adopt a criteria-guided policy to drain resources from Corporation through the medium of dividend payment.
  2) Realization by managers about the cost of equity and dividend obligation.
- If NG wants to tap resources through dividend the following criteria should be followed.

1) Circulating the information to all the public enterprises about the minimum rate of dividend.
2) Proper evaluation of public enterprise in terms capability of paying dividend should be made through Corporation Coordination committee.
3) Imposition of fixed rate of dividend by government to financially sound public enterprises.
4) Specifying performance criteria such as profit target in terms of emphasis, priority, timing and plans. Developing a strategic plan which is not just a statement of Corporation aspiration but must be done to convert the aspiration into reality.
5) Identification of Corporation objectives in corporation Act, Company Act or special character so as to clarity the public enterprises managers regarding their financial obligation to dividend to HMG.

Radheshyam Pradhan's

Radheshyam pradhan has concluded that his study on stock market behavior in the year 1992 in his study, he collected the data seventeen companies from the year 1986 to 1990 by the inspirations of the following objectives.

1) To access the stock behavior in Nepal.
2) To examine the relationship of market equity, market value or book value, price earnings and dividends with liquidity, leverage, assts turn over and interest coverage.

The conclusion of study related to dividend behavior are as follows:

i) Higher earning on stock leaders the larger ratio of Dps
ii) Stock with larger ratio of dividend per share to market price have lower leverage ratio.
iii) Positive relationship between the ratios of Dps to market price and interest coverage.
iv) Positive relationship between dividend payout and turnover ratios.
v) Positive relationship between dividends to pay out liquidity.
vi) Positive relationship between dividend payout and profitability.
vii) DPS and MPS are positively correlated.

2.4 Review from the thesis

There are few thesis available which have looked into corporate dividend behavior. The available thesis reviewed as follows:

A) Nithin Niroula's Study

Dividend policy and Effect on stock price with reference to Commercial Bank's conducted by Mr. Nithin Niroula's was carried out by using the secondary data of fire commercial Bank in 2009.

Objectives of the study are as follows

1) To compare the various aspects if dividend. Policy of the selected Commercial Banks.
2) To analyze the dividend policy and its effect on stock price changes.
3) To find out the relationship between the dividend with earnings, stock price and net worth.
4) To provide applicable suggestion on the basis of findings.

Major findings of the study:

1) The average earning per share of banks did not seem satisfactory except for SCBML and NABIL. The coefficient of variation indicated that except for NSBL, other banks; EPS seem satisfactory. The C.V ranges from 59.32% to 9.56%. among the banks under the study, SCBNL had highest average EPS with highest degree of fluctuation.
2) The average DPS showed that there was no consistency in payment if dividend. The C.V. ranged from log.82% to 15.21%. Among the banks under study, SCBNL had the highest average DPS and NSBL had the lowest. Except for SCBNL, other banks had high degree of fluctuation in dividend payout.
3) The analysis of DPR also showed high degree of fluctuation for other for other banks except for SCBNL. The fluctuation ranged from 117.38% to 19.48%. the study shows that HBL has the lowest DPR.
4) The analysis of MPS also showed that the average MPS of the MPS had quite high level of fluctuation. SCBNL had the highest average MPS followed by NABIL. Among the banks under study, NABIL had highest level of fluctuation whereas HBL and NIBL had low level of fluctuation.
5) The average dividend yield of the banks ranged from 4.53% to 0.62%. Among the banks SCBNL had the highest dividend yield with low level of

fluctuation. The fluctuation of dividend yield ranged from 129.17% to 49.50%.

6) The analysis of net worth per share should that SCBNL has the highest average NWPS and NSBL had the lowest. The C.V indicated that there was moderate level of fluctuation in NWPS of the banks under the study.

B) PADMA BHATTRAI'S STUDY

A comparative study of dividend pattern selected Nepalese Commercial Banks Conducted by Miss Padma Bhattrai was carried by using the secondary data of four Commercial Banks in 2008.

Objectives of the study are as follows

1) To identify what types if dividend policy being followed and find out whether the policy is appropriate or not.
2) To test the relationship between EPS and DPS; EY and DY; EPS and ,MPS
3) To know whether there is any uniformity among EPS, DPS and DPR of the selected banks or not.

Major findings of the study:

1) The average earning per share of related banks is satisfactory. In which SCBNL is in highest (i.e. Rs.156) position among four banks but NIBL is lowest (Rs.50.54) among this banks. Other hand EBL (Rs. 54.04) and HBL (Rs. 53.26) is the middle position from the highest lowest.
2) DPS is not satisfactory SCBNL paid highest (Rs.108) average dividend per share but EBL paid only-Rs. 7 as dividend per share and it is followed by NBIL and EBL from highest to lowest dividend per share to its share

debt. But EBL paid only Rs.7 as dividend per share, and it is followed by NBIL and EBL from to lowest dividend per share to its share-holders.

3) EPS and DPS of EBL has largest fluctuation and EPS and DPS of SCBNL has lowest fluctuation consistent among four banks, EPS of NBIL and HBL is followed the high fluctuation. Similarly, DPS of HBL and NIBL is followed the highest fluctuation from the highest to lowest.
4) Fluctuation in dividend percentage is highest in case of EBL (164.51%) while consistent in case of 19.95% of SCBNL among concerned banks.
5) Fluctuation of P/E ratio of SCBNL is 51.12 and consistent of P/E ratio of BIBL is 16.81

CHAPTER-3

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is defined as the guideline followed by the researcher in order to give the result of this study. It is a way to systematically solve the research problem. "Research methodology refers to the various sequential steps to adopt by a researcher in studying a problem with certain objects in view." In fact, research methodology is the outline of the research which the researcher is going to do. Here a focus is given to the research design, sources of data, population and sample method of analysis, tools defined about certain financial indicators, test of hypothesis and statistical tools used.

3.2 Research Design

By Research design we mean overall framework or plan for the activities to be undertaken during the course of a research study. The research design serves as a framework for the study, guiding the collection and analysis of the data, the research instruments to be utilized, and the sampling plan to be followed, specifically speaking, research design describes the general plan for collecting, analyzing and evaluating data after identifying.

What the researcher wants to know?

What has to be dealt with in order to obtain the required information?

The research design is an organized approach and not a collection of loose, unrelated parts. It is an integrated system that guides t he researcher in formulating, implementing and controlling the study useful research design can produce the answer to the proposed research questions. The research

design is thus as integrated from that guide the researcher in planning and executing the research works.

Kerlinger (1986) describes a research design as follows:

Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research question and to control variance. The plan is the overall scheme of program of the research. It includes an outline of what the investigator will do from writing the hypothesis and their operational implications to the final analysis of data. The structure of the research is more specific. It is the outline, the scheme, the paradigm of the operation of the variables. When we draw diagrams that outline the variable and their relation and juxtaposition, we guide structural schemes for accomplishing operational purpose. Strategy, as used here, is also more specific than plan. In other words, strategy implies now the research objectives will be faked (Kerlinger,1986:275)

Research design is like a philosophy of life; no one is without one, but some people are more aware of theirs and thus able to make more informed and consistent decision, similarly, every types of empirical research has an implicit, if not implicit, research design. Because a design always exists, it is important to make it implicit, to get it out in the open where it's strengths, limitations and implications can be clearly understood (Maxwell, 1996:34)

3.3 Population and Sample

"All the items under consideration in any field of inquiry constitute a universe or population." (C.R. Kothari op.cit;23.) A complete study of all the elements of the population is known as census inquiry. But, when field of study is large, this method becomes difficult to adopt in view of

resources involved time. Therefore sampling in made i.e. selected of only a few item will made from the population for the study. "The selected respondent constitute what is technically called a sample and the selection process is called sampling technique and the survey so conducted in known as the sample survey (ibid,23). The population of this study is as follows.

i) Nepal Bank Limited
ii) Rastriya Banijya Bank
iii) Nabil Bank Ltd.
iv) Nepal Investment Bank Limited.
v) Standard Charted Bank Limited.
vi) Himalayan Bank Limited.
vii) Nepal SBI Bank Ltd.
viii) Nepal Bangladesh Bank Ltd.
ix) Everest Bank Ltd.
x) Bank of Kathamandu
xi) Nepal Industrial and Commercial Bank Ltd.
xii) Nepal Credit and Commercial Bank Ltd.
xiii) Lumbini Bank Ltd.
xiv) Machhapuchhare Bank Ltd.
xv) Kumari Bank Ltd.
xvi) Laxmi Bank Ltd.
xvii) Siddhartha Bank Ltd.
xviii) Global Bank Ltd.
xix) Kist Bank Ltd.
xx) NMB Bank Ltd.
xxi) DCBL Bank Ltd.
xxii) Bank of Asia Nepal Ltd.
xxiii) Sunrise Bank Ltd.
xxiv) Prime commercial Bank Ltd.

xxv) Citizen Bank Ltd.

xxvi) Janta Bank Ltd.

xxvii) Mega Bank Ltd.

xxviii) Agriculture Development Bank Ltd

xxix) Commerz and Trust Bank Nepal Ltd.

xxx) Civil Bank Ltd

xxxi) Century commercial Bank ltd

xxxii) Sanima bank Ltd.

The research has taken only four commercial banks as sample, which are as follows:

1. Everest Bank Limited
2. Kumari Bank Ltd
3. Siddhartha Bank Ltd.
4. Bank of Kathmandu Limited.

This study is based on five years financial data, which can be indicated 2063/064 to 2067/2068 period.

3.4 Nature and Source of Data

The study is primarily based on secondary source of India. The required data have been collected from financial statement of listed companies which have located at www.Nepal Stock.com and official website of Nepal stock changed Ltd.

Financial data of previous five years of the selected banks are downloaded from www.Nepalstock.Com. Different books from library, Periodicals, news paper cutting, companies, magazines will also be used whenever required. Needless to say that this study is associated with past phenomena, therefore only the secondary data will be used to carry out the whole

calculations. Thus, the historical data from the NEPSE'S websites shall be used which obviously the secondary sources and past phenomena nature.

3.5 Data Processing Procedure

The study attempts to present the relevant data of selected banks by calculating useful financial indicators. Data are presented and explained the light of theoretical basis. Similarly, the collected data are arranged and presented in from of percentage, ratio and rupees etc.

3.6 Methods of Data Analysis

The facts and figure collected are to be systematically processed with a view to reducing them to manageable proportion; so that the statistical treatment and meaningful interpretation can be done to formulate theory or findings. Thus, the data analysis process comprises of editing, coding, categorization and tabulation and performing statistical analysis.

The data has been analyzed according to the pattern of data available, wide verities of methodology have been applied according to the reliability and consistency of data. Before using the analytical tools to compare result, the data containing in the financial statements have been grouped and re-arranged so as to make comparison easy. For the data of five years were taken as sample from 2004/05 to 2008/09. The data were analyzed in ways as:

→ Financially
→ Statistically

The results and the finding from the findings from the two types of analysis were jointly interpreted.

3.6.1 Financial Tools

1. Market Price Per Share(MPS)

It indicates the selling price of one share in the market. Here, MPS we mean the average market price per share. It is calculated as:

$$\text{MPS} = \frac{\text{Opening MPS-Closing MPS+High MPS+Low MPS}}{4}$$

2. Earning per Share(EPS)

Earning per share refers the rupees amount earned per share of common stock outstanding. It measures the return of each equity shareholders. It is also identified to measures the profitableness of the shareholders investment. The earning per share simple shows the profitability of the banks on a per share basis. The higher earning indicated the banks mobilizing their funds and vice versa. In other words, higher equity per share denotes the strength and lower earning per share indicates the weakness of the banks.

Earning per share in computed to know the earning capacity and to make comparison between concerned banks. This ratio can be computed by dividing the earning available to common shareholders by the total numbers of common stock outstanding of banks. Thus,

$$\text{EPS} = \frac{\textit{Total earning available to ordinary shareholder}}{\text{Number of ordinary share outstanding}}$$

3. Dividend in Percent

Dividend in percent indicates that the ratio of dividend per share to the paid up price per outstanding share. It is obtained by dividend per share paid up capital per share.

$$\text{Dividend in Percentage (\%)} = \frac{\text{Dividend per share}}{\text{Paid up Capital per share.}}$$

4. Dividend Per Share (DPS)

The part of earning distributed to the share holders as per share basis is known as DPS. It is the amount calculated by dividing the total dividend with total numbers of share outstanding.

$$DPS = \frac{\text{Total Dividend}}{\text{No. of common shares outstanding}}$$

5. Dividend payout Ratio(DPR)

The percentage of the profit on share, which is distributed as dividend is called dividend ratio(DPR). This ratio shows the percentage of profit, which is distributed as dividend and what percentage is retained as reserve and surplus for the grown of the bank. It is calculated with purpose of knowing earning's power and dividend policy of selected banks.

Mathematically it is calculated as;

$$\text{Dividend Payout Ratio (DPR)} = \frac{\text{Dividend Per Share(DPS)}}{\text{Earning per Share (EPS)}}$$

6. Retention Ratio

It is the ratio of earnings not distributed to total earnings and the retention is also calculated as the followings.

Retention Ratio= 1- Dividend Payout Ratio

Retention Ratio= 1-DPR

Or,

$$\text{Retention Ratio} = \frac{\text{Retained earning per share}}{\text{Earning per share}}$$

7. Price Earning ratio(P/E ratio):

P/E ratio expresses the amount currently paid to each rupee of currently reported by the balance sheet of company's earning per shares by the market .it is calculated using following formula.

$$\text{P/E Ratio} = \frac{\text{market value per share(MPS)}}{\text{Earning per share (EPS)}}$$

8. Dividend yield(DY):

Dividend yield is a percentage of dividends per share on market price per share. it measures the dividend in retain to market value per share so, the dividend yield is the dividend receive by the investors as a percentage of market prices per share in the stock market.

Mathematically,

$$\text{Dividend yield (D/Y)} = \frac{\text{Dividend per share(DPS)} * 100\%}{\text{Market price per share (MPS)}}$$

3.6.2 Statistical tools

The various statistical tools have been used for the analysis and interpretations of the study.in the study, the following statistical tools are to analyze the relationship between dividend and other variables.

$\bar{X}$

1. Mean or average(X)

The most popular and widely used measure of central tendency is the arithmetic mean or simply the mean. Arithmetic mean is the sum of all the observations on dividend by the number of observations is called arithmetic mean. It represents the entire data by a single value. In this study, the data

related to dividend are tabulated and drawn out average over different years.

Mathematically,

$$\text{Mean}(\bar{X}) = \frac{\sum x}{n}$$

Where,

$\sum x$= the sum of observation

N= No. of observations

2. Standard Deviation(σ)

Standard deviation measure the dispersion. In other worlds, SD shows that in what extent the given value is far from the central value. Higher the value S.D indicated he greater deviation from central value and vice versa. It is absolute measurement of dispersion. The study has used these tools to know the dispersion of each financial indicator of selected bank.

Mathematically;

$$\sigma = \sqrt{\frac{\sum (X-\bar{X})^2}{n-1}}$$

Here,

Sigma used to denote standard deviation.

X= Set of observation

$\bar{X}$= Arithmetic Means

N= Number of observation

3. Co-efficient of Variation (C.V):

Co-efficient of variation (C.V) is the most commonly used measures of relative variation. It is used in such problems where to compare the variability of two or more than two series. " The coefficient of variation(C.V) is the relative based on the standard deviation and is defined as the ratio of the standard deviation to the mean expressed in percent." (K.N. Shrestha, 1996:112). The series for which the co-efficient of variation is greater is said to be more variables or conversely less consistent, less uniform, less stable or less homogenous. On the other hand, the series for which co-efficient of variation is less said to be less variables or more consistent, more uniform, more homogenous. Co-efficient of variation is denoted by CV and is obtained as follows.

$$\text{Co-efficient of variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100\%$$

Where,

C.V = Co-efficient of variation

σ = Standard Deviation

$\bar{X}$ = Arithmetic Mean.

4. Correlation Coefficient(r)

Co-efficient of co-relation is an analytical tool for measuring co-variation between two or more variables. In other words, it measures the closeness of one variable with other variables. The relationship may be positive or negative which depends upon their movement. If variables move to the same directions, the co-relation will be positive and if the variables move to opposite directions from each other, then the co-relation will be negative. It is calculated to show the relationship between MPS and DPS, MPS and

EPS Earning Yield and Dividend yield, EPS and DPS, Dividend multiple and price earning ratio market capitalization with EPS and DPS.

Mathematically,

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

Where,

r = Karl persons Correlation co-efficient

N = Total number of observation

$\sum xy$ = Sum of the value of two variable multiplied.

$\sum x$ = Sum of the value of variable of 'X'

$\sum y$ = Sum of the value of varible'Y'

$\sum X^2$ =Sum of the squared value of variable'X'

$\sum Y^2$ = Sum of the squared value of variable'Y'

$(\sum X)^2$ = Squared of the value of variable of 'X'

$(\sum Y)^2$ = Squared of the value of variable of 'Y'

5. Regression Analysis

Regression analysis helps in estimating the value of variable from the known value of another variable is mostly used in economics and business research. The variable, which variables, is to be found out is called dependent variables and the variables whose is known, and with the help of these values we can estimate, is called independent variables. If there is only one independent variables used in regression then it is called simple regression and if there are more than two variables then it is called multiple regression.

Simple regression can be expressed as:

$Y = a+bx$

Where,

Y= Value of dependent variables

a = intercept, that does not very with the fluctuation in independent variable.

X= Value of independent variable.

Multiple regressions can be expressed as:

$Y = a_1+b_1x_1+b_2x_2+b_3x_3+\ldots\ldots\ldots\ldots b_n+x_n$

Where,

$b_1, b_2\ldots\ldots\ldots\ldots b_3$= regression coefficient of each independent variables which estimates the change in dependent variable for each unit change in that independent variable in regression model.

6. t-Statistics

It is used to test validity of assumption of the study for small sample. It is very difficult to make clear-cut distinction between small samples and large samples. Generally, a sample is termed as small, if $u<30$ from practical point of view. For applying t- distribution, the t-values are calculated first and compared with critical values at a certain level of significance for given degree of freedom. If the computed value of (t) exceeds the table value (say to 0.05), it is known that the difference is significance at 5% at level of significance but if t-values are less corresponding critical values of the t-distribution, the different in not treated as significant. T-value is calculated as follows:

$$\text{T-Value (t)} = \frac{b}{S_b}$$

Where,

b = Regression coefficient

S_b = Standard Error of Beta coefficient

7. F-Test

The technique of analysis of variance enables us to test for the significance of the different between more than two samples variance, we use F-test, the different between two samples means can be studied through t-test but to examine the equality between two or more sample variable at one and same time, ANOVA is used. Here, one-way ANOVA method is used to examine the equity between sample variables.

Formula:

$$F = \frac{\text{Various between samples}}{\text{Various within Samples}}$$

OR,

$$F = \frac{\text{Sum of square due to row between banks}}{\text{Sum of square due to error or within banks.}}$$

3.7 Test of Hypothesis

Statements of the relationship between two or more variable is called hypothesis. Hypothesis statements should be able to show the relationship between the variables. At the same time, they should carry clean implications for testing the stated relations. The reason on the thesis topic strongly holds the hypothesis criteria. The hypothesis of the research work is as follows:

A. Null Hypothesis (H_0)

There is no significant difference is MPS in sample banks.

Alternative Hypothesis (H_1):

There is significant difference in MPS in sample banks.

B. Null Hypothesis(H_0):

There is no significant different in EPS in Sample banks.

Alternative Hypothesis (H_1):

There is significant different in EPS in sample banks.

C. Null Hypothesis (H_0):

There is no significant different in DPS in sample banks.

Alternative hypothesis (H_1):

There is significant different in DPS in sample banks.

D. Null Hypothesis (H_0):

There is no significant different in DPR in sample banks.

Alternative hypothesis (H_1):

There is significant different in DPR in sample banks.

CHAPTER-4

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

The chapter entitled " Presentation and analysis of Data" is a crucial and has been organized to present the result and analyze them accordingly. The basic objectives of the study is to compare the dividend policies and practices of sample banks viz. Kumari Bank Ltd., Siddhartha Bank Ltd, Bank of Kathmandu Ltd and Everest Bank Ltd. In this chapter data are collected in tabular, graphic and diagram form and are analyzed using different statistical and financial tools.

4.1.1 Share price Analysis

This analysis shows the market price of share of each selected banks. So, inter bank comparison can be made. Similarly coefficient of variation is also calculated to find out the uniformity of given sample banks.

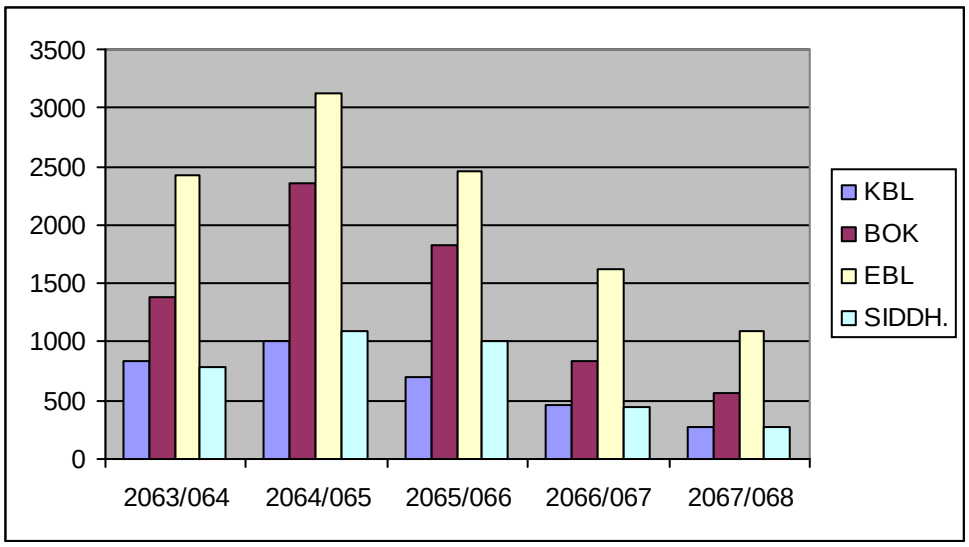
Table no.4.1

Market Price Per Share (in Rs.)

Year	KBL	BOK	EBL	SIDDH.
2063/064	830	1375	2430	778
2064/065	1005	2350	3132	1090
2065/066	700	1825	2455	1000
2066/067	468	840	1630	444
2067/068	266	570	1094	270
Average	653.80	1392	2148.20	716.40
S.D	261.32	645.90	710.11	315.36
C.V %	39.97	46.40	33.06	44.02

Source: Appendix I(A)

Figure 4.1
Market Price Per Share of banks



The above table 4.1 shows the MPS of related banks from the year 2063/064 to 2067/068. In the year 2064/065, MPS of every bank is increased .Then after; MPS of every bank is decreased accordingly. So, MPS of F/Y 2067/068 represents the lowest value of every bank. In the same way, standard deviation of bank is very high

4.1.2 Earning Per Share Analysis:

Earning Per Share (EPS) is an important financial indicator, which is calculated by dividing net profit after tax (NPAT) by the total number of common stocks outstanding. It measures the profitability of shareholders investment per share basis.

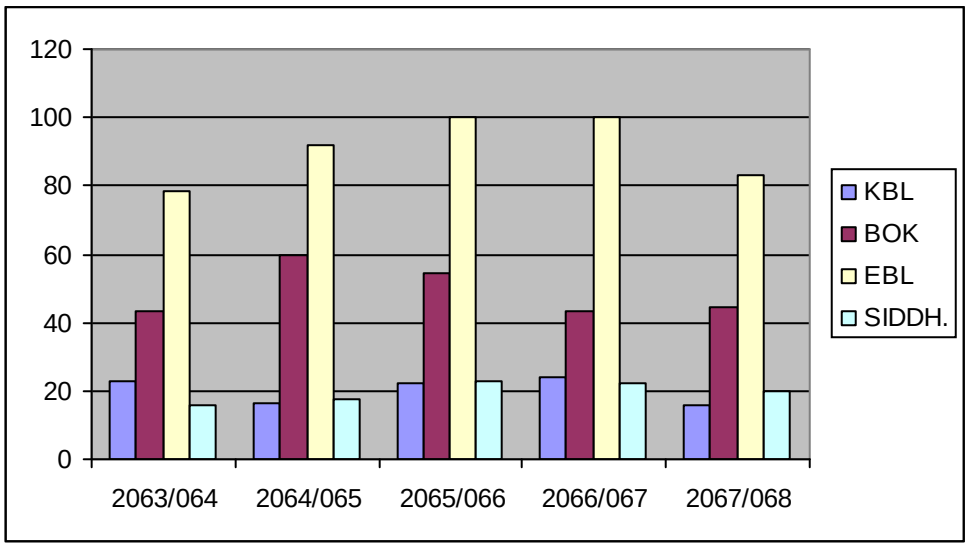
Table no.4.2

Earning Per Share (in Rs.)

Year	KBL	BOK	EBL	SIDDH.
2063/064	22.70	43.50	78.42	15.88
2064/065	16.35	59.94	91.82	17.29
2065/066	22.04	54.68	99.99	22.89
2066/067	24.24	43.08	100.16	21.99
2067/068	15.67	44.51	83.16	19.82
Average	20.20	49.14	90.71	19.57
S.D	3.50	6.89	8.77	2.67
C.V %	17.33	14.02	9.67	13.64

Source: Appendix I(B)

Figure 4.2
Earning Per Share of banks (in Rs.)



The above table 4.2 shows the EPS of related banks from the year 2063/064 to 2067/068.It represents the average earning per share of banks. EBL has highest average earning per share i.e. Rs.90.71 and Siddhartha bank has lowest average earning per share i.e. Rs. 19.57.It means Everest bank is earning high income among the sample banks. Similarly, CV of KBL is highest than that of sample banks, which represents that KBL has higher fluctuation in income

4.1.3 Dividend Per Share of Respective Banks

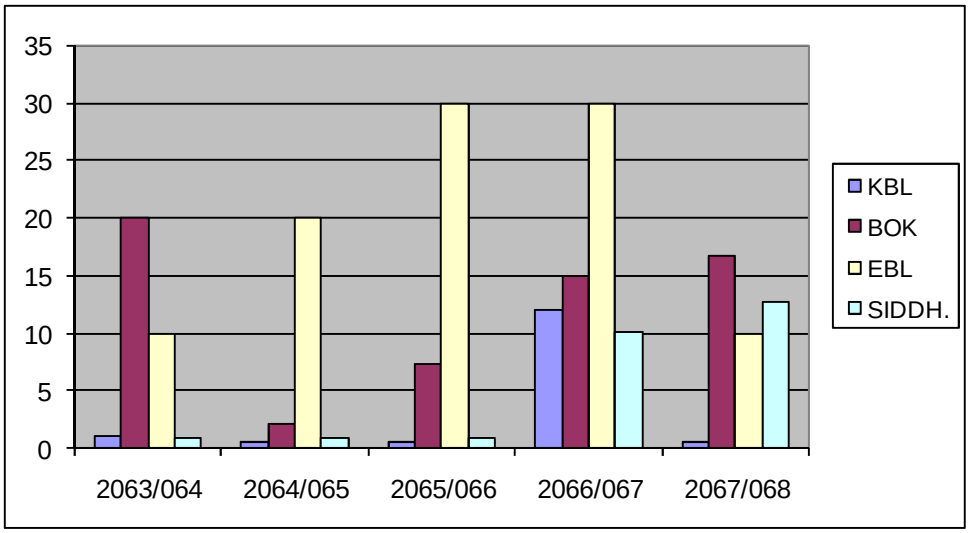
Dividend Per Share (DPS) is that part of earning which is distributed to the shareholders.

Table no.4.3
Dividend Per Share (in Rs.)

Year	KBL	BOK	EBL	SIDDH.
2063/064	1.05	20	10	0.79
2064/065	0.53	2.11	20	0.79
2065/066	0.55	7.37	30	0.79
2066/067	12	15	30	10.03
2067/068	0.44	16.75	10	12.79
Average	2.91	12.25	20	5.04
S.D	4.55	10.73	8.94	5.28
C.V %	156.36	87.59	44.72	104.76

Source: Appendix I(C)

Figure 4.3
Dividend Per Share of banks (in Rs.)



Above table shows the amount of dividend per share paid by the banks from the year 2063/064 to 2067/068.Average DPS of EBL is more than that of sample banks. Similarly, KBL has lowest DPS among the selected banks. Coefficient of Variation of KBL is highest, which shows more fluctuation in dividend.

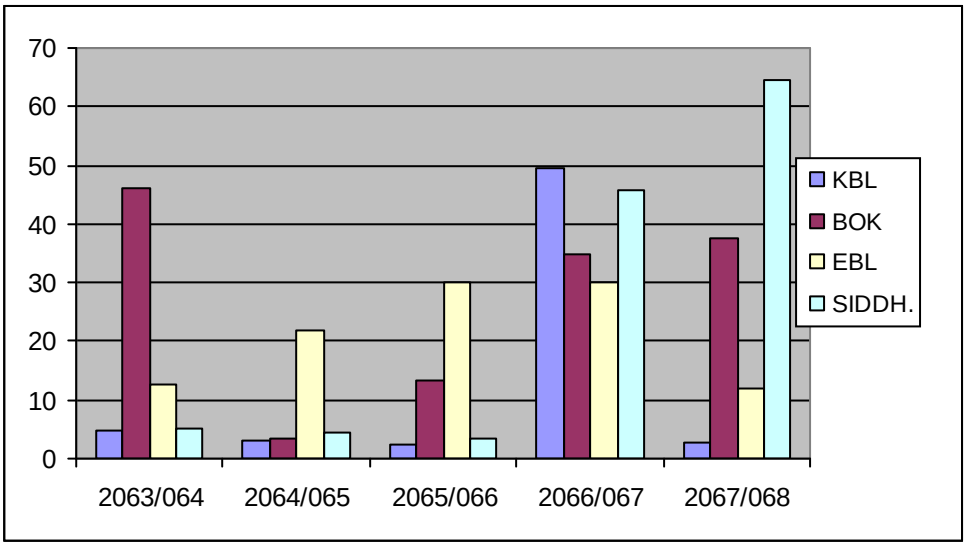
4.1.4 **Dividend Payout Ratio Analysis :**

Table no.4.4
Dividend Payout Ratio of Respected Banks (in %)

Year	**KBL**	**BOK**	**EBL**	**SIDDH.**
2063/064	4.63	45.98	12.75	4.97
2064/065	3.24	3.52	21.78	4.57
2065/066	2.5	13.48	30	3.45
2066/067	49.5	34.82	29.95	45.61
2067/068	2.81	37.63	12.03	64.53
Average	12.54	27.09	21.30	24.63
S.D	18.50	15.93	7.87	25.57
C.V %	147.50	58.80	36.95	103.83

Source: Appendix I(D)

Figure 4.4
Dividend payout Ratio of Respective Banks



The above table 4.4 shows the dividend payout ratio of four sample banks, which is the percentage of dividend paid out of earning generated. Company may comply three categories of dividend policy: Conservative, Moderate and Aggressive policy.

In the fiscal year 2067/068 , Siddhartha Bank applied aggressive dividend policy. It has 64.53 % dividend payout ratio .In the F/Y 066/067 ,Siddhartha bank applied moderate dividend policy and in the year 2063/064 to 2065/066 ,it has applied conservative dividend policy.
In the year 2066/067 , KBL applied moderate dividend policy and in other selected years , it has applied conservative dividend policy.

Similarly , EBL applied conservative dividend policy in the year 2063/064 and 2067/068 ,whereas it applied moderate dividend policy in the year 2064/065 to 2066/067 distributing dividend in the ration between 20 % to 50%.

BOK applied moderate dividend policy in the year 2063/064, 2066/067 and 2067/068 and applied conservative dividend policy for the fiscal year 2064/065 and 2065/066 distributing the dividend less than 20 %.

The average DPR of Siddhartha Bank Ltd i.e. 24.63% is highest and DPR of KBL i.e.12.54 % is lowest among the sample banks. The highest CV of KBL represents the higher fluctuation in DPR in comparison to other selected banks.

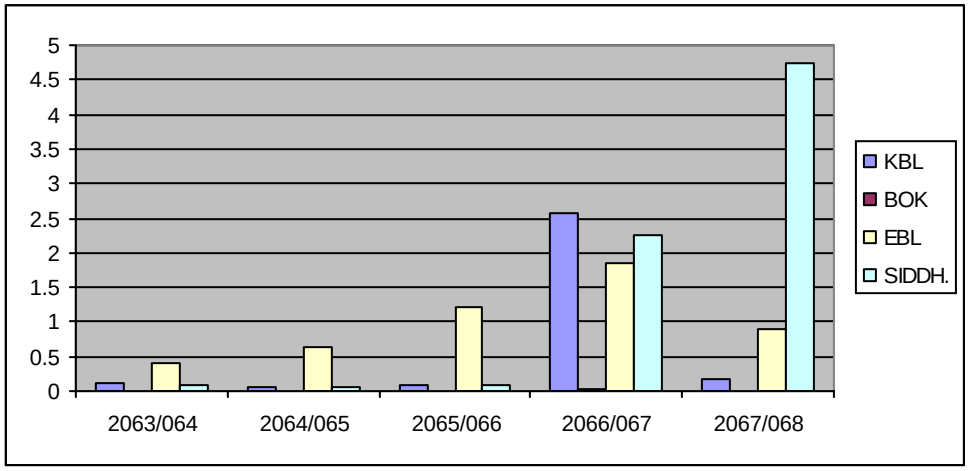
4.1.5 **Dividend Payout Ratio Analysis**

Table no.4.5
Dividend Yield of Respective Banks (in %)

Year	KBL	BOK	EBL	SIDDH.
2063/064	0.13	0.01	0.41	0.10
2064/065	0.05	0.0009	0.64	0.07
2065/066	0.08	0.004	1.22	0.08
2066/067	2.56	0.018	1.84	2.26
2067/068	0.17	0.0107	0.91	4.74
Average	0.60	0.01	1.004	1.45
S.D	0.98	0.0061	0.4979	1.84
C.V %	163.33	61	49.59	127.48

Source: Appendix I(E)

Figure 4.5
Dividend Yield of Respective Banks



Above table 4.5 shows the dividend yield analysis of four sample banks for the years 2063/064 to 2067/068 .In the year 2063/064,064/65 and 065/66

EBL has highest dividend yield of 0.41, 0.64 and 1.22. But in the year 2066/067, KBL has highest Dividend yield and in the year 2067/068 Siddhartha Bank has highest Dividend yield in comparison to other selected banks. In average also Siddhartha Bank has highest Dividend Yield. Higher CV of KBL represents the more fluctuation in dividend yield among sample banks.

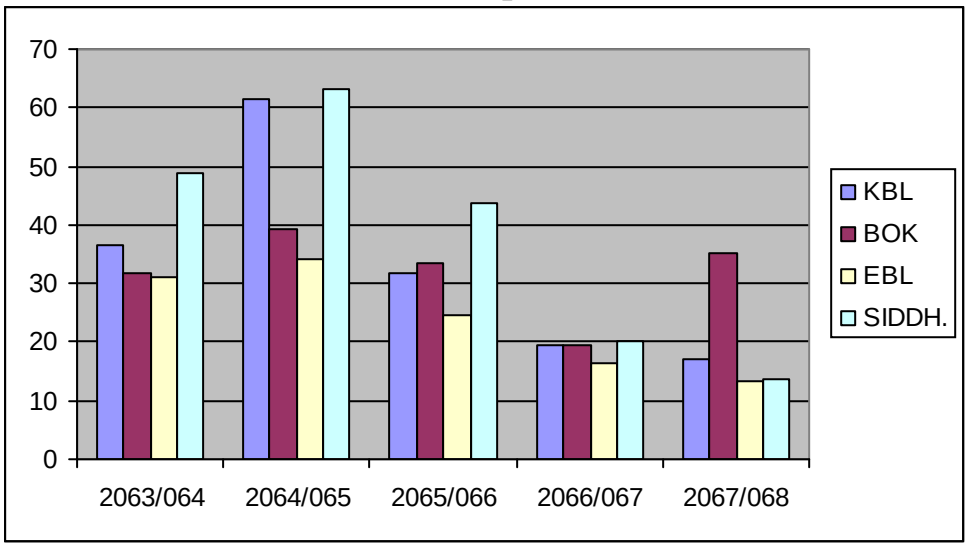
4.1.6 **Analysis of P/E Ratio:**

Table no.4.6
P/E Ratio of Respective Banks

Year	KBL	BOK	EBL	SIDDH.
2063/064	36.56	31.61	30.99	48.99
2064/065	61.47	39.21	34.11	63.04
2065/066	31.76	33.38	24.55	43.78
2066/067	19.31	19.50	16.27	20.19
2067/068	16.98	35.27	13.15	13.62
Average	33.22	31.79	23.81	37.92
S.D	15.92	6.64	8.1	18.40
C.V %	47.93	20.90	34.02	48.52

Source: Appendix I(F)

Figure 4.6
P/E Ratio of Respective Banks



Above table 4.6 shows the P/E Ratio of sample banks .This describes the relationship between EPS and MPS .

In the year 2063/064 P/E Ratio of KBL, BOK,EBL & SIDDH.,are 36.56, 31.61 , 30.99 & 48.99 respectively. Siddhartha Bank has highest P/E ratio and EBL has lowest P/E Ratio for the years 2063/064 to 2066/067, but in the year 2067/68, BOK has highest P/E Ratio i.e 35.27 and EBL has lowest P/E Ratio of 13.15 among the selected banks.

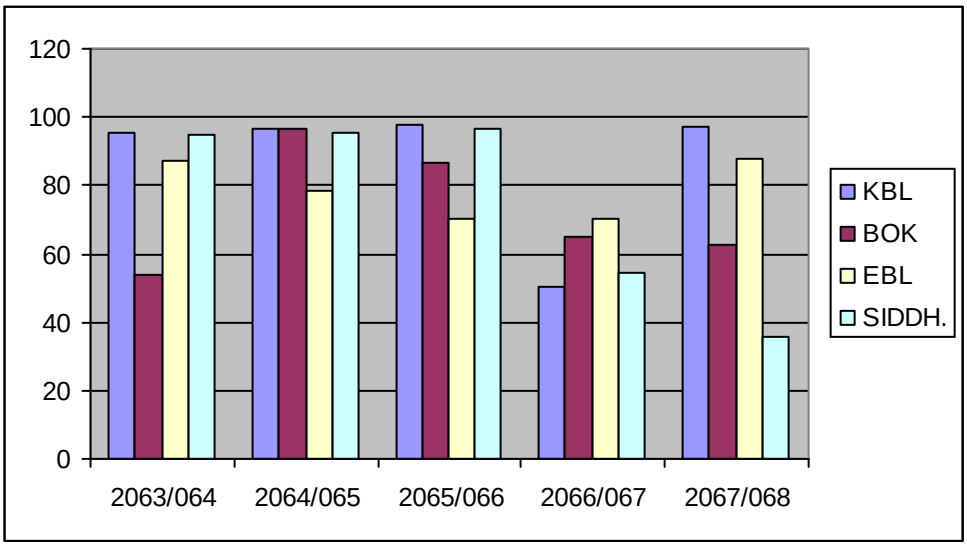
4.1.7 **Retention Ratio**

Table no.4.7
Retention Ratio of Respective Banks (in %)

Year	KBL	BOK	EBL	SIDDH.
2063/064	95.37	54.02	87.25	95.03
2064/065	96.76	96.48	78.22	95.43
2065/066	97.50	86.52	70	96.55
2066/067	50.50	65.18	70.05	54.39
2067/068	97.19	62.37	87.97	35.47
Average	87.46	72.91	78.70	75.37
S.D	18.49	15.92	7.87	25.57
C.V %	21.14	21.83	10	33.92

Source: Appendix I(G)

Figure 4.7
Retention Ratio of Respective Banks



Above table 4.7 shows the retention ratio analysis of four sample banks for the year 2063/064 to 2067/068.

In the year 2063/064 KBL has highest retention ratio of 95.37 and BOK has lowest retention ratio of 54.02.In the year 2064/65,065/66and 067/68 also KBL has highest retention ration in comparison to other selected banks. But in the year 2066/067 EBL has highest retention ratio.

In average, retention ratio of KBL is higher than that of others and BOK has lower retention ratio. The lowest CV of EBL i.e.10 % represents that retention ratio of EBL is more consistent than others.

4.2 Correlation Analysis

Correlation analysis helps to determine the strength of the linear relationship between two variables. In other words, as to how strongly are those two variables correlated. It helps to determine whether a positive or negative relationship exists between two variables and the relationship is significant or not.

4.2.1 Correlation between EPS and DPS

Table No. 4.8
Correlation Between EPS and DPS

Bank	r	Relationship	r^2	Probable Error	Sign/Insignificant
KBL	0.60	Positive	0.36	0.20	Insignificant.
BOK	-0.96	Negative	0.92	0.027	Insignificant.
EBL	0.98	Positive	0.96	0.0135	Significant.
SIDDH.	0.32	Positive	0.10	0.2698	Insignificant.

Source: Appendix II(B)

Above table 4.8 shows the relationship between EPS and DPS of sample banks. It is observed that the correlation of KBL,EBL and SIDDH. are positive, which represents that DPS and EPS of these banks are strongly correlated with each other .But in case of BOK ,here are correlating negatively indicate EPS and DPS of this bank are correlated negatively with each other.

The relationship between EPS and DPS, whether they are significant or not can be measured by calculating the probable error of the correlated coefficient. In case of KBL, it is less than 6 PE, so the relation between EPS and DPS is insignificant. In case of EBL, correlation coefficient is greater than 6 PE ,EPS is the key factor to determine DPS due to significant relationship between EPS and DPS.

The coefficient of determination is an important measure of the relationship between two variables and it can be presented as a proportion or percentage. The coefficient of determination between EPS and DPS of EBL is 0.96 which means that the change in EPS has a significant effect on the variation of DPS.

4.2.2 Correlation Between EPS and MPS

Table No. 4.9
Correlation Between EPS and MPS

Bank	r	Relationship	r2	Probable Error	Sign/Insignificant
KBL	0.0392	Positive	0.0015	0.3012	Insignificant.
BOK	0.8985	Positive	0.8073	0.0581	Significant.
EBL	0.11	Positive	0.01	0.2986	Insignificant.
SIDDH.	-0.2155	Negative	0.0464	0.2876	Insignificant.

Source: Appendix II(B)

Above table 4.9 shows the relationship between EPS and MPS of sample banks. It is observed that the correlation of KBL,BOK and EBL. are positive, which represents that MPS and EPS of these banks are strongly correlated with each other .But in case of SIDDH. , correlation indicates that EPS and MPS of this bank are correlated negatively with each other.

4.3 Regression Analysis:

Regression analysis is a very powerful tool in the field of statistical analysis in predicting the value of one variable, given the value of another

variable, when these two variables are related to each other. It describes about the effect to the dependent variable due to change in independent variable. The regression analysis either be simple regression or multiple .In simple regression analysis only one independent variable has taken for the prediction of the value of dependent variable. But multiple regression analysis involves two or more independent variables forming the basis of estimating the values In this research ,simple regression analysis is used to establish relationship between the dependent variable and single independent variable on individual sample company where the multiple regression analysis is used to show the combined relationship of dependent variable to other independent variable of all sample companies.

4.3.1 **Simple Regression Analysis**:

When we take only one independent variable to predict the value of the dependent variable through the appropriate regression line the analysis is known as simple regression analysis.

4.3.1.1 Simple Regression Analysis Between DPS and EPS

The major outcome of simple regression analysis between DPS and EPS of the sample banks based on the data are shown as follows:

Table no.4.10
Regression Analysis between DPS and EPS

Bank	No. of years	Constant (a)	Regressio coeff.(b)	S.E.E	Sβ	T-Value
KBL	5	-12.85	0.78	4.67	0.60	1.30
BOK	5	57.13	-0.9134	2.2713	0.1474	-6.1967
EBL	5	-71.07	1.0024	3.0334	0.1547	6.4796
SIDDH	5	-5.72	0.55	6.46	1.08	0.51

Source: Appendix II(A)

The above table no. 4.10 helps to find the mathematical equation that relates to dependent variable (DPS) with the independent variable

(EPS).The simple regression equation between DPS and EPS calculated in the appendix II is:

$$Y = a+bx$$

Let the independent variable DPS is denoted by y and independent variable EPS is denoted by x, and then the equation is:

DPS = a+bEPS

Now,

DPS (KBL)= -12.85+0.78EPS(KBL)

DPS (BOK)= 57.13+(-0.9134)XEPS(BOK)

DPS (EBL)= -71.07+1.0024EPS(EBL)

DPS (SIDDH.)= -5.72+0.55EPS (SIDDH.)

From the above table 4.10, regression coefficient (b) of BOK is - 0.9134, which indicates that one rupee increase in independent variable(EPS) leads to average Rs.0.9134 decrease in dependent variable(DPS) if the constant (a) remains same. Since calculated T-value of BOK (-6.1967) is less than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

Regression coefficient of KBL is 0.78, which indicates that one rupee increase in independent variable (EPS) leads to average Rs.0.78 increase in dependent variable (DPS) if the constant (a) remains same. Since calculated T-value of KBL 1.30 is less than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

In case of EBL, regression coefficient is 1.0024, which indicates that one rupee increase in independent variable (EPS) leads to average Rs 1.0024 increase in dependent variable (DPS) if the constant (a) remains same. Since calculated T-value of EBL 6.4796 is higher than the tabulated T-

value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically significant.

Similarly regression coefficient of SIDDH. is 0.55, which indicates that one rupee increase in independent variable (EPS) leads to average Rs.0.55 increase in dependent variable (DPS) if the constant (a) remains same. Since calculated T-value of KBL 0.51 is less than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

4.3.1.2 Simple Regression Analysis Between MPS and EPS

The major outcome of simple regression analysis between MPS and EPS of the sample banks based on the data are shown as follows:

Table no.4.11
Regression Analysis between MPS and EPS

Bank	No.of years	Constant (a)	Regression coeff.(b)	S.E.E	Sβ	T-Value
KBL	5	594.65	2.9281	337.11	43.055	0.068
BOK	5	-2747.55	84.24	365.42	23.72	3.5512
EBL	5	1318.20	9.15	910.81	46.45	0.197
SIDDH	5	1606.05	-45.46	390.15	65.24	-0.6968

Source: Appendix II(B)

The above table no. 4.10 helps to find the mathematical equation that relates to dependent variable (MPS) with the independent variable (EPS).The simple regression equation between MPS and EPS calculated in the appendix II is:

$$Y = a+bx$$

Let the independent variable MPS is denoted by y and independent variable EPS is denoted by x, and then the equation is:

MPS = a+bEPS

Now,

MPS (KBL)= 594.65+2.9281EPS(KBL)

MPS (BOK)= -2747.55+84.24XEPS(BOK)

MPS (EBL)= 1318.20+9.15EPS(EBL)

MPS (SIDDH.)= 1606.05+(-45.46)EPS (SIDDH.)

From the above table 4.10, regression coefficient (b) of BOK is 84.244, which indicates that one rupee increase in independent variable(EPS) leads to average Rs.84.24 increase in dependent variable(MPS) if the constant (a) remains same. Since calculated T-value of BOK 3.5512 is higher than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically significant.

Regression coefficient of KBL is 2.9281, which indicates that one rupee increase in independent variable (EPS) leads to average Rs.2.9281 increase in dependent variable (MPS) if the constant (a) remains same. Since calculated T-value of KBL 0.068 is less than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

In case of EBL, regression coefficient is 9.15, which indicates that one rupee increase in independent variable (EPS) leads to average Rs 9.15 increase in dependent variable (MPS) if the constant (a) remains same. Since calculated T-value of EBL 0.197 is less than the tabulated T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

Similarly regression coefficient of SIDDH. is -45.46, which indicates that one rupee increase in independent variable (EPS) leads to average Rs.45.46 decrease in dependent variable (MPS) if the constant (a) remains same. Since calculated T-value of KBL -0.6968 is less than the tabulated

T-value (2.78) at 5 % level of significance and 4 degree of freedom, so the result is statistically no significant.

4.3.2 Multiple Regression Analysis:

The simple regression coefficient shows the effect on one variable (dependent) of other variable(independent) .It does not tell the whole story that how much other independent variables affect the dependent variable. So, multiple regression coefficient analysis is used to avoid the weakness of the simple regression analysis. For this section MPS (dependent variable is regressed against the EPS and DPS (Independent variable).

4.3.2.1 Multiple Regression Analysis Between MPS on EPS and DPS.

The major outcome of simple regression analysis between MPS on EPS and DPS.of the sample banks based on the data are shown as follows:

Table no.4.12
Regression Analysis between MPS on EPS and DPS.

Bank	No. of years	Constant (a)	Regression coeff.(b)		S.E.E	F-Value
			EPS(b1)	DPS(b2)		
KBL	5	13.72	36.40	-32.67	299.68	24.16
BOK	5	-7313.55	157.31	79.62	320.67	17.77
EBL	5	12354.31	-146.79	155.49	849.55	54.99
SIDDH	5	1009.12	-0.0725	-57.82	118.37	19.94

Source: Appendix III

The above table no. 4.12 helps us to find the mathematical equation that relates to dependent variable (MPS) with the independent variables (EPS and DPS).The multiple regression equation between DPS and EPS calculated in the appendix III is:

$$X1 = a+b1X1+b2X2$$

Let the dependent variable MPS is denoted by X1 and independent variable EPS is denoted by X2 and DPS is denoted by X3, then the equation is:

MPS = a+b1EPS+b2DPS

Now,

MPS (KBL) = 13.72+36.40EPS+ (-32.67) DPS

MPS (BOK) = -7313.55+157.31EPS+79.62DPS

MPS (EBL) = 12354.31+ (-146.79) EPS+155.49DPS

MPS (SIDDH.)= 1009.12+ (-0.0725) EPS+ (-57.82) DPS

From the above table 4.12,the multiple regression line of MPS on EPS and DPS states that the regression coefficient (b) of EPS i.e.157.31 is positive and DPS (79.62) is also positive in case of BOK, which clearly indicated that a percent increase in EPS impact to MPS (dependent variable) increasing by 157.31 times and also DPS impact increasing by 79.62 times, if the constant (a) is -7313.55,and remains same since ,the calculated F-value of BOK (17.77) is greater than tabulated F-value (3.89) at 5% level of significance for (2,12) degree of freedom.So,Null Hypothesis (H0) is rejected and alternative hypothesis (H1) is accepted. Therefore we can conclude that the regression equation of X1 on X2 and X3 is significant. In other words, there is a linear relationship between dependent variable X1 (MPS) and two independent variable X2 (EPS) and X3 (DPS).

Likewise, the multiple regression line of MPS on EPS and DPS states that the regression coefficient (b) of EPS i.e.36.40 is positive and DPS -32.67 is negative in case of KBL, which clearly indicated that a percent increase in EPS impact to MPS (dependent variable) increasing by 36.40 times but DPS impact decreasing by 32.67 times, if the constant (a) is 13.72,and remains same. Since, the calculated F-value of KBL (24.16) is greater than tabulated F-value (3.89) at 5% level of significance for (2,12) degree of freedom.So,Null Hypothesis (H0) is rejected and alternative hypothesis (H1) is accepted. Therefore we can conclude that the regression equation

of X1 on X2 and X3 is significant. In other words, there is a linear relationship between dependent variable X1 (MPS) and two independent variable X2 (EPS) and X3 (DPS).

The multiple regression line of MPS on EPS and DPS states that the regression coefficient (b) of EPS i.e.-146.79 is negative and DPS 155.49 is positive in case of EBL, which clearly indicated that a percent increase in EPS impact to MPS (dependent variable) decreasing by 146.79 times but DPS impact increasing by 155.49 times, if the constant (a) is 12354.31,and remains same. Since, the calculated F-value of EBL (54.99) is greater than tabulated F-value (3.89) at 5% level of significance for (2,12) degree of freedom.So,Null Hypothesis (H0) is rejected and alternative hypothesis (H1) is accepted. Therefore we can conclude that the regression equation of X1 on X2 and X3 is significant. In other words, there is a linear relationship between dependent variable X1 (MPS) and two independent variable X2 (EPS) and X3 (DPS).

Similarly, the multiple regression line of MPS on EPS and DPS states that the regression coefficient (b) of EPS i.e.-0.0725 is negative and DPS -57.82 is also negative in case of SIDDH., which clearly indicated that a percent increase in EPS impact to MPS (dependent variable) decreasing by 0.0725 times and DPS impact decreasing by 57.82 times, if the constant (a) is 1009.12,and remains same. Since, the calculated F-value of SIDDH. (19.94) is greater than tabulated F-value (3.89) at 5% level of significance for (2,12) degree of freedom.So,Null Hypothesis (H0) is rejected and alternative hypothesis (H1) is accepted. Therefore we can conclude that the regression equation of X1 on X2 and X3 is significant. In other words, there is a linear relationship between dependent variable X1 (MPS) and two independent variable X2 (EPS) and X3 (DPS).

4.4 Major Findings:

Major findings obtained from the secondary data analysis are listed as follows:

(i) The analysis of EPS shows that EBL lies in the top position and it is followed by KBL, BOK and SIDDH.respectively.EBL has higher average EPS among selected banks. CV of KBL is greater than other selected banks and EBL has lowest CV .It indicates that common stock of EBL is less riskier as compared to other sample banks due to its lower C.V.

(ii) MPS of all four banks are fluctuating .It shows that the average MPS of EBL is highest and average MPS of KBL is lowest.BOK has highest CV and EBL has lowest CV among sample banks. It indicates that BOK has greater variability in MPS and its capital increasing rate is higher than others. But EBL has less variability in MPS.

(iii) DPS analysis of sample banks shows that DPS of EBL is greater and DPS of KBL is lower as compared to other sample banks. Higher DPS creates positive attitude of the shareholders towards the company which consequently helps to increase the market value of shares.CV of DPS of KBL is greatest and EBL is lowest. It indicates that among the sample banks, EBL has the highest consistency in paying dividend whereas DPS of KBL is highly fluctuating.

(iv) DPR of BOK is higher and KBL has lowest among selected banks, which indicates that BOK is following aggressive dividend policy and it has strong ability to pay the dividend than other selected banks. The CV of DPR of BOK indicates that the BOK's DPR to common shareholders are much better than other sample banks.

(v) Dividend Yield of Siddhartha Bank is higher and BOK has lower among all sample banks. It indicates that the shares of Siddhartha Bank is worth buying .The CV of D/Y is highest of KBL and lowest of Siddhartha which indicates that Siddhartha Bank has followed the highest consistency whereas D/Y of KBL is highly fluctuating than other sample banks.

(vi) There are not significance differences among P/E ratio of selected banks. These values are almost close to each other.

(vii) The average R/E of KBL is higher and R/E of BOK is lower among selected banks, which means there are more chance to gain profit from future investment opportunities for KBL.

(viii) Correlation between EPS and MPS is positive for all four banks.

(ix) The correlation between EPS and DPS is positive for KBL, EBLand SIDDH. Whereas BOK has negative correlation between EPS and DPS.

(x) The T-value between DPS and EPS shows that the result is statistically significant for EBL.

(xi) The T-value between MPS and EPS shows that the result is statistically significant for BOK.

(xii) The F-value between MPS on EPS and DPS indicates that there is linear relationship between MPS,EPS and DPS or the regression equation of MPS on EPS and DPS is significant for all the sample banks.

(xiii) The regression line of DPS and EPS shows that beta coefficient is positive for three banks except BOK.

CHAPTER-5

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter attempts to provide a summary and conclusion after comparatively analyzing the dividend policy of four banks named Kumari bank limited, Bank of Katmandu limited, Everest bank limited and Siddhartha bank limited. This chapter includes conclusion of the study based on major findings. It also tries to provide some recommendations to the concerned banks from the conclusion derived from the study. The chapter five is sub-divided into summary, conclusion and recommendation.

5.1 Summary:

Dividend decision is a major financial decision because the firm has to choose between distributing the profit to the shareholders or retain that amount for re-investment. Dividend refers to the distributed earnings to the shareholders of the company in return to their investment. Dividend may be affected by different factors such as earning of the firm, net worth, liquidity position of the firm, legal complications etc. These factors show the financial position of the company. If a firm has good performance in terms of these factors, the firm will be able to provide return in form of dividend.

This study covers some specific objectives mainly to find out the relationship between other financial indicators and also to find out the appropriate dividend policies of different banks. The study is mainly based on the secondary data of four commercial banks. It covers a period of five years from 2063/064 to 2067/068 .Many more analysis are conducted to find out the appropriate relationship between dividend and other variables to make the research reliable.

While analyzing the available data related to dividend policy of sample banks, it is found that EBL has highest EPS and DPS but BOK has highest DPR which indicates that BOK is following aggressive dividend policy as compared to other sample banks .The average R/E of KBL is highest and BOK is lowest among sample banks. Dividend Yield of Siddhartha Bank is higher and BOK has lower among all sample banks. It indicates that the shares of Siddhartha Bank is worth buying . The correlation between EPS and DPS is positive for KBL, EBLand SIDDH. Whereas BOK has negative correlation between EPS and DPS. The F-value between MPS on EPS and DPS indicates that there is linear relationship between MPS,EPS and DPS or the regression equation of MPS on EPS and DPS is significant for all the sample banks.

5.2 Conclusions:

The major findings or conclusion derived from the study of dividend policy analyzing various financial indicators and statistical tools of the sample banks are as follows:

BOK is following aggressive dividend policy as it has highest DPR as compared to other sample banks. The CV of DPR of BOK indicates that the BOK's DPR to common shareholders are much better than other sample banks.

EBL lies in the top position from point of view of EPS analysis among selected banks. CV of KBL is greater than other selected banks and EBL has lowest CV .It indicates that common stock of EBL is less riskier as compared to other sample banks due to its lower C.V.

The average R/E of KBL is higher and R/E of BOK is lower among selected banks, which means there are more chance to gain profit from future investment opportunities for KBL.

The major findings have also led to conclude that the companies are neglecting the major factors like earning position of the firm, liquidity

position of the firm while distributing dividend.

Most of the companies don't seem to follow the optimum dividend policy of paying regular dividend as per shareholders expectations.

The study covers only a period of five years. So, If a large sample is taken for the whole population, the result be vary and more accurate and absolute. So dividend policy may be subject of further study.

From the analysis, it is found that the market price of stock is affected by other variables which indicate about the rational behavior of investors.

5.3 Recommendations:

From the analysis of the findings and conclusions of the study, the following recommendation is offered to improve the present dividend policy and practices of the bank.

1. The policy and practices of dividend payment procedure adopted by the commercial banks are not stable because in some cases, small amount of dividend is distributed without considering the future effect. So, banks should be conscious about it.
2. Most of the sample banks have great fluctuation in terms of coefficient of variation (CV), EPS, MPS and DPS.Such fluctuations increases the risk factors among the investors. Therefore, the banks should take necessary steps towards bringing consistency in these factors.
3. Low Earning per share may be disappointed to shareholders. So bank should consider on increasing EPS by improving its earning.
4. The bank should consider about investment opportunity, competitors' strategy, economic and legal environment of the nation while taking dividend decision.
5. Nepalese commercial banks should give more priority to the

shareholders interest while formulating dividend policy.

6. The sample banks should go on to strengthen their human resource which is taken as the heart of the organization. On the other hand, the banks should develop its technologies in order to give quick services and to achieve competitive advantages.

BIBLIOGRAPHY

Black Fisher and Scholes, Myron, May (1974). *The effect of Dividend Yield and Dividend policy on common Stock Prices and Returns*, Journal of financial economics.

Brandt, Louis K. (1972). *Analysis of Financial Management*, Engle Wood Cliffs. N.J., Prentice Hall Ine.

Chawala, Deepak and Shrinicasam G.(1987). *Impact of Dividend and Retention On Share Prices*: An Economic study, Decision Vol.14

Friend, Irwin and Puckett, Marshal.(1964), *Dividends and Stock Prices*. The American Economic Review Vol.LIV

Gupta, D.P. (1998). *The Banking System*, UNCTAD/GATT, Geneva

Gitman, Lawrevnce J.(1994). *Principle of Managerial Finance*, 2nd Edition. New York, Harper Collins publishers.

Hasting, P.G.(1996). *The Management of Business Finance*, New York :Van Nostrand.

Holder, Mark E. Langreher Frederick and Hexter's J. Lawerance. (1998). *Dividend Policy Determinats: An investigation of the influences of stockholder Theory*. Financing Management,Vol.27

Jain and Khan, *Financial Management text and Problem*, Third Edition, Tata Mc Graw Hill Pvt. Ltd. New Delhi.

Linter, J. (1996), *Distribution of Incomes of Corporations among Dividend, Retained Earnings and Taxes*. American Economics Review Vol. 46.

Nepal Stock Exchange Ltd. *Financial Management of listed companies*, Volume III 95/96 & 97/98 NEPSE Singhadurbar Plaza, Kathmandu.

Shrestha Sunity, Silwal Dhurba Prasad, (2000). *Statistical Methods on Management for MBS*, 1st edition, Kathmandu: Winner Printing Press.

Van Horne, James C. and Mc. Donald, G. (1971), *Dividends policy and new equity financing* Journal of a Finance Vol. XXVI.

Wolf L. Howard and Pant, P.R. (2005), *Social and Science Research and Thesis Writing* 4th edition. Buddha Academic enterprises, Kathmandu, Nepal.

W. Reed Fward, Rechard V. Cotlel, Rechard K. Smith, (1976) *Commercial Banking*, Prentice Hall of India Pvt. Ltd. New Delhi.

Web Site:

www.nepalstock.com

www.nrb.org.np

APPENDIX-I(A)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(830-653.8)2+(1005-653.8)2+(700-653.8)2+(468-653.8)2+(266-653.8)2\}}{5}}$$

= 261.32

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=39.96%

For BOK

$$\delta = \sqrt{\frac{\sum(1375-1392)2+(2350-1392)2+(1825-1392)2+(840-1392)2+(570-1392)2}{5}}$$

δ = 645.9

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=46.40%

For EBL

$$\delta = \sqrt{\frac{\sum\{(2430-2148.2)2+(3132-2148.2)2+(2455-2148.2)2+(1630-2148.2)2+(1094-2148.2)2\}}{5}}$$

= 710.11

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=33.05%

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(778-716.40)2+(1090-716.40)2+(1000-716.40)2+(444-716.40)2+(270-716.40)2\}}{5}}$$

= 315.36

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=44.02%

APPENDIX-I(B)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(22.70-20.20)2+(16.35-20.20)2+(22.04-20.20)2+(24.24-20.20)2+(15.67-20.20)2\}}{5}}$$

$= 3.50$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=\frac{3.50 X 100\%}{20.20}$

$=17.33\%$

For BOK

$$\delta = \sqrt{\frac{\sum\{(43.50-49.14)2+(59.94-49.14)2+(54.68-49.14)2+(43.08-49.14)2+(44.51-49.14)2\}}{5}}$$

$= 6.89$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=14.02\%$

For EBL

$$\delta = \sqrt{\frac{\sum\{(78.42-90.71)2+(91.82-90.71)2+(99.99-90.71)2+(100.16-90.71)2+(83.18-90.71)2\}}{5}}$$

$= 8.77$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=9.67\%$

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(15.88-19.57)2+(17.29-19.57)2+(22.89-19.57)2+(21.99-19.57)2+(19.82-19.57)2\}}{5}}$$

$= 2.67$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=13.64\%$

APPENDIX-I(C)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(1.05-2.91)2+(0.53-2.91)2+(0.55-2.91)2+(12-2.91)2+(0.44-2.91)2\}}{5}}$$

$= 4.55$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$$= \frac{4.55 \times 100\%}{2.91}$$

$=156.36\%$

For BOK

$$\delta = \sqrt{\frac{\sum\{(20-12.25)2+(2.11-12.25)2+(7.37-12.25)2+(15-12.25)2+(16.75-12.25)2\}}{5}}$$

$= 10.73$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=89.59\%$

For EBL

$$\delta = \sqrt{\frac{\sum\{(10-20)2+(20-20)2+(30-20)2+(30-20)2+(10-20)2\}}{5}}$$

$= 8.94$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=44.72\%$

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(0.79-5.04)2+(0.79-5.04)2+(0.79-5.04)2+(10.03-5.04)2+(12.79-5.04)2\}}{5}}$$

$= 5.28$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=104.76\%$

-APPENDIX-I(D)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(4.63-12.54)2+(3.24-12.54)2+(2.5-12.54)2+(49.5-12.54)2+(2.81-12.54)2\}}{5}}$$

$= 18.50$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$= \frac{18.50 X 100\%}{12.54}$

$=147.50\%$

For BOK

$$\delta = \sqrt{\frac{\sum\{(45.98-27.09)2+(3.52-27.09)2+(13.48-27.09)2+(34.82-27.09)2+(37.63-27.09)2\}}{5}}$$

$= 15.93$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=58.80\%$

For EBL

$$\delta = \sqrt{\frac{\sum\{(12.75-21.30)2+(21.78-21.30)2+(30-21.30)2+(29.95-21.30)2+(12.03-21.30)2\}}{5}}$$

$= 7.87$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=36.95\%$

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(4.97-24.63)2+(4.57-24.63)2+(3.45-24.63)2+(45.61-24.63)2+(64.53-24.63)2\}}{5}}$$

$= 25.57$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=103.83\%$

APPENDIX-I(E)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(0.13-0.60)2+(0.05-0.60)2+(0.08-0.60)2+(2.56-0.60)2+(0.17-0.60)2\}}{5}}$$

$= 0.98$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$$= \frac{0.98X100\%}{0.60}$$

$=163.33\%$

For BOK

$$\delta = \sqrt{\frac{\sum\{(0.01-0.01)2+(0.0009-0.01)2+(0.004-0.01)2+(0.018-0.01)2+(0.0107-0.01)2\}}{5}}$$

$= 0.0061$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=61\%$

For EBL

$$\delta = \sqrt{\frac{\sum\{(0.41-1.004)2+(0.84-1.004)2+(1.22-1.004)2+(1.84-1.004)2+(0.91-1.004)2\}}{5}}$$

$= 0.4979$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=49.59\%$

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(0.10-1.45)2+(0.07-1.45)2+(0.08-1.45)2+(2.26-1.45)2+(4.74-1.45)2\}}{5}}$$

$= 1.84$

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$=127.48\%$

APPENDIX-I(F)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(36.56-33.22)2+(61.47-33.22)2+(31.76-33.22)2+(19.31-33.22)2+(16.98-33.22)2\}}{5}}$$

= 15.92

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

$$= \frac{15.92 X 100\%}{33.22}$$

=47.93%

For BOK

$$\delta = \sqrt{\frac{\sum\{(31.61-31.79)2+(39.21-31.79)2+(33.38-31.79)2+(19.50-31.79)2+(35.27-31.79)2\}}{5}}$$

= 6.64

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=20.90%

For EBL

$$\delta = \sqrt{\frac{\sum\{(30.99-23.81)2+(34.11-23.81)2+(24.55-23.81)2+(16.27-23.81)2+(13.15-23.81)2\}}{5}}$$

= 8.10

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=34.02%

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(48.99-37.92)2+(63.04-37.92)2+(43.78-37.92)2+(20.19-37.92)2+(13.62-37.92)2\}}{5}}$$

= 18.40

$$CV = \frac{\delta \times 100\%}{\bar{X}}$$

=48.52%

APPENDIX-I(G)

For Kumari Bank Limited

$$\delta = \sqrt{\frac{\sum(X-\bar{X})2}{N}}$$

$$\delta = \sqrt{\frac{\sum\{(95.37-87.46)2+(96.76-87.46)2+(97.5-87.46)2+(50.50-87.46)2+(97.19-87.46)2\}}{5}}$$

$= 18.49$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$= \frac{18.49X100\%}{87.46}$

$=21.14\%$

For BOK

$$\delta = \sqrt{\frac{\sum\{(54.02-72.91)2+(96.48-72.91)2+(86.52-72.91)2+(65.18-72.91)2+(62.37-72.91)2\}}{5}}$$

$= 15.92$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=21.83\%$

For EBL

$$\delta = \sqrt{\frac{\sum\{(87.25-78.70)2+(78.22-78.70)2+(70-78.70)2+(70.05-78.70)2+(87.97-78.70)2\}}{5}}$$

$= 7.87$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=10\%$

For Siddhartha Bank Limited

$$\delta = \sqrt{\frac{\sum\{(95.03-75.37)2+(95.43-75.37)2+(96.55-75.37)2+(54.39-75.37)2+(35.47-75.37)2\}}{5}}$$

$= 25.57$

$CV = \frac{\delta \times 100\%}{\bar{X}}$

$=33.92\%$

APPENDIX-II(A)

For KBL

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
22.70	1.05	515.29	1.1	23.835	6.25
16.35	0.53	267.32	0.28	8.67	14.82
22.04	0.55	485.76	0.30	12.12	3.39
24.24	12	587.58	144	290.88	16.32
15.67	0.44	245.55	0.19	6.89	20.52
∑X= 101	∑Y=4.57	∑X2= 2101.50	∑Y2= 145.87	∑XY= 342.40	∑ (X-x)2= 61.30

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X} = \frac{\sum X}{N}$$

$$= \frac{101}{5}$$

=20.20

Coefficient of correlation (r) = $\frac{n\sum XY - \sum X . \sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$$= \frac{5X342.40-101X14.57}{\sqrt{5X2101.50-(101)2}\ \sqrt{5X145.87-(14.57)2}}$$

= 0.60

Coefficient of Determination (r2) = $(0.60)^2$

= 0.36

Standard error of correlation = $\frac{1-r^2}{\sqrt{5}}$

= 0.29

Probable error of correlation coefficient, P.E.(r) = $0.6745x\frac{(1-r^2)}{\sqrt{5}}$

= 0.6745x0.29

= 0.20

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

b= $\frac{n\sum XY-\sum X.\sum Y}{n\sum X2-(\sum X)2}$

= $\frac{5x342.40-101x14.57}{5x2101.50-(101)2}$

= 0.78

a= $\bar{Y}-b\bar{X}$

=2.91-0.78X20.20

= -12.85

Hence the required simple regression equation is as follows:

Y= -12.85+0.78X

Standard error of estimate (S.E.E) = $\sqrt{\frac{(\sum Y2-a\sum Y-b\sum XY)}{(n-2)}}$

= $\sqrt{\frac{(145.87-(-12.8)X14.57-0.78X342.40)}{(5-2)}}$

= 4.67

Standard error of Beta coefficient (Sb) = $\frac{S.E.E}{\sqrt{(X-X)2}}$

= 4.678/√ 61.30

= 0.60

T-Value (t) = b/Sb

= 0.78/0.60

= 1.30

For BOK

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
43.50	20	1892.25	400	870	31.82
59.94	2.11	3592.80	4.45	126.47	116.64
54.68	7.37	2989.90	54.32	402.99	30.69
43.08	15	1855.89	225	664.20	36.72
44.51	16.75	1981.14	280.56	745.54	21.44
∑X=245.71	∑Y=61.23	$\sum X^2$= 12311.98	$\sum Y^2$= 964.33	∑XY= 2791.21	∑(X-x)2= 237.30

Regression of Y on X , Y= a+bX

a= regression constant

$\bar{X}=\frac{\sum X}{N}$

=$\frac{245.71}{5}$

=49.14

$\bar{Y}$ =12.25

Coefficient of correlation (r) = $\frac{n\sum XY-\sum X.\sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$= \frac{5X2792.21-245.71X61.23}{\sqrt{5X12311.98-(245.71)2}\ \sqrt{5X964.33-(61.23)2}}$

= -0.96

Coefficient of Determination (r2) = (-0.96)2

= 0.92

Standard error of correlation $= \frac{1-r2}{\sqrt{5}}$

= 0.04

Probable error of correlation coefficient, P.E.(r) $= 0.6745x\frac{(1-r2)}{\sqrt{5}}$

= 0.6745x0.04

= 0.027

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

$b= \frac{n\sum XY-\sum X.\sum Y}{n\sum X2-(\sum X)2}$

$= \frac{5X792.21-245.71X61.23}{5x12311.98-(245.71)2}$

= -0.9134

$a= \bar{Y}-b\bar{X}$

=12.25-(-0.9134) X49.14

= 57.1345

Hence the required simple regression equation is as follows:

Y= 57.1345+(-0.9134)X

Standard error of estimate (S.E.E) = $\sqrt{\frac{(\sum Y2-a\sum Y-b\sum XY)}{(n-2)}}$

=

$$\sqrt{\frac{(964.33-57.1345X61.23+0.9134X2791.21)}{(5-2)}}$$

= 2.2713

Standard error of Beta coefficient (Sb) = $\frac{S.E.E}{\sqrt{(X-X)2}}$

= $\frac{2.2713}{\sqrt{237.3}}$

= 0.1474

T-Value (t) = $\frac{b}{Sb}$

= -0.9134/0.1474

= -6.1967

For EBL

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
78.42	10	6149.69	100	784.2	151.04
91.82	20	8430.91	400	1836.4	1.23
99.99	30	9998	900	2999.7	86.12
100.16	30	10032.03	900	3004.8	89.30
83.18	10	6918.91	100	831.8	56.70
∑X= 453.57	∑Y=100	$\sum X^2$= 41529.54	∑Y2= 2400	∑XY= 9456.9	$\sum (X-x)^2$= 384.39

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X} = \frac{\sum X}{N}$$

$$= \frac{437.57}{5}$$

$$= 90.71$$

$$\bar{Y} = 20$$

Coefficient of correlation (r) $= \dfrac{n\sum XY - \sum X . \sum Y}{\sqrt{n\sum X2 - (\sum X)2}\ \sqrt{n\sum Y2 - (\sum Y)2}}$

$$= \frac{5X9456.70 - 453.57X100}{\sqrt{5X41529.54 - (453.57)2}\ \sqrt{5X2400 - (100)2}}$$

$$= 0.98$$

Coefficient of Determination $(r2) = (0.98)^2$

$$= 0.96$$

Standard error of correlation $= \dfrac{1-r2}{\sqrt{5}}$

$$= 0.02$$

Probable error of correlation coefficient, $P.E.(r) = 0.6745x\dfrac{(1-r2)}{\sqrt{5}}$

$$= 0.6745x0.02$$

$$= 0.0135$$

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

$$b = \frac{n\sum XY - \sum X.\sum Y}{n\sum X2 - (\sum X)2}$$

$= \frac{5X9456.70-453.57X100}{5X41529.54-(453.57)2}$

$= 1.0024$

$a= \bar{Y}-b\bar{X}$

$=20-1.004X90.71$

$= -71.07$

Hence the required simple regression equation is as follows:

$Y= -71.70+1.0024X$

Standard error of estimate (S.E.E) $= \sqrt{\frac{(\sum Y2-a\sum Y-b\sum XY)}{(n-2)}}$

$= \sqrt{\frac{(2400-(-71.07)X100-1.0024X9456.70)}{(5-2)}}$

$= 3.0334$

Standard error of Beta coefficient (Sb) = $\frac{S.E.E}{\sqrt{(X-X)2}}$

$= 3.0334/\sqrt{384.39}$

$= 0.1547$

T-Value (t) = $\frac{b}{Sb}$

$= 1.0024/0.1547$

$= 6.4796$

For Siddhartha Bank Limited

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
15.88	0.79	252.17	0.62	12.5452	13.62
17.29	0.79	298.94	0.62	13.6591	5.20
22.89	0.79	523.95	0.62	18.0831	11.02
21.99	10.03	483.56	100.60	220.5597	5.86
19.82	12.79	392.83	163.58	253.4978	0.06
$\sum X=97.82$	$\sum Y=$ 25.19	$\sum X^2=$ 1961.45	$\sum Y^2=$ 266.04	$\sum XY=$ 518.34	$\sum (X-x)^2=$ 35.76

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X} = \frac{\sum X}{N}$$

$$= \frac{97.87}{5}$$

=19.57

$\bar{Y}$=5.04

Coefficient of correlation (r) = $\frac{n\sum XY - \sum X . \sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$$= \frac{5X518.34-97.87X25.19}{\sqrt{5X1961.45-(97.87)2}\ \sqrt{5X266.04-(25.19)2}}$$

= 0.32

Coefficient of Determination (r2) = (0.32)2

= 0.10

Standard error of correlation = $\frac{1-r2}{\sqrt{5}}$

= 0.40

Probable error of correlation coefficient, P.E.(r) =0.6745x$\frac{(1-r2)}{\sqrt{5}}$

= 0.6745x0.40

= 0.2698

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

b= $\frac{n\sum XY-\sum X.\sum Y}{n\sum X2-(\sum X)2}$

= 5X518.34-97.87X25.19

5X1961.45-(97.87)2

= 0.55

a= $\bar{Y}$-b$\bar{X}$

=5.04-0.55X19.57

= -5.72

Hence the required simple regression equation is as follows:

Y= -5.72+0.55X

Standard error of estimate (S.E.E) = $\sqrt{\frac{(\sum Y2-a\sum Y-b\sum XY)}{(n-2)}}$

= $\sqrt{\frac{(266.04+5.72X25.19-0.55X\overline{518.34})}{(5-2)}}$

= 6.46

Standard error of Beta coefficient (Sb) = $\frac{S.E.E}{\sqrt{(X-\bar{X})2}}$

= 6.46/√ 35.76

= 1.08

T-Value (t) = b/Sb

= 0.55/1.08

= 0.51

APPENDIX-II(B)

For KBL

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
22.70	830	515.29	688900	18841	6.25
16.35	1005	267.32	1010025	16431.75	14.8225
22.04	700	485.76	490000	15428	3.3856
24.24	468	587.58	219024	11344.32	16.3216
15.67	266	245.55	70756	4168.22	20.5209
$\sum X=101$	$\sum Y=$ 3269	$\sum X^2=$ 2101.50	$\sum Y^2=$ 2478705	$\sum XY=$ 66213.29	$\sum (X-x)^2=$ 61.3006

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X}=\frac{\sum X}{N}$$

$$=\frac{101}{5}$$

=20.20

Y=653.80

Coefficient of correlation (r) = $\frac{n\sum XY-\sum X.\sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$$= \frac{5X66213.29-101X3269}{\sqrt{5X2101.50-(101)2}\ \sqrt{5X2478705-(3269)2}}$$

= 0.0392

Coefficient of Determination (r2) = (0.0392)2

= 0.0015

Standard error of correlation $=\frac{1-r2}{\sqrt{5}}$

= 0.4465

Probable error of correlation coefficient, P.E.(r) $=0.6745x\frac{(1-r2)}{\sqrt{5}}$

$= 0.6745x0.4465$

$= 0.3012$

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation,
we get

$b= \frac{n\sum XY-\sum X.\sum Y}{n\sum X2-(\sum X)2}$

$= \frac{5X66213.29-101X3269}{5x2101.50-(101)2}$

$= 2.9281$

$a= \bar{Y}-b\bar{X}$

$=653.80-2.928X20.20$

$= 594.65$

Hence the required simple regression equation is as follows:
Y= 594.65+2.928X

Standard error of estimate (S.E.E) $= \sqrt{\frac{(\sum Y2-a\sum Y-b\sum XY)}{(n-2)}}$

$= \sqrt{\frac{(2478705-594.65X3269-2.9281X66213.29)}{(5-2)}}$

$= 337.1029$

Standard error of Beta coefficient (Sb) = $\frac{S.E.E}{\sqrt{(X-X)2}}$

$= 337.1029/\sqrt{61.3006}$

$= 43.055$

T-Value (t) = b/Sb

$= 2.9281/43.055$

$= 0.068$

For BOK

EPS(X)	DPS(Y)	X2	Y2	XY	(X-x)2
43.50	1375	1892.25	1890625	59812.5	31.81
59.94	2350	3592.80	5522500	140859	116.64
54.68	1825	2989.90	3330625	99791	30.69
43.08	840	1855.89	705600	99791	36.72
44.51	570	1981.14	324900	25370.7	21.44
∑X= 245.71	∑Y= 6960	∑X2= 12311.98	∑Y2= 11774250	∑XY= 362020.40	∑ (X-x)2= 237.30

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X} = \frac{\sum X}{N}$$

$$= \frac{245.71}{5}$$

=49.14

$\bar{Y}$=1392

Coefficient of correlation (r) = $\frac{n\sum XY - \sum X . \sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$$= \frac{5X362020.40-245.71X6960}{\sqrt{5X12311.98-(245.71)2}\ \sqrt{5X11774250-(6960)2}}$$

= 0.8985

Coefficient of Determination (r2) = (0.8985)2

= 0.8073

Standard error of correlation $= \frac{1-r2}{\sqrt{5}}$

= 0.0862

Probable error of correlation coefficient, P.E.(r) $= 0.6745x\frac{(1-r2)}{\sqrt{5}}$

= 0.6745x0.0862

= 0.0581

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

$$b = \frac{n\sum XY - \sum X.\sum Y}{n\sum X2 - (\sum X)2}$$

$$= \frac{5X362020.40 - 245.71X6960}{5x12311.98 - (245.71)2}$$

$$= 84.24$$

$$a = \bar{Y} - b\bar{X}$$

$$= 1392 - 84.24X49.14$$

$$= -2747.55$$

Hence the required simple regression equation is as follows:

$$Y = -2747.55 + 84.24X$$

Standard error of estimate (S.E.E) $= \sqrt{\frac{(\sum Y2 - a\sum Y - b\sum XY)}{(n-2)}}$

$$= \sqrt{\frac{(11774250 + 2747.55X6960 - 84.24X362020.40)}{(5-2)}}$$

$$= 365.42$$

Standard error of Beta coefficient (Sb) $= \frac{S.E.E}{\sqrt{(X-X)2}}$

$$= 365.42/\sqrt{237.30}$$

$$= 23.72$$

T-Value (t) $= b/Sb$

$$= 84.24/23.72$$

$$= 3.5512$$

For EBL

EPS(X)	DPS(Y)	X^2	Y^2	XY	(X-x)2
78.42	2430	6149.69	5904900	190560.6	151.044
91.82	3132	8430.91	9809424	287580.24	1.23
99.99	2455	9998	6027025	245475.45	86.12
100.16	1630	10032.03	2656900	163260.8	89.30
83.18	1094	6918.91	1196836	90998.92	56.70
$\sum X$= 453.57	$\sum Y$= 10741	$\sum X^2$= 41529.54	$\sum Y^2$= 25595085	$\sum XY$= 977876.01	$\sum$ (X-x)2= 384.39

Regression of Y on X , Y= a+bX

a= regression constant

$\bar{X} = \frac{\sum X}{N}$

$= \frac{437.57}{5}$

=90.71

$\bar{Y}$=2148.20

Coefficient of correlation (r) = $\frac{n\sum XY - \sum X . \sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$= \frac{5X977876.01-453.57X10741}{\sqrt{5X41529.54-(453.57)2}\ \sqrt{5X25595085-(10741)2}}$

= 0.11

Coefficient of Determination (r2) = (0.11)2

= 0.01

Standard error of correlation = $\frac{1-r2}{\sqrt{5}}$

= 0.44

Probable error of correlation coefficient, P.E.(r) =0.6745x$\frac{(1-r2)}{\sqrt{5}}$

= 0.6745x0.44

= 0.2986

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation,

we get

$$b = \frac{n\sum XY - \sum X.\sum Y}{n\sum X2 - (\sum X)2}$$

$$= \frac{5X977876.01 - 453.57X10741}{5X41529.54 - (453.57)2}$$

$$= 9.15$$

$$a = \bar{Y} - b\bar{X}$$

$$= 2148.20 - 9.15X90.71$$

$$= 1318.20$$

Hence the required simple regression equation is as follows:

$$Y = 1318.20 + 9.15X$$

Standard error of estimate (S.E.E) $= \sqrt{\frac{(\sum Y2 - a\sum Y - b\sum XY)}{(n-2)}}$

$$= \sqrt{\frac{(25595085 - 1318.20X10741 - 9.15X977876.01)}{(5-2)}}$$

$$= 910.81$$

Standard error of Beta coefficient (Sb) $= \frac{S.E.E}{\sqrt{(X-X)2}}$

$$= 910.81/\sqrt{384.39}$$

$$= 46.45$$

T-Value (t) = b/Sb

$$= 9.15/46.45$$

$$= 0.197$$

For Siddhartha Bank Limited

EPS(X)	DPS(Y)	X^2	Y^2	XY	$(X-x)^2$
15.88	778	252.17	605284	12354.64	13.62
17.29	1090	298.94	1188100	18846.1	5.20
22.89	1000	523.95	1000000	22890	11.02
21.99	444	483.56	197136	9763.56	5.86
19.82	270	392.83	72900	5351.4	0.06
$\sum X=97.82$	$\sum Y=$ 3582	$\sum X^2=$ 1961.45	$\sum Y^2=$ 3063420	$\sum XY=$ 69205.70	$\sum (X-x)^2=$ 35.76

Regression of Y on X , Y= a+bX

a= regression constant

$$\bar{X}=\frac{\sum X}{N}$$

$$=\frac{97.87}{5}$$

=19.57

$\bar{Y}=716.40$

Coefficient of correlation (r) = $\frac{n\sum XY-\sum X.\sum Y}{\sqrt{n\sum X2-(\sum X)2}\ \sqrt{n\sum Y2-(\sum Y)2}}$

$$= \frac{5X69205.70-97.87X3582}{\sqrt{5X1961.45-(97.87)2}\ \sqrt{5X3063420-(3582)2}}$$

= -0.2155

Coefficient of Determination (r2) = (-0.2155)2
= 0.0464

Standard error of correlation $=\frac{1-r2}{\sqrt{5}}$
= 0.4265

Probable error of correlation coefficient, P.E.(r) $=0.6745x\frac{(1-r2)}{\sqrt{5}}$

= 0.6745x0.4265

= 0.2876

b= regression coefficient (slope of the regression line)

According to the principle of Least Square two normal equation for estimating numerical constant a and b solving two normal equation, we get

$$b = \frac{n\sum XY - \sum X.\sum Y}{n\sum X2 - (\sum X)2}$$

$$= \frac{5X69205.70 - 97.87X3582}{5X1961.45 - (97.87)2}$$

$$= 0.55$$

$$a = \bar{Y} - b\bar{X}$$

$$= 5.04 - 0.55X19.57$$

$$= -5.72$$

Hence the required simple regression equation is as follows:

$$Y = -5.72 + 0.55X$$

$$\text{Standard error of estimate (S.E.E)} = \sqrt{\frac{(\sum Y2 - a\sum Y - b\sum XY)}{(n-2)}}$$

$$= \sqrt{\frac{(266.04 + 5.72X25.19 - 0.55X518.34)}{(5-2)}}$$

$$= 6.46$$

$$\text{Standard error of Beta coefficient (Sb)} = \frac{S.E.E}{\sqrt{(X-X)2}}$$

$$= 6.46/\sqrt{35.76}$$

$$= 1.08$$

$$\text{T-Value (t)} = b/Sb$$

$$= 0.55/1.08$$

$$= 0.51$$

APPENDIX-III

MPS,EPS & DPS OF KBL

MPS (X1)	EPS (X2)	DPS (X3)	$X1^2$	$X2^2$	$X3^2$	X1X2	X1X3	X2X3
830	22.70	1.05	688900	515.29	1.1	18841	871.5	23.835
1005	16.35	0.53	1010025	267.32	0.28	16431.75	532.65	8.6655
700	22.04	0.55	490000	485.76	0.3	15428	385	12.122
468	24.24	12	219024	587.58	144	11344.32	5616	290.88
266	15.67	0.44	70756	245.55	0.19	4168.22	117.04	6.8948
3269	**101**	**14.57**	**2478705**	**2101.5**	**145.87**	**66213.29**	**7522.19**	**342.3973**

$\bar{X}1=653.80$

$\bar{X}2=20.20$

$\bar{X}3=2.91$

$$r12 = \frac{n\sum X1X2-\sum X1.\sum X2}{\sqrt{n\sum X1^2-(\sum X1)^2}\ \sqrt{n\sum X2^2-(\sum X2)^2}}$$

$$= \frac{5X66213.29-3269X101}{\sqrt{5X2478705-(3269)^2}\ \sqrt{5X2101.50-(101)^2}}$$

= 0.0392

$$r23 = \frac{n\sum X2X3-\sum X2.\sum X3}{\sqrt{n\sum X2^2-(\sum X2)^2}\ \sqrt{n\sum X3^2-(\sum X3)^2}}$$

$$= \frac{5X342.40-101X14.57}{\sqrt{5X2101.50-(101)^2}\ \sqrt{5X2145.87-(14.57)^2}}$$

= 0.6038

$$r13 = \frac{n\sum X1X3-\sum X1.\sum X3}{\sqrt{n\sum X1^2-(\sum X1)^2}\ \sqrt{n\sum X3^2-(\sum X3)^2}}$$

$$= \frac{5X7522.19-3269X14.57}{\sqrt{5X2478705-(3269)^2}\ \sqrt{5X145.87-(14.57)^2}}$$

= 0.3372

Now calculation of multiple correlation,

Multiple correlation coefficient (R1.23) = $\sqrt{\frac{r12^2+r13^2-2r12r23r13}{(1-r23^2)}}$

$$= \sqrt{\frac{(0.0392)^2+(0.3372)^2-2X0.0392X0.3372X0.6038)}{(1-(0.6038)^2}}$$

= 0.3953

Multiple coefficient of determination(R123)2 = (0.3953)2

= 0.1563

Standard error of calculation of coefficient ,SE (r) = $\frac{1-(R123)2}{\sqrt{n}}$

$= \frac{1-0.1563}{\sqrt{5}}$

=0.3773

Probable error of correlation coefficient ,PE(r) = $0.6745X\frac{(1-R123^2)}{\sqrt{n}}$

=0.6745X.3773

=0.2545

Regression equation of X1 on X2 and X3

X1 =a+b1X2+b2X3

Dependent variable =X1 (MPS)

Independent Variable =X2(EPS) and X3 (DPS)

The general formula of multiple regression equation is given by :

X1=a+b1X2+b2X3…….(i)

Where, a= regression constant

b1 and b2 =regression coefficient (slope of regression line)

Required normal equation to find the value of a,b1 and b2 can be written as follows:

∑X1=na+b1∑X2+b2∑X3……..(ii)

$\sum X_1X_2=a\sum X_2+b_1\sum X_2^2+b_2\sum X_2X_3$……(iii)

$\sum X_1X_3=a\sum X_3+b_1\sum X_2X_3+b_2\sum X_3^2$ ……(iv)

Substituting the corresponding values in equation (ii) ,(iii) & (iv)we get,

$3269 =5a+101b_1+14.57b_2$……(v)

$66213.29 =101a+2101.50b_1+342.4b_2$……(vi)

$7522.19 =14.57a+342.4b_1+145.87b_2$……(vii)

Now solving equation,

Multiplying equation (v) by 101 and (vi) by 5 and solving (v) & (vi),

$330169 =505a+10201b_1+1471.57b_2$

$331065 = 505a+10507.5b_1+1712b_2$

-896 = -306b1-240.43b2……(viii)

Again, multiplying equation (vi) by 14.57 and (vii) by 101 and solving (vi) & (vii),

964727.64 = 1471.57a+30618.85b1+4988.77b2

759741.19 = 1471.57a+34582.4b1+14732.87b2

204986.45 = -3963.55b1-9744.10b2……..(ix)

Multiplying equation(viii) by 12.9528 and solving (viii) and (ix)

11605.71 = 3963.55b1+3114.24b2

204986.45 = -3963.55b1-9744.10b2

216592.16 = -6629.86b2

b2 = -32.67

putting the value of b2 in equation (viii),

-896=-306b1-240.43X(-32.67)

b1 = 36.40

Again putting the value of b1 and b2 in equation (v)

3269 = 5a+101X36.40+14.57X(-32.67)

a = 13.72

Required multiple regression equation is:
X1 = 13.72+36.40X2-32.67X3

Standard error of estimate is X1 on X2 and X3

S.E.E 1.23= $\sqrt{\frac{(\sum X1\ 2-a\sum X1-b1\sum X1X2-b2\sum X1X3)}{(n-2)}}$

= $\sqrt{\frac{(2478705-13.72X3269-36.40X\overline{66213.29}+\overline{32.67X7522.19})}{(5-2)}}$

= 299.68

Calculation of F-Value "F –Ratio"

F Ratio = Mean sum of square between samples

Mean sum of square within samples

(i) Grand Total (T) = $\sum X1+\sum X2+\sum X3$

= 3269+101+14.57
= 3384.57

(ii) Correction factor (CF) = $\frac{T^2}{N}$

$=\frac{(3384.57)^2}{15}$

= 763687.61

(iii) Total sum of square (T.S.S) = $\sum X1^2+\sum X2^2+\sum X3^2$ – C.F
= 2478705+2101.50+145.87-763687.61
= 1717264.76

(iv) Sum of square between sample (S.S.E) = $\frac{\sum X1^2}{n1}+\frac{\sum X2^2}{n2}+\frac{\sum X3^2}{n3}$ - C.F

$= \frac{(3269)\ 2}{5} + \frac{(101)\ 2}{5} + \frac{(14.57)\ 2}{5}$ - 763687.61

= 1375667.25

(v) Sum of square within samples (S.S.W) = T.S.S – S.S.E
= 1717264.76-1375667.25
= 341597.51

One way ANOVA Table

Source of variation	sum of squares	degree of freedom	Mean sum of squares	F-Ratio
Between samples	1375667.25	3-1=2	687833.63	24.16
Within samples	341597.51	12	28466.46	
Total	1717264.76	15-1=14		

MPS,EPS & DPS OF BOK

MPS (X1)	**EPS (X2)**	**DPS (X3)**	**$X1^2$**	**$X2^2$**	**$X3^2$**	**X1X2**	**X1X3**	**X2X3**
1375	43.50	20	1890625	1892.25	400	59812.5	27500	870
2350	59.94	2.11	5522500	3592.80	4.45	140859	4958.5	126.47
1825	54.68	7.37	3330625	2989.90	54.32	99791	13450.25	402.99
840	43.08	15	705600	1855.89	225	36187.2	12600	646.2
570	44.51	16.75	324900	1981.14	280.56	25370.7	9547.5	745.54
6960	**245.71**	**61.23**	**11774250**	**12311.98**	**964.33**	**362020.40**	**68056.25**	**2791.21**

$\bar{X}1 = 1392$

$\bar{X}2 = 49.14$

$\bar{X}3 = 12.25$

$$r12 = \frac{n\sum X1X2 - \sum X1.\sum X2}{\sqrt{n\sum X1^2 - (\sum X1)^2}\ \sqrt{n\sum X2^2 - (\sum X2)^2}}$$

$$= \frac{5X362020.40 - 6960X245.71}{\sqrt{5X11774250 - (6960)^2}\ \sqrt{5X12311.98 - (245.71)^2}}$$

$= 0.8986$

$$r23 = \frac{n\sum X2X3 - \sum X2.\sum X3}{\sqrt{n\sum X2^2 - (\sum X2)^2}\ \sqrt{n\sum X3^2 - (\sum X3)^2}}$$

$$= \frac{5X2791.21 - 245.71X61.23}{\sqrt{5X12311.98 - (245.71)^2}\ \sqrt{5X964.33 - (61.23)^2}}$$

$= -0.965$

$$r13 = \frac{n\sum X1X3-\sum X1.\ \sum X3}{\sqrt{n\sum X1\ 2-(\sum X1)2}\ \sqrt{n\sum X3\ 2-(\sum X3)2}}$$

$$= \frac{5X68056.25-6960X61.23}{\sqrt{5X11774250-(6960)2}\ \sqrt{5X964.33-(61.23)2}}$$

= -0.8120

Now calculation of multiple correlation,

$$\text{Multiple correlation coefficient (R1.23)} = \sqrt{\frac{(r12\ 2+r13\ 2-2r12r23r13)}{(1-r23\ 2)}}$$

$$= \sqrt{\frac{(0.8986)2+(-0.812)2-2X0.8986X(-0.965)X(-0.812))}{(1-(-0.965)2}}$$

= 0.9229

Multiple coefficient of determination $(R123)2 = (0.9229)^2$

= 0.8517

Standard error of calculation of coefficient, $SE(r) = \frac{1-(R123)^2}{\sqrt{n}}$

$$= \frac{1-0.8517}{\sqrt{5}}$$

=0.0663

Probable error of correlation coefficient, $PE(r) = 0.6745X\frac{(1-R123^2)}{\sqrt{n}}$

=0.6745X0.0663

=0.0447

Regression equation of X1 on X2 and X3

X1 =a+b1X2+b2X3

Dependent variable =X1 (MPS)

Independent Variable =X2(EPS) and X3 (DPS)

The general formula of multiple regression equation is given by :

X1=a+b1X2+b2X3…….(i)

Where, a= regression constant

b1 and b2 =regression coefficient (slope of regression line)

Required normal equation to find the value of a,b1 and b2 can be written as follows:

$\sum X_1 = na + b_1 \sum X_2 + b_2 \sum X_3$……..(ii)

$\sum X_1 X_2 = a \sum X_2 + b_1 \sum X_2^2 + b_2 \sum X_2 X_3$……(iii)

$\sum X_1 X_3 = a \sum X_3 + b_1 \sum X_2 X_3 + b_2 \sum X_3^2$ ……(iv)

Substituting the corresponding values in equation (ii) ,(iii) & (iv)we get,

6960 =5a+245.71b1+61.23b2……(v)

362020.40 =245.71a+12311.980b1+2791.21b2……(vi)

68056.25 =61.23a+2791.21b1+964.33b2……(vii)

Now solving equation,

Multiplying equation (v) by 49.142 and solving (v) & (vi),

342028.32 =245.71a+12074.68b1+3008.96b2

362020.40= 245.71a+12311.98b1+2791.21b2

-19992.08 = -237.30b1+217.75b2……(viii)

Again, multiplying equation (vii) by 4.0129 solving (vi) & (vii),

362020.40 = 245.71a+12311.98b1+2791.21b2

273102.93= 245.71a+11200.85b1+3869.76b2

88917.47= 1111.13b1-1078.55b2……..(ix)

Multiplying equation(viii) by 4.6824 and solving (viii) and (ix)

-93610.92 = -1111.13b1+1019.59b2

88917.47= 1111.13b1-1078.55b2

-4693.45 = -58.95b2

b2 = 79.62

putting the value of b2 in equation (ix),

88917.47=1111.13b1-1078.55X79.62

b1 = 157.31

Again putting the value of b1 and b2 in equation (v)

6960= 5a+245.71X157.31+61.23X79.62

a = -7313.55

Required multiple regression equation is:

X1 = -7313.55+157.31X2+79.62X3

Standard error of estimate is X1 on X2 and X3

S.E.E 1.23= $\sqrt{\frac{(\sum X1\ 2-a\sum X1-b1\sum X1X2-b2\sum X1X3)}{(n-2)}}$

$$= \sqrt{\frac{(11774250+7313.55X6960-157.31X362020.40-79.62X68056.25)}{(5-2)}}$$

= 320.67

Calculation of F-Value "F –Ratio"

F Ratio = Mean sum of square between samples

Mean sum of square within samples

(i) Grand Total (T) = $\sum X1+\sum X2+\sum X3$

= 6960+245.71+61.23

= 7266.94

(ii) Correction factor (CF) = $\frac{T^2}{N}$

$=\frac{(7266.94)^2}{15}$

= 3520561.13

(iii) Total sum of square (T.S.S) = $\sum X1^2+\sum X2^2+\sum X3^2$ – C.F

= 11774250+12311.98+964.23-3520561.13

= 8266965.08

(iv) Sum of square between sample (S.S.E) = $\frac{\sum X1^2}{n1}+\frac{\sum X2^2}{n2}+\frac{\sum X3^2}{n3}$ - C.F

$= \frac{(6960)^2}{5} + \frac{(245.71)^2}{5} + \frac{(61.23)^2}{5} - 3520561.13$

= 6180583.27

(v) Sum of square within samples (S.S.W) = T.S.S – S.S.E

= 8266965.08-6180593.27

= 2086381.81

One way ANOVA Table

Source of variation	sum of squares	Degree of freedom	Mean sum of squares	F-Ratio
Between samples	6180583.27	3-1=2	3090291.64	17.77
Within samples	2086381.81	12	173865.15	
Total	8266965.08	15-1=14		

MPS,EPS & DPS OF EBL

MPS (X1)	**EPS (X2)**	**DPS (X3)**	**$X1^2$**	**$X2^2$**	**$X3^2$**	**X1X2**	**X1X3**	**X2X3**
2430	78.42	10	5904900	6149.70	100	190560.6	24300	784.2
3132	91.82	20	9809424	8430.91	400	287580.24	62640	1836.4
2455	99.99	30	6027025	9998	900	245475.45	73650	2999.7
1630	100.16	30	2656900	10032.03	900	163260.8	48900	3004.8
1094	83.16	10	1196836	6918.91	100	90977.04	10940	831.6
10741	**453.57**	**100**	**25595085**	**41529.55**	**2400**	**977876.01**	**220430**	**9456.90**

$\bar{X}1 = 2148.20$

$\bar{X}2 = 90.71$

$\bar{X}3 = 20$

$r12 = \frac{n\sum X1X2-\sum X1.\sum X2}{\sqrt{n\sum X1^2-(\sum X1)^2}\sqrt{n\sum X2^2-(\sum X2)^2}}$

$= \frac{5X977876.01-10741X453.57}{\sqrt{5X25595085-(10741)^2}\sqrt{5X41529.55-(453.57)^2}}$

= 0.0595

$$r23 = \frac{n\sum X2X3-\sum X2.\sum X3}{\sqrt{n\sum X2\ 2-(\sum X2)2}\ \sqrt{n\sum X3\ 2-(\sum X3)2}}$$

$$= \frac{5X9456.90-453.57X100}{\sqrt{5X41529.55-(453.57)2}\ \sqrt{5X2400-(100)2}}$$

$$= 0.9831$$

$$r13 = \frac{n\sum X1X3-\sum X1.\ \sum X3}{\sqrt{n\sum X1\ 2-(\sum X1)2}\ \sqrt{n\sum X3\ 2-(\sum X3)2}}$$

$$= \frac{5X220430-10741X100}{\sqrt{5X25595085-(10741)2}\ \sqrt{5X2400-(100)2}}$$

Now calculation of multiple correlation,

Multiple correlation coefficient (R1.23) $= \sqrt{\frac{r12\ 2+r13\ 2-2r12r23r13)}{(1-r23\ 2)}}$

$$= \sqrt{\frac{(0.0595)2+(0.1767)2-2X0.0595X0.9831X0.1767)}{(1-(0.9831)2}}$$

$$= 0.6484$$

Multiple coefficient of determination$(R123)2 = (0.6484)^2$

$$= 0.4205$$

Standard error of calculation of coefficient ,$SE(r) = \frac{1-(R123)^2}{\sqrt{n}}$

$$= \frac{1-0.4205}{\sqrt{5}}$$

$$=0.2592$$

Probable error of correlation coefficient ,$PE(r) = 0.6745X\frac{(1-R123^2)}{\sqrt{n}}$

$$=0.6745X0.2592$$

$$=0.1748$$

Regression equation of X1 on X2 and X3

X1 =a+b1X2+b2X3

Dependent variable =X1 (MPS)

Independent Variable =X2(EPS) and X3 (DPS)

The general formula of multiple regression equation is given by :

X1=a+b1X2+b2X3…….(i)

Where, a= regression constant

b1 and b2 =regression coefficient (slope of regression line)

Required normal equation to find the value of a,b1 and b2 can be written as follows:

$\sum X_1 = na + b_1 \sum X_2 + b_2 \sum X_3$……..(ii)

$\sum X_1 X_2 = a \sum X_2 + b_1 \sum X_2^2 + b_2 \sum X_2 X_3$……(iii)

$\sum X_1 X_3 = a \sum X_3 + b_1 \sum X_2 X_3 + b_2 \sum X_3^2$……(iv)

Substituting the corresponding values in equation (ii) ,(iii) & (iv)we get,

10741=5a+453.57b1+100b2……(v)

977876.01 =453.57a+41529.55b1+9456.90b2 ……(vi)

220430 =100a+9456.90b1+2400b2……(vii)

Now solving equation,

Multiplying equation (v) by 90.714 and solving (v) & (vi),

974359.074 =453.57a+41145.15b1+9071.4b2

977876.01= 453.57a+41529.55b1+9456.90b2

-3516.94 = -384.4b1-385.50b2

3516.94 = 384.4b1+385.50b2 ……(viii)

Again, multiplying equation (vii) by 4.5357and solving (vi) & (vii),

977876.01 = 453.57a+41529.55b1+9456.90b2

999804.35=453.57a+42893.66b1+10885.68b2

-21928.34= -1364.11b1-1428.78b2

21928.34= 1364.11b1+1428.78b2 ……..(ix)

Multiplying equation(viii) by 3.5487 and solving (viii) and (ix)

12480.56 = 1364.11b1+1368.02b2

21928.34= 1364.11b1+1428.78b2

-9447.78 = -60.76b2

b2 = 155.49

putting the value of b2 in equation (viii),

3516.94=384.4b1+385.50X155.49

b1 = -146.79

Again putting the value of b1 and b2 in equation (v)

10741= 5a+435.57X(-146.79)+100X155.49

a = 12354.31

Required multiple regression equation is:

X1 = 12354.31+(-146.79)X2+155.49X3

Standard error of estimate is X1 on X2 and X3

S.E.E 1.23= $\sqrt{\frac{(\sum X1\ 2-a\sum X1-b1\sum X1X2-b2\sum X1X3)}{(n-2)}}$

$= \sqrt{\frac{(25595085-12354.31X10741+146.79X977876.01-155.49X220430)}{(5-2)}}$

= 849.55

Calculation of F-Value "F –Ratio"

F Ratio = Mean sum of square between samples

Mean sum of square within samples

(i) Grand Total (T) = ∑X1+∑X2+∑X3

= 10741+453.57+100

= 11294.57

(ii) Correction factor (CF) = $\frac{T^2}{N}$

$$= \frac{(11294.57)^2}{15}$$

$$= 8506746.35$$

(iii) Total sum of square (T.S.S) = $\sum X1^2 + \sum X2^2 + \sum X3^2 - C.F$

$$= 25595085 + 41529.55 + 2400 - 8506746.35$$

$$= 17132268.20$$

(iv) Sum of square between sample (S.S.E) = $\frac{\sum X1^2}{n1} + \frac{\sum X2^2}{n2} + \frac{\sum X3^2}{n3} - C.F$

$$= \frac{(10741)^2}{5} + \frac{(453.57)^2}{5} + \frac{(100)^2}{5} - 8506746.35$$

$$= 14610214.99$$

(v) Sum of square within samples (S.S.W) = T.S.S – S.S.E

$$= 17132268.20 - 14610214.99$$

$$= 2522053.21$$

One way ANOVA Table

Source of variation	sum of squares	Degree of freedom	Mean sum of squares	F-Ratio
Between samples	14610214.99	3-1=2	7305107.49	34.76
Within samples	2522053.21	12	210171.10	
Total	17132268.20	15-1=14		

MPS,EPS & DPS OF SIDDHARTHA BANK LIMITED

MPS (X1)	EPS (X2)	DPS (X3)	$X1^2$	$X2^2$	$X3^2$	X1X2	X1X3	X2X3
778	15.88	0.79	605284	252.17	0.62	12354.64	614.62	12.54
1090	17.29	0.79	1188100	298.94	0.62	18846.1	861.1	13.66
1000	22.89	0.79	1000000	523.95	0.62	22890	790	18.08
444	21.99	10.03	197136	483.56	100.60	9763.56	4453.32	220.56
270	19.82	12.79	72900	392.83	163.58	5351.4	3453.3	253.49
3582	**97.87**	**25.19**	**3063520**	**1951.45**	**266.04**	**69205.70**	**10172.34**	**518.34**

$\bar{X}1 = 716.40$

$\bar{X}2 = 19.57$

$\bar{X}3 = 5.04$

$$r12 = \frac{n\sum X1X2 - \sum X1.\sum X2}{\sqrt{n\sum X1^2 - (\sum X1)^2}\ \sqrt{n\sum X2^2 - (\sum X2)^2}}$$

$$= \frac{5X69205.70 - 3582X97.87}{\sqrt{5X3063520 - (3582)^2}\ \sqrt{5X1951.45 - (97.87)^2}}$$

$= -0.2154$

$$r23 = \frac{n\sum X2X3 - \sum X2.\sum X3}{\sqrt{n\sum X2^2 - (\sum X2)^2}\ \sqrt{n\sum X3^2 - (\sum X3)^2}}$$

$$= \frac{5X518.34 - 97.87X25.19}{\sqrt{5X1951.45 - (97.87)^2}\ \sqrt{5X266.04 - (25.19)^2}}$$

$= 0.3584$

$$r13 = \frac{n\sum X1X3 - \sum X1.\sum X3}{\sqrt{n\sum X1^2 - (\sum X1)^2}\ \sqrt{n\sum X3^2 - (\sum X3)^2}}$$

$$= \frac{5X10172.34 - 3582X25.19}{\sqrt{5X3063520 - (3582)^2}\ \sqrt{5X266.04 - (25.19)^2}}$$

$= -0.9467$

Now calculation of multiple correlation,

Multiple correlation coefficient (R1.23) = $\sqrt{\frac{r12\ 2+r13\ 2-2r12r23r13)}{(1-r23\ 2)}}$

$$= \sqrt{\frac{(-0.2154)2+(-0.9467)2-2X(-0.2154)X0.3584X(-0.9467)}{(1-(0.3584)2}}$$

= 0.9560

Multiple coefficient of determination(R123)2 = (0.9560)2

= 0.9139

Standard error of calculation of coefficient ,SE (r) = $\frac{1-(R123)2}{\sqrt{n}}$

$= \frac{1-0.9139}{\sqrt{5}}$

=0.0385

Probable error of correlation coefficient ,PE(r) = $0.6745X\frac{(1-R123\ 2)}{\sqrt{n}}$

=0.6745X0.0385

=0.026

Regression equation of X1 on X2 and X3

X1 =a+b1X2+b2X3

Dependent variable =X1 (MPS)

Independent Variable =X2(EPS) and X3 (DPS)

The general formula of multiple regression equation is given by :

X1=a+b1X2+b2X3…….(i)

Where, a= regression constant

b1 and b2 =regression coefficient (slope of regression line)

Required normal equation to find the value of a,b1 and b2 can be written as follows:

$\sum X_1=na+b_1\sum X_2+b_2\sum X_3$……..(ii)

$\sum X_1X_2=a\sum X_2+b_1\sum X_2^2+b_2\sum X_2X_3$……(iii)

$\sum X_1X_3=a\sum X_3+b_1\sum X_2X_3+b_2\sum X_3^2$……(iv)

Substituting the corresponding values in equation (ii) ,(iii) & (iv)we get,

3582=5a+97.87b1+25.19b2……(v)
69205.70 =97.87a+1951.45b1+518.34b2……..……(vi)
10172.34 =25.19a+518.34b1+266.04b2……(vii)
Now solving equation,
Multiplying equation (v) by 19.574 and solving (v) & (vi),

70114.068 =97.87a+9578.54b1+493.07b2

69205.70= 97.87a+1951.45b1+518.34b2

908.34 = 7627b1-25.27b2 ……(viii)

Again, multiplying equation (vii) by 3.885 and solving (vi) & (vii),

69205.70=97.87a+1951.45b1+518.34b2

39522.59=97.87a+2013.91b1+1033.64b2

29683.11= -62.46b1-513.30b2 ……..(ix)

Multiplying equation(ix) by 122.116 and solving (viii) and (ix)

908.34 = 7627.09b1-25.27b2

3624652.05=-7627.09b1-62679.88b2

3625560.39 = -62705.15b2

b2 = -57.82

putting the value of b2 in equation (viii),

908.34=7627.09b1-25.27X(-57.82)

b1 = -0.0725

Again putting the value of b1 and b2 in equation (v)
3582= 5a+97.87X(-0.0725)+25.19X(-57.82)
a = 1009.12
Required multiple regression equation is:

X1 = 1009.12 1+(-0.0725)X2+(-57.82)X3

Standard error of estimate is X1 on X2 and X3

S.E.E 1.23= $\sqrt{\frac{(\sum X1\ 2-a\sum X1-b1\sum X1X2-b2\sum X1X3)}{(n-2)}}$

= $\sqrt{\frac{(3063520-1009.12X3582-(-0.0725)X69205.70-(-57.82)X10172.34)}{(5-2)}}$

= 118.37

Calculation of F-Value "F –Ratio"

F Ratio = $\frac{\text{Mean sum of square between samples}}{\text{Mean sum of square within samples}}$

(i) Grand Total (T) = $\sum X1+\sum X2+\sum X3$

$= 3582+97.87+25.19$

$= 3705.06$

(ii) Correction factor (CF) = $\frac{T^2}{N}$

$=\frac{(3705.06)^2}{15}$

$= 915164.64$

(iii) Total sum of square (T.S.S) = $\sum X1^2+\sum X2^2+\sum X3^2 - C.F$

$=3063520+1951.45+266.04-915164.64$

$= 2150572.85$

(iv) Sum of square between sample (S.S.E) = $\frac{\sum X1^2}{n1}+\frac{\sum X2^2}{n2}+\frac{\sum X3^2}{n3} - C.F$

$= \frac{(3582)^2}{5} + \frac{(97.87)^2}{5} + \frac{(25.19)^2}{5} - 915164.64$

$= 1653022.77$

(v) Sum of square within samples (S.S.W) = T.S.S – S.S.E

$= 2150572.85-1653022.77$

$= 497550.08$

One way ANOVA Table

Source of variation	sum of squares	degree of freedom	Mean sum of squares	F-Ratio
Between samples	1653022.77	3-1=2	826511.38	19.94
Within samples	497550.08	12	41462.51	
Total	2150572.85	15-1=14		