INFLATION AND BANKING RETURNS

By:
SUJAN JOSHI
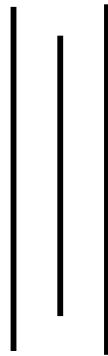**Shanker Dev Campus**
Campus Roll No: 171/063
T.U. Regd. No: 7-1-271-279-2001

A Thesis Submitted to:
Office of the Dean
Faculty of Management
Tribhuvan University

In partial fulfillment of the requirement for the Degree of
Master of Business Studies (MBS)

Kathmandu, Nepal
May, 2010

RECOMMENDATION

This is to certify that the Thesis

Submitted by:

SUJAN JOSHI

Entitled:

INFLATION AND BANKING RETURNS

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

…..….…..………..…………….………	…………….…..…....…………….	……………….…………..………
Dr. Shilu Manandhar Bajracharya	**Prof. Bisheshwor Man Shrestha**	**Prof. Dr. Kamal Deep Dhakal**
(Thesis Supervisor)	**(Head of Research Department)**	**(Campus Chief)**

VIVA-VOCE SHEET

We have conducted the viva –voce of the thesis presented

By:

SUJAN JOSHI

Entitled:

INFLATION AND BANKING RETURNS

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 Degree of Business Studies (MBS)

<u>Viva-Voce Committee</u>

Head, Research Department   ………………….………

Member (Thesis Supervisor)   ….………………………..

Member (External Expert)   ….………………………..

TRIBHUVAN UNIVERSITY

Faculty of Management

Shanker Dev Campus

DECLARATION

I hereby declare that the work reported in this thesis entitled "**Inflation and Banking Returns**" submitted to Office of the Dean, Faculty of Management, Tribhuvan University, is my original work done in the form of partial fulfillment of the requirement for the Master Degree in Business Studies (MBS) under the supervision of **Dr. Shilu Manandhar Bajracharya** of Shanker Dev Campus.

………………………………

Sujan Joshi

Researcher

Campus Roll No: 171/063

T.U. Regd. No: 7-1-271-279-2001

TABLE OF CONTENTS

CHAPTER 3:   RESEARCH METHODOLOGY

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

CHAPTER 5:   SUMMARY, FINDINGS, CONCLUSION & RECCOMENDATION

Bibliography

Appendices

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ANOVA	Analysis of Variance
ASEAN	Association of South East Asian Nation
BIMSTEC	Bay of Bengal Initiative for Multi Sectoral Technical Economic Cooperation
BOD	Board of Directors
BOK	Bank of Kathmandu Limited
CEO	Chief Executive Officer
CPI	Consumer Price Index
CV	Coefficient of Variation
d.f.	Degree of Freedom
EBL	Everest Bank Limited
EPS	Earning Per Share
et al.	And others
EU	European Union
FIs	Financial Institutions
FY	Fiscal Year
GDP	Gross Domestic Product
GNP	Gross National Product
HBL	Himalayan Bank Limited
ICAN	Institute of Chartered Accountants of Nepal
IPOs	Initial Public Offerings
Ltd.	Limited
MPS	Market Price per Share
MSE	Mean Sum of Square Due to Error
MSR	Mean Sum of Square Due to Regression
NABIL	NABIL Bank Limited
NATO	North Atlantic Treaty Organization
NEPSE	Nepal Stock Exchange
NI	Net Income
NIB	Nepal Investment Bank Limited

NIC	Nepal Industrial and Commercial Bank Limited
No.	Number
NRB	Nepal Rastra Bank
NYSE	New York Stock Exchange
OTC	Over the Counter
P/E	Price-Earning Ratio
ROE	Return on Equity
SAFTA	South Asian Free Trade Area
SBI	Nepal SBI Bank Limited
SCB	Standard Chartered Bank Nepal Limited
SD	Standard Deviation
SEBON	Securities Board of Nepal
TD	Total Deposits
TL	Total Loans
WTO	World Trade Organization

Chapter 1: INTRODUCTION

1.1 Background of the Study

Businesses these days have crossed national boundaries .A country cannot be confined into its political borders for economic activities. Economic activities have crossed national boundaries. The waves of liberalization and information technology such a big that every time and second new and new invention and technology is developed. Several global and regional economic co-operations like WTO, EU, SAFTA, ASEAN, BIMSTEC etc, have their roots in the fundamentals of globalization. In international forum, common goals and policies are adopted to cope with any challenges, and inflation has been the great challenge around the globe from the very ancient period till today.

The world economy witnessed a contraction of 3.7 percent growth in 2008 compared to 5.2 percent in 2007. This is obviously lower than that in the previous year. The world economy is projected to grow at a lower rate of 1.7 percent in 2009 and to continue at about the same pace in 2010. These estimates reveal a contractionary trend similar to the ones observed at the beginning of the millennium. Earlier, notwithstanding the higher growth of 4.7 percent recorded in the year 2000; the world economy had observed slowdown and grew at a lower rate of 2.2 percent in 2001 and 2.8 percent in 2002.
However, the world economy grew by 3.6 percent, 4.9 percent, and 5.2 percent in 2002, 2004, and 2007 respectively. Also, the per capita income growth is estimated to remain lower in 2009 and 2010. The per capita income growth for advanced economies for both of these years is projected at 0.8 percent compared to 2.7 percent in 2007. The per capita income growth for developing economies is projected at 5.2 percent in 2009 and 1.6 percent in 2010. This was 6.6 percent in 2007.

As a fall out of the financial market problems, the US economy experienced a major slowdown with growth rate of 0.5 percent in 2009. This followed a low growth trajectory from 3.6 percent in 2004 to 2.2 percent in 2007. This is also likely to affect other advanced as well as emerging and developing economies through trade and financial linkages. However, the US has been actively exercising the instruments of major macroeconomics policies (monetary policy and fiscal policy) to check the probable economic recession US government unveiled a US$ 150 billion fiscal stimulus package in January 2008, and the US central Bank- Federal Reserve- has gradually slashed the federal funds rate from above 5 percent in early September 2007, to 2 percent in April 2008.

Nepal's two large neighboring economies India and China witnessed an impressive growth in 2007 as well. These economies grew by 6.4 percent and 4.8 percent

respectively. The projection for these economies for 2008, however, is at the lower side of 8.3 percent and 4.8 percent respectively. Nepal, a low growth economy with a lower per capita in the region, needs to make the best use of the available opportunities through learning lessons from the amazing performance of her neighboring economies.

Table 1.1: Economic Growth Rate of Neighboring Economies
(Annual Percentage Change)

Countries/Region	2000/04	2005	2006	2007	2008	2009	Projection 2010
Developing Asia	8.6	9.0	9.8	10.6	7.6	6.2	7.3
South Asia	8.1	8.6	9.1	8.6	7.5	7.7	7.8
China	10.1	10.4	11.6	13.0	9.0	8.5	9.0
Afghanistan	8.8.	16.1	8.2	12.1	3.4	15.7	8.6
Bangladesh	6.1	6.3	6.5	6.3	6.0	5.4	5.4
Bhutan	6.8	6.5	6.3	21.4	7.6	8.5	5.3
India	7.9	9.2	9.8	9.4	7.3	5.4	6.4
Maldives	9.5	-4.6	18.	7.2	5.8	-4.0	3.4
Nepal	4.7	3.1	3.7	3.2	4.7	4.0	4.1
Pakistan	7.4	7.7	6.1	5.6	2.0	2.0	3.0
Sri Lanka	5.4	6.2	7.7	6.8	6.0	3.0	5.0

 Source: IMF, World Economic Outlook, Washington DC, April 2009
(From Economic Survey 2008/09)

The average price of oil in U.S. dollars a barrel was $97.03 in 2008; the assumed price based on future markets is $61.53 in 2009 and $74.50 in 2010.Crude oil price touched all time high of $147.27 (July 11, 2008) per barrel. Euro Inflation is 4%, highest in 16 years. UK inflation is 4.4% and is also 16 years high as of July 2008. In the USA over the past 12 months, wholesale prices are up 9.2%, the highest year-over-year surge since June 1981, though there is said to prevail stagflation. Core inflation in Japan is 1.9% and excluding the energy sector, it is just 0.7 %. On the other side, developing nations like India and China are experiencing inflation of 11.89 %(13 years high), and 9% respectively .This inflation is obviously believed to have roots in rising prices of oil and food, because developing nations like India and China have huge demand for energy to keep their economic growth. So, some countries have already forbid exports of food grains.

Amidst of this global financial crisis which started in the USA and spread all over the world, Nepal too is not an exception because of its policy towards globalization and liberalization. Since this global financial crisis is said to be because of excess liquidity in the US economy, inflation and global financial crisis are closely related. This is because the prevalent of inflation decreases purchasing power and excess liquidity in the economy brings inflation. Banks in USA liberally made investments that they failed to recover and

hence, several big names like AIG, Lehman Brothers, City Group, Merrill Lynch etc. went bankrupt. This crisis spread to the whole world and brought economic hardships to every country even more some countries like Iceland and Latvia were declared bankrupt.

Nepalese inflation has been affected more by the structural and external factors. However, increase in aggregate demand through the expansion of monetary aggregates as a factor affecting inflation can not be disregarded. Overall supply of goods and services such as agricultural products and industrial products, and supply constraints due to closures and strikes come under structural factors. Factors such as price hike of petroleum products in the global markets as direct impact of Indian inflation come under external factors that affect inflation in Nepal. The world currently is facing challenges to contain inflation due to food and petroleum products' price hike. India has also adopted anti-inflationary measures including smoothening the internal supply of goods and services. This has affected the overall supply in the Nepalese market too. In this way, the steps that India took to easer supply situation internally, the effect of increasing Indian inflation, and increasing process of petroleum and food products in the international market have exerted pressure on price situation in Nepal. In this regard, there is a need to ensure economic stability through effective monetary management, supply management and fiscal management so that people's livelihood will not get adversely affected.

The year-on-year consumer price inflation increased to13.2percent in mid-March 2008 from 7.7 percent a year ago. The average consumer price inflation remains at 4.7 percent in the first eight months of FY 2008/09. While announcing monetary policy for FY 2008/09 Nepal Rastra Bank (NRB) had estimated that price situation would remain under control at 5.3 percent. However, through the mid-term review of the monetary policy, the NRB had stated that there was an upward pressure on price mainly due to international inflationary pressure as a result of increased prices of petroleum and food products, and rise on domestic food prices due to supply constraints after India imposed export restrictions on some of the food products in Nepal (Source: Economic Survey Fiscal Year 2008/09).

Though Nepal has expected economic growth of 7% expressed through the budget of 2065/66. It seems difficult in the scene of inflation and global economic turndown. Inflation in the first 3 months of the fiscal year is already 14.1%, which was only 6.3%, earlier period. Nepal, however, seem to take precautionary measure in this aspect by making an effort to control liquidity, NRB has increased the liquidity ratio, CRR of commercial banks to The reserve money increased substantially in the review year. The reserve money grew by 29.9 percent in 2008/09 compared to a growth of 8.9 percent in the previousYear. This is because Nepalese economy also showed some sign of excess liquidity as evidences show that the initial issue of the instruments of both money market and capital market were heavily oversubscribed.

Simply, inflation can be termed as too much money chasing too few goods. Neo-classical economists referred inflation as "a destroying disease born out of lack of monetary control whose results undermined the rules of business, creating havoc in markets and financial ruin of even the prudent."(Ball RJ &Doyle Peter, 1969:7).According to a Nobel laureate economist Milton J Friedman: "Inflation is always and everywhere a monetary phenomenon … and can be produced only by a more rapid increase in the quantity of money than output." (The Counter – Revolution in Monetary Theory: 1970)

Monetary policy is a tool to police level of inflation and to ensure adequate level of liquidity in the economy that is sound for its economic health. The work of formulating monetary policies on the government's behalf is entrusted to central banks. As a central bank of Nepal, NRB formulates monetary policy deemed sound for Nepalese economy. Prologue of NRB Act, 2002 has tried to address different sets of policy tensions in macroeconomic management. The Act has granted independence to NRB. This autonomy leads NRB in formulating monetary policy independent of any other state authority. Since, 2002-2003 NRB is publicizing monetary policy. Monetary policy formulated in such a way has broader objective of maintaining financial sector stability. But the new Act has clearly stated the goals of monetary policy. The prominent two goals to be addressed by the monetary policy are keeping domestic prices stable and maintaining external sector stability (Nepal Badrinath, 2008).NRB further is more responsible for financial sector in the economy and essentially commercial banks shares the major chunk of financial activities in Nepal.

Nepal Rastra Bank has made public the monetary policy for the fiscal year 2065/66 through press conference on 16 Aswin, 2065. The new monetary policy has increased the bank policy rates. To control the inflation to the desirable level the new monetary policy has tried to make cautious and hard efforts. The monetary policy has projected the inflation for the fiscal year2065/66 to be 7.5%. To achieve the economic growth of 7%, expressed through the Budget Speech 2065/66, the monetary policy has also quoted to manage adequate liquidity. The main characteristics of the monetary policy 2065/66 is that beside commercial banks, also development banks and finance companies would be provided the status of colleague for the operation of the monetary policy (NRB Samachar,2008).

Investment, in its broadest sense, means the sacrifice of current dollars for future dollars. Two different attributes are generally involved: time and risk. The sacrifice takes place in the present and is certain. The reward comes later, if at fall, and the magnitude is generally uncertain. In some cases the element of time predominates (for example, government bonds). In other cases risk is the dominant attribute (for example, call options on common stocks). In yet others, both time and risk are important (for example, shares of common stock) (Sharpe et al., 2006:1).

Shareholders are the prime constituent of any company. Shareholders are the investors to tie their fortune with the fortune of the company in which they invest. So, there is no doubt regarding a company should maximize the wealth of its shareholders. This means a company should provide increment in shareholders' wealth or must create something of value to their shareholders that they can not do for themselves (Van Horne JC, 2004:3). The more accurate and simple way to measure whether shareholders' wealth is maximized or not is look for the return that the company is providing to their shareholders. This return comprises both of dividend yields and capital gain. Hence in this inflationary world investment is actually a blessing which can mitigate the effects of inflation. However, there are several investment instruments available from real to financial assets. Real investment includes investment in real estates, gold, silver, commodities etc. Financial instruments on the other hand range from money market instruments like treasury bills, commercial paper, certificates of deposit, banker's acceptance, repurchase agreements, short-term municipal securities etc. to capital market instruments like stocks, bonds, preference shares, mortgage loans, derivatives etc. Among these the prime concern is with stocks or equity shares. And the only capital market where this security is traded is NEPSE.

Nepal Stock Exchange (NEPSE) is the only stock exchange for trading securities in Nepal which was established in January 13, 1994. However, over–the–counter (OTC) market is started from June 4, 2008; it is yet to take full operational form. This means Nepalese shareholders have to trade securities on NEPSE through its brokers for maximizing their wealth and counter any other phenomenon like inflation that prevents from wealth maximization.

The history of commercial banking in Nepal started with the establishment of Nepal Bank Limited in 1994 B.S., with 51% government and 49% general public ownership. Later on, Rastriya Banijya Bank was established in 2022 B.S. with 100% government ownership. Nepalese commercial banking took yet another turn from 2041B.S. onwards with the establishment of series of joint venture commercial banks. Till day there are at least 23 commercial banks operating in Nepal. But only 16 of them have been listed in NEPSE for transaction, and the oldest bank Nepal Bank Limited has been delisted because of its internal problems. Till day there are 16 commercial banks listed in NEPSE for transaction (SEBON, 2006/07) as shown in the table 1.2.

Further commercial banks constitute the major chunk of NEPSE index. The visible dominance of commercial banks over NEPSE can be seen both volume-wise and transaction-wise which account for more than 70% each. Further, NEPSE sensitive index compose of commercial banks. Also, the highest rupees per unit of share traded are recorded for commercial banks. Investors were ready enough to pay more than Rs.9000 for a unit of share of SCB. Not only in secondary market is the investors' preference over commercial bank shares, this case is also same in primary market. The IPOs of commercial bank shares are oversubscribed several times higher than that of other group shares. So, all these things provided impetus to the researcher to study whether the

investors' behavior is logical to act in such a way or at least returns from commercial bank investment can compensate these shareholders against inflation.

These and other research questions are hence mentioned in the following section.

Table 1.2: Commercial Banks in Nepal

Name	Operation Date (A.D.)	Listing Date (A.D)
Nepal Bank Limited	1937/11/15	
Rastriya Banijya Bank	1966/01/23	
NABIL Bank Limited	1984/07/16	1985/11/24
Nepal Investment Bank Limited	1986/02/27	1986/07/22
Standard Chartered Bank Nepal Limited	1987/01/30	1988/07/04
Himalayan Bank Limited	1993/01/18	1993/07/05
Nepal SBI Bank Limited	1993/07/07	1995/01/17
Nepal Bangladesh Bank Limited	1993/06/05	1995/12/24
Everest Bank Limited	1994/10/18	1996/04/07
Bank of Kathmandu Limited	1995/03/12	1997/07/17
Nepal Credit and Commerce Bank Limited	1996/10/14	2005/01/31
Lumbini Bank Limited	1998/07/17	2004/11/10
Nepal Industrial and Commercial Bank Limited	1998/07/21	2000/06/13
Machhapuchhre Bank Limited	2000/10/03	2003/05/28
Kumari Bank Limited	2001/04/03	2004/07/29
Laxmi Bank Limited	2002/04/03	2004/04/20
Siddhartha Bank Limited	2002/12/24	2006/02/24
Agriculture Development Bank Limited	2006/03/16	
Global Bank Limited	2007/01/02	2009/03/26
Citizens Bank International Limited	2007/06/21	2009/01/26
Prime Commercial Bank Limited	2007/09/24	2009/04/20
Sun Rise Bank Limited	2007/10/12	2009/04/08
Bank of Asia Nepal Limited	2007/10/12	2009/01/07
Development Credit Bank Limited	2001/01/23	2008/03/08
NMB Bank Limited	1996/11/26	2009/03/23
KIST Bank Limited	2003/02/21	2007/10/03
Janata Bank Nepal Ltd	2010/04/06	

Source: Banking and Financial Statistics, No.50, Mid-January 2009 (NRB); and Annual Report (Securities Board of Nepal), Fiscal year 2008/09.The Himalayan Times Daily (2010) Also.

1.2 Statement of the Problem

The debtor-creditor hypothesis in this inflationary world describes the situation of wealth transfer from creditors to debtors. This is because debtors having their fixed liability to pay their creditors may result in paying lower amounts in real terms as purchasing power of money declines over time in the situation of inflation.

But inflation in the economy is normal phenomenon. So, is it normal to be such a creditor who keeps transferring their wealth to debtors? If such is the case can this situation last long because in the long run abnormal or arbitrage opportunities must exit the scene with large numbers of market forces entering such markets and ultimately such opportunities must disappear. If not then are creditors charging enough to debtors to compensate themselves against lost purchasing power? Moreover, creditors may only act against expected portion of inflation and then what can they do about unexpected inflation.

Stockholders are variable income groups and hence fall into debtor category, so are they having their wealth maximized against creditor groups like bondholders, lenders, depositors (in FIs) etc.

Or since they are the residual claimants of the corporation, if all things went adverse in the situation of inflation, they may be ended with nothing at all. For e.g. inflation reports higher earnings, but depreciation and like are deducted on historical costs (without considering inflation), and hence higher reported earnings may actually result in paying higher taxes means lower returns to shareholders after taxes.
Further, the relationship between inflation and stock returns may be determined by condition in the economy similarly as announcement of unemployment is good news for stock market during economic expansions and bad news during economic contractions (Boyd et al., 2005).

The so called blue chip shares, the majority of which falls under shares of commercial banks, do face the same fate with relation to inflation in Nepal? In other words, do banking stock returns provide hedge against inflation? What does the ROE of commercial banks suggest about this and what market prices tell? Moreover, do investors actually prefer commercial banks to other groups of NEPSE with regard to stock returns? And what might be their ranks to these commercial banks?

Among several investment instruments available do investors actually prefer financial assets? More specifically commercial bank stocks to real estates, gold and silver, and

depositing money with FIs? What might be their relative ranks to these investment options? And is the reason behind their common stock investment? This is because cash dividends may not be sufficient enough to compensate against inflation as capital gain does.

And finally, if common stock is not good investment for inflation what might be such, or if no such option exist till day, which financial engineering is possible to innovate those financial assets that can cope with inflation. If it is not possible, are investors left with only option to invest in the basket of commodities that determine CPI in an effort to compensate against lost purchasing power. Some of the major problems are as follows:
   a) Investors unaware of macroeconomic variables that affect their investment returns.
   b) Investors making decisions without true analysis of fundamental and market factors but instead making rumors based decisions.
   c) Corporations' unawareness towards providing adequate returns to their prime constituents (shareholders) that can compensate against inflation.
   d) Lack of coordination among regulatory authorities to provide investor friendly investment environment.
   e) Regulatory authorities' lacking conscience while making policies and decisions which can potentially affect shareholders reaction towards capital markets.

1.3 Research Objectives

Investors have limited resources but have unlimited demand and maximizing wealth within these constraints is obviously difficult. The situation would have been further aggravated if there were no choices or alternatives. The presence of these factors for shareholders wealth maximization has been kept in mind in pursuing the following research objectives:
The objectives of this research are:
   a) To explore if stock returns are affected by inflation.
   b) To find out whether the stock returns of the listed commercial banks considers inflation.
   c) To rank the listed commercial banks with regard to real return to shareholders.
   d) To find out the investors perception towards inflation and banking returns.

1.4 Scope of the Study

The area covered in the research are Nepalese macro economic variables specifically inflation and GDP growth rates. The returns are of banking sector in Nepal which composes primarily of commercial banks. Further, among these commercial banks, only those listed in Nepalese capital market NEPSE are relevant for the study. Further,

commercial banks and NEPSE are affected by several regulatory authorities like NRB, SEBON, ICAN, and Company Registrar's Office etc. For example NRB has direct impact on both inflation and banking returns (the major variables of the study). Moreover, among several investor groups only shareholders are taken into account. So, several cross-sections of the interacting variables are considered while determining stockholders' wealth.

More specifically, the researcher hopes that this research would help:
a) Shareholders who can compare among several investment options.
b) Bankers who can compensate their shareholders adequately so that they can outperform other bankers and stand in better rankings in the eyes of investors.
c) Shareholders to make sound investment decisions taking into account the real returns of the investments.
d) Regulatory authorities and policy makers for introducing prudent regulations and policies those are sound for the overall investment health of the country.

1.5 Research Questions

The intriguing questions behind the research are obviously related with present inflation and returns provided by commercial banks in Nepal. Following are some of the research questions:
a) Are real stock return and inflation dependent on each other?
b) Is the impact of inflation on stock returns moderated by state of the economy?
c) Are variables not considered in the framework relevant for the study?
d) Is average stock real returns greater than average inflation?
e) Which analysis fundamental or technical is good for making investment decision?
f) Is there significant difference between expected and observed rankings of commercial banks with respect to real stock returns?
g) Is there significant difference in respect to the preference over commercial banks between those who regularly trade securities and those who do not?
h) And finally, are investors whose response to relationship among stock returns, inflation and GDP growth; and their reasons behind common stock investment independent attributes?

1.6 Limitations of the Study

Research is a never ending process. This means a single research work is never sufficient. Similarly this research also contains some shortcomings which are as follows:
a) The research assumes inflation as given means that no attempt has been made to explore causes for inflation.
b) Primary data have been collected exclusively from within the Kathmandu Valley.
c) The conclusions drawn in the report is based the data provided, the reliability of which is source dependent and verification of which may not be possible.

d) Only seven years data have been considered, more reliable result can be expected with longer time horizon.

 e) Only commercial banks have been considered as total population of the study. Inclusion of the cross-section of the companies listed in NEPSE would help in drawing further generalized conclusions.

f) Only inflation and GDP growth have been considered for the study of their impact on stock returns, but along with inflation and GDP, several other national and global macroeconomic variables affect stock returns.

1.7 Organization of the Study

The study is organized into five chapters following with bibliography and appendix.

First chapter provides a general introduction to the study named "Inflation and Banking Returns". It contains general background, statement of problem, objectives of the study, scope of the study, research questions and limitations of the study.

Chapter two is all about review of literature. The first part of this chapter deals with the underlying conceptual reviews of the relevant topic. The other part of this chapter deals with the related studies in the topic, ranging from international to national studies.

Chapter three describes the methodology employed in conducting this study. It deals with research design, population and sample, source of the data for the study, data collection techniques, and finally data presentation and analysis tools.

Chapter four deals the presentation and analysis of data. It accompanies presentation of secondary data and also primary data. For this several parametric and non-parametric statistics have been used to answer the relevant research questions.

Last chapter of this thesis presents summary, conclusion and recommendations of the study. The major findings are also reported in this chapter. This section ends with a sub-chapter dealing with avenues for future research. Finally, bibliography, appendices and curriculum vitae of the researcher are included at the end of the thesis.

Chapter 2: REVIEW OF LITERATURE

The main purpose of the review of literature is to avoid reinventing the wheels. For this purpose stock-taking of the previous available literature is done. The researcher has done the same by reviewing the concepts underlying the topic, and by reading and taking notes of related studies.

2.1 Conceptual Review

Under conceptual review of literature, the conceptual foundation of the research topic has been covered. The meaning of inflation, its types, effects, measures, the meaning of monetary policy, its major instruments, commercial banks, stock market, shareholders wealth, and inflation and stock returns are some of the topics discussed.

2.1.1 Meaning of Inflation

According to Edward Shapiro, "Inflation is a persistent and appreciable rise in the general level of price". Likewise, according to Gardner Ackley, "We can define inflation as a persistent and appreciable rise in the general level of prices. This clearly makes inflation a process: rising prices, not high price". (Joshi Shyam, 2060:113)

According to J M Keynes, underemployment in the economy, an increase in the money supply leads to increase in aggregate demand, output, and employment. Starting from a depression, as the money supply increases, output at first rises proportionately. But as aggregate demand, output and employment rise further, diminishing returns start and certain bottlenecks appear and prices start rising. This process continues till the full employment level is reached. The rise in the price level during this period is known as bottleneck inflation or "semi inflation". If the money supply increases beyond the full employment level, output ceases to rise and prices rise in proportion with money supply. This is true inflation, according to Keynes (Jhingan ML, 2005:439).

2.1.2 Types of Inflation

a) Demand – Pull or Monetary Theory of Inflation
Monetarist view or monetary theory o inflation can be stated in the form of simple quantity theory of money i.e. Fisher's equation of exchange
MV=PQ
Where
M= money supply
V = velocity of money
P = price level
Q = level of real output

And because velocity of money, V and level of real output, Q are constant for the time being; price level, P is proportionate relationship with money supply, M. More specifically, price level or inflation has direct and positive relationship with money supply.

Keynes and his followers emphasize the increase in aggregate demand as the source of demand-pull inflation. There may be more than one source of demand which may be consumption, investment, and government expenditures. When the value of aggregate demand exceeds the value of aggregate supply at the full employment level, the inflationary gap arises. The larger the gap between aggregate demand and aggregate supply, the more rapid the inflation. Given a constant average propensity to save, rising money incomes at the full employment level would lead to an excess of aggregate demand over aggregate supply and to a consequent inflationary gap. Thus Keynes used the notion of the inflationary gap to show an inflationary rise in prices.

b) Cost-Push Inflation
Cost-push inflation is caused by wage increases enforced by unions and profit increases by employers. The type of inflation has not been a new phenomenon and was found even during the medieval period. But it was revived in the 1950s and again in the 1970s as the principal cause of inflation. It also came to be known as the "New Inflation". Cost-push inflation is caused by wage-push and profit-push to prices.
The basic cause of cost-push inflation is the rise in the money wages more rapidly than the productivity of labor. In advanced countries, trade unions are very powerful. They press employers to grant wage increases considerably in excess of increases in the productivity of labor, thereby raising the cost of production of commodities. Employers, in turn, raise prices of their products. Higher wages enable workers to buy as much as before, in spite of higher prices. On the other hand, the increase in prices induces unions to demand still higher wages. In this way, the wage-cost spiral continues, thereby leading to cost-push or wage-push inflation.
Another cause of cost-push inflation is profit-push inflation. Oligopolist and monopolist firms raise the price of their products to offset the rise in labor and production costs so as to earn higher profits. There being imperfect competition in the case of such firms, they are able to "administer price" of their products. "In an economy in which so called administered prices abound there is at least the possibility that these prices may be administered upward faster than cost in an attempt to earn greater profits. To the extent such a process is widespread profit-push inflation will result." Profit-push inflation is, therefore, also called administered-price theory of inflation or price-push inflation or sellers' inflation or market-power inflation (Jhingan ML, 2005:437-443).

c) Mixed Demand – Pull Cost – Push Inflation
Demand-pull and cost-push inflation are not dichotomy, but actual inflationary process contains some elements of both. In fact, excess demand and cost-push forces operate simultaneously and interdependently in an inflationary process. So price increases may

start with either of the two forces, but the inflationary process can not be sustained in the absence of the other forces.

d) Structural Inflation
In developing economies, the pressure of population growth and rising urban incomes would tend to raise through chain reaction mechanism, first the prices of agricultural goods; second, the general price level and third, wages.

When demand for agricultural goods increases, supply being inelastic price rises; productivity does not rise because of defective land tenure and other rigidities like lack of irrigation, finance, storage, marketing facilities and bad harvests. To tackle the prevailing condition, imports are done but because of limited foreign exchange reserves, and costs of imports being higher than domestic production, this tends to raise the price level further within the economy. The situation is further worsening when wage earners further ask for wage increase. With increased wages, it lowers productivity and employment; the result being decrease in real expenditure, income and consumption but decrease in consumption is lower than decrease in real income. So, demand increases giving upward pressure in price level.

Another reason that can be forwarded for structural inflation is ineffective tax collection system. The tax collected does not reflect inflation prevailing in the economy and rapid adjustment is not possible in the short run. Also because of the lag between tax amount collection and spending, the amount of inflation could not be adjusted; this brings budget deficit in economy, for this government needs larger funds from central bank which leads to monetary expansion and to a further rise in the rate of inflation.

2.1.3 Effects of Inflation

The effects of inflation could be taken into consideration from two groups of people in the society
Fixed income group like bondholders
Flexible income group like stockholders
With inflation prevailing in the economy, fixed income groups like bondholders lose while flexible income groups like stockholders gain.
Inflation is a rising price level, the price level being a figure that changes as the outlay needed to purchase an assortment of specific quantities of different goods changes. Simply, inflation is persistent and appreciable rise in the general level of prices. "The rich gets richer and the poor get poorer" (Shapiro, 1995)

2.1.4 Measures of Inflation

Four popular measures of inflation are as follows:

a) Consumer Price Index (CPI)
b) Producer Price Index (PPI) formerly called the Wholesale Price Index (WPI).
c) The GNP Implicit Price Deflator
d) Personal Consumption Expenditure Implicit Price Deflator or the PCE Deflator (an alternative to CPI)

Of these four indexes, the GNP deflator has the broadest coverage and therefore most closely approximates the concept of the general price level of all final goods and services. Consequently, economists regard it as the best single rate of inflation in the United States of America. However, the average consumer who is concerned with what is happening to the purchasing power of the dollar ordinarily looks to the CPI for an answer. Beyond this, to ten of millions of consumers, changes in this index number are directly translated into changes in their income, because their wage rates and pensions are automatically adjusted in response to such changes. Approximately 9 million workers are covered by collective bargaining agreements with escalator clauses that provide for automatic wage increases as the CPI goes up. For a far larger number of persons who receive civilian and military pensions as former federal employees, social security benefits or food stamps (and some receive more than one of these, the amounts received are periodically adjusted upward or indexed to cover in full the rise in prices shown by CPI. If the average consumer follows any price index at all, it is understandable that it will be the CPI.

2.1.5 Monetary Policy

Monetary policy is concerned with government's attempt to provide a more stable economy by regulating the rate of growth of the money supply (Shapiro: 588)
Monetary policy is the exercise of the central bank's control over the money supply as an instrument for achieving the objectives of general economic policy. Monetary policy primarily contributes to the achievement of such objectives as full employment, stable prices, and economic growth by influencing the level of aggregate demand and thereby the level of money income. Following are the monetary Measures to Control Inflation (Jhingan M.L., 2005:471):

a) Credit Control: To control quality and quantity of credit central bank raises the bank rates, sells securities in open market, raises the reverse ratio, and adopts a number of selective credit control measures, such as raising margin requirements and regulating consumer credit. Monetary policy may not be effective in controlling inflation, if inflation is due to cost – push factors. Monetary policy can only be helpful in controlling inflation due to demand –pull factors.
b) Demonetization of currency: Another way to control inflation is to demonetize currency of higher denominations. This measure is specially applied with excess black money in the economy.
c) Issue of new currency: Issuing new currency in the place of old currency is also a monetary measure of controlling inflation. This measure is undertaken in case of issue of excessive notes and if there is hyperinflation.

2.1.6 Instruments of Monetary Policy

Monetary policy affects level of aggregate demand through supply of money, cost of money, and availability of money. Two instruments of monetary policy are as follows:
- ➢ Quantitative, general or indirect: The instruments like bank rate variation, open market operations, and changing reserve requirement all affect the overall level of credit in the economy.
- ➢ Qualitative, selective or direct: The instruments like margin requirement and regulation of consumer credit plays the role of controlling specific types of credit.

1) Bank Rate Policy
The bank rate is the minimum lending rate of the central bank at which it rediscounts first class bills of exchange and government securities held by the commercial banks. With raising inflationary pressure; as the result of raising bank rate, commercial banks borrow less and charges high interest on lending to the customers and vice versa with the opposite situation.

2) Open Market Operations
The act of purchasing and selling of securities by central bank in money market is called open market operations. With inflation prevailing in the economy, central bank sells securities and with depression prevailing, central bank purchases back those securities.

3) Changes in Reserve Ratio
Commercial banks are required to keep certain percentages of deposits in central bank and in its own as well, which is known as reserves. Inflation in the economy is controlled when such reserve rates are raised.

The instruments like margin requirement can be also applied to control inflation in the selected area. While advancing loans against collateral the determination of specific margin will affect the inflation level by affecting the level of aggregate demand. For instance the margin requirement of 60% will leave the borrower with only Rs.400 if the security is valued Rs.1000; Rs.600 being margin.

It has been accepted by all monetary theorists that the success of monetary policy is nil in a depression when business confidence is at its lowest ebb and it is successful against inflation. So, it can be safely said that expansionary monetary policy is used to curb deflationary gap i.e. to overcome recession or a depression; and restrictive monetary policy is used to curb inflationary gap i.e. to curtail aggregate demand.

2.1.7 Commercial banks

Commercial banks are organized on a joint stock company system, primarily for the purpose of earning a profit. They can be either of the branches banking type, as we see in most of the countries, with a large, network of branches, or of the unit banking type, as we see in the United States, where a bank's operations are confined to a single office or to a few branches within a strictly limited area. Although the commercial banks attract deposits of all kinds current, savings and fixed, their resources are chiefly drawn from current deposits, which are repayable on demand. So they attach much importance to the liquidity of their investments and as such they specialize in satisfying the short-term credit needs of business other than the long-term.

Commercial banks play a dynamic role in the economic development of a nation. It may not be an exaggeration to assert that without the evolution of commercial banks in the 18th and 19th centuries, industrial evolution would not have occurred in Europe. It is equally true that without the development of sound commercial banking, underdeveloped countries can not hope to join the group of advanced countries. Sayers has rightly remarked that the banking system as a whole has an important influence on the tempo of economic activity. (Gordon and Natarajan K, 2001:50).

2.1.8 Stock Market

In recent years, globalization, deregulation, and advances in technology have contributed to a dramatic reshaping of global capital markets. Central banks play a pivotal role in financial markets by setting monetary policy and regulating financial institutions. Central bank operations have major impact on money and capital markets.
Stock markets are essential to economic development. The stock market provides a place where corporations can go to raise long-term capital to finance a multitude of projects. Stocks also offer investors the opportunity to obtain capital gains from ownership of business enterprises, as well as to receive current dividend income. Stock ownership has expanded dramatically in the past decade as individuals have assumed more responsibility for providing for their retirements. In addition, low-cost online trading has opened the world of equities to millions of people who might not have otherwise considered investing in the stock market. Corporations issue stocks in the primary market. In the secondary market investors express their opinions, based on certain valuation techniques, about the future profitability of a company through the trades that they make. The aggregate of these trades gives the market consensus about the price of the stock. Investors use several approaches to determine the value of a stock, including fundamental analysis, technical analysis, and the efficient market hypothesis.

Primary and Secondary Markets

Companies issue new securities to raise money in the primary market. The first time a company offers its stock for sale to the public is called an initial public offering (IPO). Subsequently, the company may issue additional shares to raise more capital.

Investors trade outstanding shares in the secondary market. Although corporations do not raise capital directly in the secondary market, this market plays an important role in the process. After all, investors would be very reluctant to purchase stock in the primary market if they had no easy way of later selling these securities for cash. The secondary market provides a place for investors to trade securities that have already been issued. It allows investors to shift their assets into different securities and different markets. The secondary market also provides pricing information, thus making a firm's valuation transparent.

Stock Exchanges vs. Over-the-Counter-Market
The transactions among investors in the secondary market take place at organized exchanges or in the OTC market. The organized exchanges have trading floors where traders execute buy and sell orders for their clients. The OTC market does not have a trading floor; instead, traders execute transactions through a computerized telecommunications networks. (Liaw, K.T., 2004)

2.1.9 Stockholders Wealth

Shareholders are the owners of the corporation, and they purchase the stocks because they want to earn a good return on their investment without undue risk exposure. Management's primary goal is stockholder wealth maximization, which translates into maximizing the price of the firm's common stocks. Stock price maximization is the most important goal for most corporations (Brigham et al., 1996:13).

What kinds of actions can managers take to maximize a firm's stock price? What determines stock prices? In a nutshell, it is a company's ability to generate cash flows now and in the future. Three important facts that must be considered for maximizing the shareholders wealth are:
  ➢ Any financial assets, including a stock is only valuable if it generates cash flows.
  ➢ Timing of cash flows matters.
  ➢ Investors generally are averse to risk.
So if managers, enhance their firm's stock prices by increasing the size of the expected cash flows by speeding up their receipts, and by reducing their riskiness, can maximize shareholders' wealth. And keeping in mind the above factors, managers need to make investing, financing and dividend decisions.
It should be however kept in mind that increasing cash flows (present or future) may be sometimes in contrary to maximizing current profits or EPS (especially with increasing future cash flows).

17

A stock's value is the present value of the expected future cash flow streams. This expected cash flow consists of the dividends expected in each year and the price investors expect when they sell the stock.

The present value model used to determine the price of a security, which is as follows:

Present Value$_0$ = cashflow$_1$/(1+K)^1 + cashflow$_2$ /(1+k)^2 + ……+ cash flow$_n$/(1+k)^n

Time Value of Money is the very base for the calculation of the stock value. And the essence of this is: "a dollar in hand today is worth more than a dollar to be received in the future because, if you had it now, you could invest it, earn interest and end up with more than one dollar in the future". Dollars that are paid and received at two different points in time are different and this difference is recognized and accounted for by time value of money (TVM) analysis.

Another most important factor in determining the stock price is obviously cost of capital, K. Two important things governing the cost of capital are:

- That investors provide managers with the necessary funds or capital to undertake projects, and
- Managers, if they are good stewards of the money entrusted to them, invest only in projects that produce rates of return at least as high as the return investors could get elsewhere. The return investors could get elsewhere is their opportunity cost of capital, also called their required rate of return.

Three basic ways can be applied to calculate the firm's cost of capital so that it can be further used to calculate the firm's stock value.

1. The CAPM Approach: $K_s = K_{RF} + (K_M - K_{RF}) b_i$
2. Bond-yield-plus-risk-premium approach: Ks = Bond yield + risk premium
3. Dividend-yield-plus-growth rate, or discounted cash flow approach: $\bar{K} = \dfrac{D_1}{P_0} + g$

Another most similar interpretation for the composition of the cost of capital is given by the determination of market interest rates, which is as follows:

Quoted interest rate = K = K* + IP + DRP + LP + MRP
$$= K_{RF} + DRP + LP + MRP$$

Where,
K*= real risk free rate with zero inflation were expected.
K_{RF} = quoted risk-free rate of interest on a security which is very liquid and also free of market risks.
IP = average expected inflation rate over the life of the security.
DRP = the possibility that the issuer will not pay interest or principal at the stated time and in the stated amount.

LP = liquidity or marketability premium to reflect the fact that some securities can not be converted to cash on short notice at a reasonable price.

MRP = exposure to risk of price declines.

Among the various sources of risks or uncertainty like interest rate risk, bull-bear market risk, management risk, default risk, liquidity risk, callability risk, convertibility risk, political risk, industry risk etc., the major one is purchasing power risk. It is the variability of return investor suffers because of inflation. Economists measure the rate of inflation by using a price index. The consumer price index (CPI) is a popular price index in the USA. The percentage change in the CPI is a widely followed measure of the rate of inflation.

$$q_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}}$$ i.e. rate of inflation in the CPI period t.

Also,

$$q_t = \frac{1+R}{1+rr} - 1$$

Where
rr= real rate of return
r = nominal rate of return
q = inflation prevailing

Fisher hypothesis

In this regard the Fisher's hypothesis might be more relevant. The Fisher hypothesis is that, in the long run, inflation and nominal interest rates move together, meaning that real interest rates are stable in the long term. This is also called the Fisher effect. It was formulated by Irving Fisher.

    The Fisher equation is:

$n = i + r$

where i is the rate of inflation
n is the nominal interest rate and
r is the real interest rate.

If the Fisher hypothesis is correct (the Fisher effect is real), then n and i move together, which means that r (the real interest rate) is stable in the long term.

The equation above is an approximation. The difference between this and the absolutely correct equation is very small unless either the interest rate or inflation is very high, or it is being applied over a long period of time.

Further risk can be analyzed in two ways:

i) On a stand alone basis, where the asset is considered in isolation, and

ii) On a portfolio basis, where the asset is held as one of a number of assets in a portfolio. Thus an asset's stand-alone risk is the risk an investor would face if he or she held only this one asset.

Also the primary conclusion of CAPM is "the relevant riskiness of an individual stock is its contribution to the riskiness of a well-diversified portfolio".

The expected return on a portfolio, K_P, simply the weighted average of the expected returns on the individual stocks in the portfolio, with the weights being the fraction of the portfolio invested in each stock:

$$K_P = W_1K_1 + W_2K_2 + \ldots\ldots\ldots + W_n + K_n$$

$$\sum_{i=1}^{N} wiki$$

Here the $K_{i's}$ are the expected returns on the individual stocks, the $W_{i's}$ are the weights, and there are N stocks in the portfolio. Note that W_1 is the proportion of the portfolio's dollar value invested in stock 1(that is, the total value of the portfolio) the $W_{i's}$ must sum to 1.0. (Weston & Brigham, 1996:193)

In sum, return is measured taking into account the wealth aspect.

i.e. Return = (Ending Wealth – Beginning Wealth)/Beginning Wealth

$$R = \frac{W_1 - W_0}{W_1}$$

This means if the shareholders have their wealth maximized, they are experiencing positive returns and if they have positive returns, their wealth is maximized.

2.1.10 Inflation and Stock Returns

Bodie et al. (2006) discussed about the effects of inflation on stock prices. They started with an "inflation-neutral" case in which all real variables, and therefore the stock price, are unaffected by inflation. They then explored the ways in which reality might differ. Consider the case of Inflatotrend, a firm that in the absence of inflation pays out all earnings as dividends. Earnings and dividends per share are Rs.1, and there is no growth. They used asterisked (*) letters to denote variables in the no-inflation case, or what represents the real value of variables. They considered an equilibrium real capitalization rate, k*, of 10% per year. The price per share of this stock should be Rs.10:

$$P_0 = \frac{Rs.1}{0.10} = Rs.10$$

Now imagine that inflation, i, is 6% per year, but that the values of the other economic variables adjust so as to leave their real values unchanged. Specifically, the nominal capitalization rate, k, becomes

$(1+k^*)(1+i)-1 = 1.10 \times 1.06-1 = .166$, or 16.6%, and the expected nominal growth rate of dividends, g, is now 6%, which is necessary to maintain a constant level of real dividends. The nominal dividend expected at the end of this year is therefore Rs.1.06 per share.

If the constant-growth DDM is applied to these nominal variables the same price is got as in the no-inflation case:

$$P_0 = \frac{D_1}{k-g} = \frac{Rs.1.06}{0.166-0.060} = Rs.10$$

Thus, as long as real values are unaffected, the stock's current price is unaffected by inflation.

.Note that the expected nominal dividend yield D_1/P_0 is 10.6% and the expected nominal capital gains rate, $(P_1-P_0)/P_0$, is 6%. Almost the entire 6.6% increase in nominal return comes in the form of expected capital gains. A capital gain is necessary if the real value of the stock is to remain unaffected by inflation.

Van Horne (2004) describes the presence of inflation. It is known that investors are concerned with inflation, and they factor this into account when making an investment decision. The realized real return for a security can be expressed as

$$R_j^r = R_j - \rho$$

Where R_j^r is the return for security j in real terms, R_j is the return for security j in nominal terms, and ρ is the inflation during the period. If inflation is highly predicable, investors simply will add an inflation premium on to the real return they require, markets will equilibrate in the manner describe earlier in the chapter. As long as inflation is predictable, it is not a source of uncertainty. Therefore, the risk of security can be described by its systematic and unsystematic risk, regardless of whether these risks are measured real or nominal terms.

$$\bar{R}_j = R_j + b\beta_j - i\frac{\text{inf } lation \text{ cov } ariance}{\sigma_i^2}$$

Where i is a coefficient indicating the relative importance of a security's covariance with inflation, σ_i^2 is the variance of inflation, and the other variables are the same as defined previously. In effect, the last variable is a beta for the sensitivity of security returns to changes in inflation. By dividing by inflation's variance, things are expressed on a relative as opposed to an absolute basis.

Francis J.K. (2003) states that pioneering thinking by Fisher and Williams during the 1930s provided compelling logic which suggested that the returns from securities should vary directly with the rate of inflation. But during the 1970s, Bodie, Jaffe and Mandelker, and Nelson all published empirical studies that challenged the received theory of Fisher and Williams. Using empirical data from the 1953 to 1974 period, they all found that both the nominal and the real returns from common stocks were negatively correlated with the inflation rate. Fama and Schwert examined the returns from T-bills, T-bonds, corporate bonds, real estate, labor income, and common stocks. They concluded that only T-bills and both types of bonds provided investors with complete hedges against both expected inflation and unexpected inflation. Moosa, Hasbrouck, and Gultekin used more recent data to investigate the ability of common stocks to provide hedge against inflation. Their conclusions agreed with the research mentioned above.

The portfolios were formed without any attempt to pick either the best or the worst securities in each category. The portfolios thus represented indexes of average investment performance. A naïve buy-and-hold investment strategy should produce results like those of Ibbotson's hypothetical portfolios.

Comparing the annual yields from the T-bills with the annual rates of inflation reveals that the Treasury bill investment's nominal returns approximated the rate of inflation – T-bills yielded almost no real return.

On average, the common stocks (represented by S&P 500 index) earned much greater returns than any of the bond investments. This however should not be hastily concluded that common stock investments are better than bond investments. Common stocks must pay higher returns to compensate their investors for assuming the greater risks associated with common stock investing.

Comparing the risk statistics for common stocks with the bonds' risk statistics is informative. Investment risk is measured by the standard deviation of returns. Comparing the bond risk statistics with the common stock shows that, in both the nominal and the real sense, stock investors suffer more anxiety, lose more sleep, and endure a greater possibility of bankruptcy to get their higher average returns. However, do not forget that a poorly diversified stock investor can have an experience that diverges substantially from the averages.

The real rate of return measures the percentage increase in purchasing power over physical goods that an investment yielded. Scrutinizing the year-by-year returns reveals that occasionally most investments had a positive nominal return, $r_t > 0$, and a negative real return, $rr_t < 0$, meaning that the asset's nominal return was less than the inflation rate, $r_t < q_t$. Stated differently, this means that none of the assets shown i.e. common stocks, T-bills and long term bonds is a consistently good inflation hedge.

2.2 Review of Related Studies

The related studies carried out in the field of inflation and banking returns have been reviewed and hence are categorized in review of journals and articles, and review of dissertations.

2.2.1 Review of Journals and Articles

Boyd et al. (2005) in states that conceptually, stock prices are determined by three primitive factors: the risk-free rate of interest, the expected rate of growth of corporate earnings and dividends (growth expectations) and the equity risk premium.
For example, suppose the real interest rate remains the same, but inflation goes down when unemployment goes up. This would result in a decline in the nominal interest rate and would be good news for bond. If higher unemployment also signals lower real earnings in the future on equities, stock prices need not go up.

Henry (2002) finds that the stock market appreciates by an average of 24% in real dollar terms when countries attempt to stabilize annual inflation rates that are greater than 40%. In contrast the average market response is 0 when the pre-stabilization rate of inflation is less than 40%. These results suggest that the potential long-run benefits of stabilization may dominate short-run costs at high levels of inflation, benefits may be offset by costs in the present value since stock market response also help predict the change in inflation and output in the year following all 81 stabilization efforts.

The sheer number of attempted disinflations over the past quarter century seem to suggest a widely held view that the expected long-run benefits of reducing inflation outweigh any short-run costs. In spite of the limitations, it is learnt a lot by using financial data to study important macroeconomic issues. The traditional view says that disinflation is costly, because reducing inflation causes a fall in output in accordance with the Phillips curve. The rational expectations view says that disinflation need not be costly if policy makers credibly commit to reducing inflation. The stock market approach understates the myopia inherent in both views. The paramount issue is not whether disinflation is costly in the short run, but whether the benefits of disinflation outweigh the costs.

Boudoukh et al. (1994) investigated the cross-sectional relation between industry-sorted stock returns and expected inflation, and they found that this relation is linked to cyclical movements in industry output. Stock returns of non-cyclical industries tend to co-vary positively with expected inflation, while the reverse holds for cyclical industries. From a theoretical perspective they described a model that captures both (i) the cross-sectional variation in these relations across industries, and (ii) the negative and positive relation between stock returns and inflation at short and long horizons, respectively. The model is

developed in an economic environment in which the spirit of the Fisher model is preserved.

The Fisher model. (1930) states that expected nominal rates of return on assets should move one-for-one with expected inflation. This belief is generally attributed to Irving Fisher's work on interest rates, in particular to his view that the real and monetary sectors are causally independent. In an apparent contradiction to the Fisher hypothesis, however, it is a common empirical finding that stock returns are negatively related to both expected and realized inflation (Lintner(1975), Bodie (1976), Nelson (1976), Fama and Schwert (1977), Kaul (1987), and Marshall(1992), among others. Recently, however, Boudoukh, and Richardson (1993) provide statistical evidence that this result is horizon specific. They find that, at long horizons, expected stock returns and inflation move closely together.). The negative correlation is especially surprising for stocks which, as claims against real assets, should compensate for movements in inflation.

An interesting feature of the model is that it synthesizes some of the more palatable features of existing explanations of the negative relation between inflation and returns. Of special interest is the development of the model in a money-neutral world, so that the basic premise underlying Fisher's work is maintained. Since, most theoretical models of the negative relation between stocks and inflation drop assumption, their study is unusual in this respect.

The study of Schwert (1981) analyzes the reaction of stock prices to the new information about inflation. Based on daily returns to the Standard and Poor's composite portfolio from 1953-78, it seems that the stock market reacts negatively the announcement of unexpected inflation in the Consumer Price Index (C.P.I.), although the magnitude of the reaction is small. It is interesting to note that the stock market seems to react at the time of announcement of the C.P.I., approximately one month after the price data are collected by the Bureau of Labor Statistics.

His paper extends the existing evidence by analyzing the reaction of daily stock returns to the announcement of the C.P.I. inflation rate. If unexpected inflation is bad news for the stock market, and if the announcement of the C.P.I. contains new information about inflation, then unexpected inflation (deflation) should be associated with a decrease (increase) in stock prices at the time of the announcement. There is a lag of more than a month between the time that the Bureau of Labor Statistics (B.L.S.) collects the price data and the time when the C.P.I. is announced. By using daily common stock returns, it is possible to test whether the stock market reacts at the time that the price data are collected, or at the time when the C.P.I. is announced, if it reacts at all.

Feldstein (1980) discussed a crucial cause of the failure of share prices to rise during a decade of substantial inflation. Indeed, the share value per dollar of pretax earnings actually fell from 10.82 in 1967 to 6.65 in 1976. The analysis indicates that this inverse

relation between higher inflation and lower share prices during the past decade was not due to chance or to other unrelated economic events. On the contrary, an important adverse effect of increased inflation on share prices results from basic features of the current U.S. tax laws, particularly historic cost depreciation and the taxation of nominal capital gains.

His analysis shows that in order to understand the structural relation between inflation and share prices, it is crucial to distinguish between the effect of a high constant rate of inflation and the effect of an increase in the rate of inflation expected for the future. When the steady-state rate of inflation is higher, share prices rise in proportion to the price level to maintain a constant ratio of share prices to real earnings. In contrast, an increase in the expected future rate of inflation causes a concurrent fall in the ratio of share prices to current earnings. Although share prices then rises from this lower level at the higher rate of inflation, the ratio of share prices to real earnings is permanently lower. This permanent reduction in the price-earning ratio occurs because, under prevailing tax rules, inflation raises the effective tax rate in corporate-source income.

Hong (1977) based on his doctoral dissertation writes about "Inflation and the Market Value of the Firm: Theory and Tests" and states that Inflation causes wealth transfers among different sectors of the economy, consisting of business firms, households and the governments where they affect business profits. These transfers take place over and above the nominal increase in the value of the firm that follows from a general price level change. In the absence of the distortions represented by these transfers, classical theory of macroeconomic equilibrium would require the nominal equity values increase in exactly the same proportion as the price level. (Williams, 1938 and Metzler,1951). Under such conditions, a 10% increase in the general price level, for example, would induce a 10% increase in the nominal value of all assets. Firms would neither enjoy capital gains nor suffer losses, in real terms as a consequence of the price level change. This is consistent with the fact that real return from capital are dependent only on production functions and factor proportions, which are invariant to price levels. However, the presence of wealth transfer due to inflation would imply that this fundamental postulate need no longer hold: the market value of the firm would not be homogenous of degree are in the price level. These considerations naturally raise the perennial questions of whether or not common stocks are a good hedge against inflation. More generally: what is the statistical relation between inflation and stock prices? Past studies have been concerned mainly with the relation between aggregate stock market levels and inflation rates, and the results have been varied and sometimes inconclusive

His paper models the differential wealth transfers effects of inflation on a firm and tests hypothesis concerning their impact on stocks prices. The results differ from previous tests in finding no evidence of transfers from creditors to debtors. Instead, they showed that the main effect of inflation on corporations' wealth transfers, through the taxation system, from business to government.

The results are consistent with the hypothesis that inflation affects stock prices through additional tax burdens borne by firms. These tax effects vary widely across firms due to different degrees of understanding depreciation expenses and the cost of inventory withdrawals. The results from the paper have some implication for managerial decision making and government tax policies. In so far as firms try to maximize their stock prices, management would naturally choose investment and different accounting methods which minimize their tax liabilities in inflation. The incidence of such inflation taken may have to be considered in formulating public policy for the taxation of corporations.

Shrestha (2007) writes under "NRB Monetary Policy and Stock Market Impacts" that NRB's monetary policy had an impact on the performance of stock market as investors were lured into buying shares of commercial banks at higher market price with the expectation that banks would issue bonus shares to increase its capital base to Rs.100 million. As a result there had been tremendous demand for shares of commercial banks in everyday transaction raising stock market index to unexpected highs. Investors used their owned and borrowed capital for purchasing shares of these banks and market price jumped in multiples showing top price swings. The credit facilities from banks and FIs accepting banks shares as collateral became encouraging factor to increase volume of share transactions. During such a bullish period, it is estimated that loan from various commercial banks, FIs and other non-bank FIs crossed more than Rs.5billion putting shares as collateral. The NEPSE Index reached to the almost peak of 430 points compared to previous year figure of 287 points. During the same period, market capitalization reached as high as Rs.97 billion although it was just Rs.61.4 billion in 2004/05.

The study of Thapa (2007) shows that looking back into the history of Nepalese securities market; it can be found that the market started in the mid 1930s with the issuance of shares by some companies. However, the formal institutionalization began only after the establishment of Securities Exchange Centre in 1976. Securities Exchange Centre used to conduct brokering, underwriting, managing public issue, market making for government bonds and other securities market services. The Issuance of Government Bond in 1964, the enactment of Companies Act, 1964, and Securities Act, 1983, were some past initiation for developing securities market in Nepal. The most significant fruit of the liberalization policies of 1990s was the establishment of SEBON in 1993 as an apex regulator of securities markets. Then, Securities Exchange Centre was converted into Nepal Stock Exchange Limited (NEPSE), which started secondary trading of securities with the introduction of stock brokers. There are 24 securities businessperson, 9 issue managers and 2 securities dealers and providing securities market intermediation services and 135 listed companies.

The study of Pradhan and Balampaki (2004) deals with the fundamentals of stock returns in Nepal. It examines if dividend yield, capital gain yield and the total yield are related to

earnings yield, size, book to market ratio and cash flow yield. The study is based on pooled cross sectional data of 40 enterprises whose stocks are listed in Nepal Stock Exchange limited and traded in the stock market. The study reveals that earnings yield and cash flow yield have significant positive impact on dividend yield. In the case of earnings yield and cash flow yield , cash flow yield have been found to be more informative than earnings yield. Likewise, it is observed that capital gain yield is positively influenced by earnings yield and size, whereas, the same is negatively influenced by book to market value and cash flow yield. Book to market value has been found to be statistically strong in predicting capital gain yield. Similarly, it is noticed that the total yield is positively determined by earnings yield and size, whereas the same is negatively determined by book to market value and cash flow yield. Book to market value has been found to be more informative than other variables. The study also revealed the positive relationship among earnings yield, book to market value and cash flow yield. However, the size is negatively related to these three variables.

Adhikari (2004) shows that securities market facilitates the exchange of financial assets by bringing together buyers and sellers of securities. Securities markets provide an effective way of raising money for commercial enterprises and at the same time provide an investment opportunity for individuals and institutions. The activities of buying and selling of securities on the securities markets are extremely important for the allocation of capital within economies. The securities markets serve as a reliable guide to the performance of companies, and thereby promoting efficiency.

The act of raising funds by issuing shares to the general public in Nepal started in 1937. Though, the development of then industrial policy of Nepal led to institutional development of securities markets with the establishment of Securities Exchange Centre in1976. Security Exchange Centre used to manage and operate primary and secondary markets of long-term government securities and corporate securities. Then policies and programs were made to develop and promote stock exchange, issue manager, underwriter, securities dealer, stock broker, and portfolio manager.

With the objective of regulating securities transactions and protecting interest of investors, Securities Exchange Act was enacted in 1983. The Act provided some legal and institutional basis for the securities market development. The first amendment in the Act in 1993 led to the establishment of Securities Board Nepal (SEBO) to regulate and manage securities markets. The Securities Exchange Center was converted into Nepal Stock Exchange Limited (NEPSE), with the objective of operating and managing secondary transactions of securities. After the conversion the open cry-out system of trading among stock brokers started. The second amendment made provisions for registering securities business persons in SEBO.
The amendment also made mandatory provisions for the listed companies to submit semi-annual and annual reports to SEBO.

NEPSE is the market operator and it provides membership to securities business persons. Listed companies and securities business persons report their performance to SEBO and NEPSE.

Bhattarai (2004) writes that listing means registration of securities that are floated by corporate sector, to raise funds for the establishment and operation of a company. The company by means of listing arranges liquidity on the floated securities. The Securities and Exchange Board of India (SEBI) guideline defines listing as "admission of the securities of a public limited company on a recognized stock exchange which provide a forum for the purchase and sale of securities". A listed company can raise additional funds from market and listing facilitates value to the securities. Investors are further awarded liquidity, and information about the companies as reflected by trading price.

Manandhar and Dahal (2000) in the topic "Monetary Policy and Banking Profits in Nepal" write to analyze the effect of monetary policy in commercial bank profits in Nepal. The study presents the results about how commercial bank investment portfolio and profits are affected by monetary policy. They find that the commercial banks' activities are affected by the choice of monetary policy in the country.

Flannery (1981) presented the results of his empirical investigation on market interest rates and commercial bank profitability. His principal hypothesis in his study is that the market rate fluctuations have a significant impact on bank profitability. The author states that the banking system's ability to weather these conditions has come as surprise to many, but seems to indicate that banks have effectively balanced their assets and liability portfolios to hedge against interest rate changes. The author selects the fifteen commercial banks randomly and takes the data for sample period of his study 1959-78. The regression models are tested to determine if market rate fluctuations adversely affect commercial bank profit.

Major objective of commercial banks is to maximize the profits through the use of deposits made by public. NRB through the use of measures of monetary policy limits on the amount of commercial bank lending, effecting interest rates and thereby the profits. Holding some of the details constant for the moment, the excess of the interest earned on the loaned funds over the interest paid on the borrowed funds is the profit of the commercial banks. Commercial banks make a number of investment decisions. These decisions may be:
- The interest rates they will pay to borrow or hire funds.
- The interest rate they will charge to lend funds.
- The type of loans they will make.
- The type of securities they will acquire.

Banks behavior affects interest rates, the money stock, the volume of credit extended by banks, and economic activity. And how does monetary policy affect such behavior? Monetary policy involves the formulation and issuance of specific rules to govern the

structure and conduct of commercial banks by manipulating cost and availability of credit.

2.2.2 Review of Dissertations

Khakurel (2005) in his "Study of Money Supply and Inflation in Nepal" writes inflation is pushing up money incomes faster than production. R.J. Gordon defines, "inflation as a process of continuously rising price of goods and services or equivalently of a continuously falling value of money and other fixed price assets in the economy."
Inflation is a phenomenon when currency of a country exceeds the production. Existence and availability of surplus currency rises to general price level and lowers the purchasing power of currency. So, inflation results on depreciation in the value of money.
The rapidly increasing trend of price in Nepal which is mainly attributed to inelastic supply structure, increasing demand with increased money income in urban sector, increase in petroleum price and increase in Indian price have left the country in inflationary situation. Because of the long open border and free trade with India, inflation is bound to be occurring eventually in Nepal, if there is inflation in India.
The situation of continuous rising population, declining output, and increase in money supply may be the root cause of Nepalese inflation. So, inflation in Nepal is not only the monetary phenomena but it is also structural phenomenon.

Adhikari (2003) studies "Performance of listed companies and returns to Investors" and states that market price per share in one hand reflects the performance information of company and in other hand determines the return to investors in the form of capital gain. In a capital market, all firms operate to generate earnings. Shareholders supplies equity capital hoping to share in the earning either directly in the form of dividends or indirectly in the form of retained earnings.

Chan, Hamao and Lakonishok (1991) analyzed the relation of earnings yield, size, book to market ratio, and cash flow yield with the expected returns. Their findings reveal significant relationship between these variables and expected stock returns.Stock returns may be influenced by the liquidity, leverage, profitability, turnover and other variables.

Khatiwada (1994) tries to analyze the inflationary situation of Nepal and concludes that money supply and other structural variables are important to explain the inflationary behavior in Nepal. The explanatory variables of his model are growth rate of money supply, real income, government expenditure, one year lagged rate of inflation.

Acharya (1977) shows that monetary policy is an intervention by the monetary authorities in the economy through various instruments that includes manipulation of money supply. Central banks have the control over the availability of money and cost of credit.

Further it is stated that qualitative monetary policy is about changing characteristics of money and monetary institutions and institutional arrangements. Whereas quantitative monetary policy is essentially about intervention that changes the volume of money in circulation. Implementation of monetary control techniques influences commercial bank reserves, which influences the supply of money, which influences the interest rate (the cost) and the availability of bank credit, which influences investment spending, output, employment, price level etc. For developing country the main objective of monetary policy is to accelerate the development tempo with stability which is said that both can nsot be achieved at the same time.

2.3 Research Gap

Very few studies have been conducted in the field of inflation and banking returns behavior. Nepal Rastra Bank has lunched different monetary plans and policies. Despite these efforts, there is no indication that the crisis will be abated. While Nepal has escaped the immediate impact of the global financial crisis, the effects of this crisis have recently emerged and are reflected in some sectors of the Nepalese economy as well. Banks were aware of the possible risks in the financial sector emanating from financial crisis such as: excessive exposure of banks and financial institutions in real estate; the rising share and asset prices; and loss of value of bank deposits resulting from negative real interest rate Given these circumstances and an underlying liquidity overhang in the economy though these banks have adopted a cautious and tighter monetary policy there is no remarkable change in the economic and financial situation, which had existed. The inflation rate is still high and there is no positive sign in addressing the negative rate of real interest rate in the market. The liquidity position is also in comfortable position so that tight and precautionary monetary stance is going to be continued for the remaining period of this fiscal year. But it is clearly realized that inflation and returns are fluctuating abnormally and there is lack of appropriate researches to find out the impacts of inflation on returns of commercial banks.

Present study tries to analyze the return behavior of commercial banks with impact of inflation in it by applying various facts using secondary data. Therefore this study is designed to highlight the ranking of real estate, financial investment, gold and Deposit account and impact of inflation on the banks' return. Previous study has not been yet made emphasizing the effects of inflation on return. This research work covers time periods of seven years for the purpose of detail analysis. The present study will be fruitful to the interested person in academic as well as in policy prospective. Hope this study will help others in future in the related field.

Chapter 3: RESEARCH METHODOLOGY

The methods and techniques undertaken from the very beginning to the very end for studying the research phenomenon have been described under this chapter. More specifically the design of the research, the nature and sources of data, the population and sampling of the study, the methods employed for data collection, and data processing and analysis tools are the topics covered under research methodology.

3.1 Research Design

Among several types of research designs the researcher has used the mix of these research designs as they should not be thought of mutually exclusive ones.

For instance, historical research design have been used as past data about inflation and stock returns of listed commercial banks have been taken into account to show relevance of past events to the present.

Moreover, since characteristics of the given variable will be studied to describe the situation and events occurring at present, the research is also descriptive. This is because descriptive research includes all forms of research except historical and experimental (Isaac, 1978).

Further some attempt has also been made to predict future portfolio stock returns of the sample commercial banks with the given inflation and the GDP growth. This means developmental or predictive research design will be applied (Wolff H.K. and Pant P.R., 2005:101).

Finally, some comparative research designs have also been used as comparison between several banks will be made, and correlation and regression analysis have been made.

In sum it can be said that the mix of descriptive and analytical research designs have been used in the research.

3.2 Nature and Sources of Data

Most of the data used in this report have been both secondary and primary .The secondary data have been collected through various published and unpublished sources, which are essentially related with stock returns, inflation and the GDP growth rate of the country. More specifically they have been collected from various libraries like Tribhuvan

University Central Library, Library of Kathmandu University School of Management, People's Campus Library, Kaiser Library, Kathmandu Valley Public Library, NRB Library, SEBON Library, and Nepal National Library.

Mostly nominal and ordinal primary data related with the prevailing inflation and stock returns, the available investment options and the future of the investment environment etc. have been collected from Nepalese investors, bankers, securities businesspersons, authorities of NRB and SEBON etc.

3.3 Population and Sampling

The total number of listed companies for trading in the NEPSE is 137, which is categorized into 8 groups i.e. commercial banks, development banks, finance companies, insurance companies, hotels, manufacturing and processing companies, trading companies, and others. All these however do not provide the population for the study because the study is specifically concentrated in banking sector. So, the listed commercial banks provide the population of the study which stands 21 (SEBON Annual Report, 2008/09).

Since the study of whole population is not feasible because of time, money and energy costs, the sampling technique have been applied for the study purpose. And hence determination of sample size is the most important part of sampling. For this 95% confidence interval has been set with the marginal standard error of estimate at 5% and the coefficient of variation of 7% has been used. Accordingly the sample size is determined as:

$$N = \left(\frac{Z_{\alpha/2} \times C}{\theta} \right)^2 = \left(\frac{1.96 \times 0.07}{0.05} \right)^2 = 7.53 \cong 8$$

Where,

N= basic sampling unit

C= coefficient of variation set at 7%

$Z_{\alpha/2}$= 1.96, value at 5 % level of significance.

θ= standard error set at 5%.

The time undertaken for the study ranges from the year 2002/03to 2008/09 i.e. 7 years. But all 21commercial banks currently being listed in the NEPSE do not constitute 7 years data. So, instead of random sampling, non random or non probability sampling has been used for selecting the sample commercial banks. The list of sample commercial banks considered for the study is as follows:

Table 3.1: Sample Commercial Banks

Sample No.	Commercial Banks
1	NABIL
2	NIB
3	SCB
4	HBL
5	SBI
6	NIC
7	EBL
8	BOK

3.4 Data Collection Methods

For the collection of the secondary data, various published and unpublished materials available in the aforementioned libraries have been referred. More specifically, Annual Reports of respective sample banks, SEBON Annual Reports, NEPSE Trading Reports, Economic Survey, Budget Speech, Monetary Policy, Statistical Year Book of Nepal, NRB Bulletins, Journals, and various magazines and newspaper have been extensively used. Further, persuasion, politeness and frequent visits to these sources were some of the methods employed for collecting secondary data.

The mixes of observation, interview and questionnaire technique have been used for collecting primary data. More specifically, questionnaires have been collected from the investors encountered in 5 broker offices. And interview techniques have been used to know the perceptions of authorities of SEBON, NRB, Banks, and Securities Businesspersons.

3.5 Data Processing and Analysis

For processing and analysis of data, they have been edited, coded, classified, tabulated, and presented in figures, graphs and charts. The mixes of financial and statistical tools have been applied. Help from several descriptive and inferential statistics have been used for analyzing data. Moreover, for analyzing secondary data parametric statistics have been mostly used and for primary data non parametric statistics have been used. Specifically the following data processing and analysis tools have been employed:

3.5.1 Expected Return (Arithmetic Mean)

Expected return is the arithmetic average of the historical returns forecasted for next period. It is obtained by dividing the sum total of the return by the number of the

observations. In probability distribution, the expected return is obtained as the weighted average of the probability and the forecasted return.

$$\bar{R}_m = \frac{\sum R_m}{n}$$

3.5.2 Standard Deviation

Standard deviation (S.D.) is defined as the positive square root of the mean of the deviations taken from the arithmetic mean. It is denoted by σ. It is said to be the best measure of the dispersion as it satisfies most of the requisites of a good measure of dispersion. Standard deviation is an estimate of the likely divergence of actual return form an expected return. It measures the risk of the return. The higher the standard deviation, more risk will be in the assets.

$$\sigma_m = \sqrt{\frac{\sum (R_m - \bar{R})^2}{n}}$$

Where,
σ_m = Standard deviation of the market return, m.
R_m = Return on the market, m.
n = No. of observations

3.5.3 Coefficient of Variation (CV)

Coefficient of variance is the standardization measure of risk per unit of return. It is calculated as standard deviation divided by the expected rate of return. It provides a more meaningful basis for a comparison when two investments of different expected return and standard deviation are to be compared. Given the mean of expected return and its standard deviation, CV is calculated as follows:

$$CV = \frac{\sigma}{R} \times 100$$

Where,
σ = Standard deviation
R = Expected return

3.5.4 Correlation Analysis

Correlation may be defined as the degree of linear relationship existing between two or more variables. Two variables are said to be correlated when the change in the value of the variable is accompanied by the change of another variable.

Karl Pearson's Correlation Coefficient

Karl Pearson's correlation coefficient denoted by "r", measures the intensity or magnitude or degree of relationship between the two variables and is given by the formula.

$$r_{X,Y} = \frac{\text{cov} \, ariance(X,Y)}{\sigma_X \sigma_Y}$$

Where, covariance measures the relative change in the variable X and Y. Mathematically it can be obtained by using the relation.

$$\text{Covariance } (X, Y) = \frac{1}{n} \sum (X - \bar{X})(Y - \bar{Y})$$

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

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

n = number of pairs of observations

Multiple Correlation Coefficient

The study on degree of relationship between a single dependent variable and a number of independent variables in combination is called multiple correlation analysis, which is denoted by $R_{1.23}$ …………..n. the subscript left to the dot is the dependent variable and to right is the independent variables. Let us consider three variables say X_1, X_2 and X_3, then $R_{1.23}$ = Correlation coefficient between dependent variable X_1 and joint effect of the independent variables X_2 and X_3 on X_1.In other words, it is the correlation coefficient between X_1 and its estimated value(X_{e1}) as given by the regression equation of X_1, X_2 and X_3.

The formulae for the calculation of multiple correlation coefficient can expressed in terms of r_{12}, r_{23} and r_{13} as follows,

$$R_{1.23} = \sqrt{\frac{r_{12}^2 + r_{13}^2 + 2r_{12}r_{23}r_{13}}{1 - r_{23}^2}}$$

Coefficient of Multiple Determination in Terns of Zero Order Correlation Coefficient:

The square of multiple correlation coefficient is known as the coefficient of multiple determination and is used to interpret the value of multiple correlation coefficient. It is the fraction that represents the proportion of total variation of dependent variable that is explained by regression plane. Coefficient of multiple determination measures how well the multiple regression plan fits the data.

Probable Error (PE)

The probable is used to measure the reliability and test of significance of correlation coefficient. It is calculated by the following formula.

$$P.E. = 0.6745 \frac{1 - r^2}{\sqrt{n}}$$

Where, r = the value of correlation coefficient
n = number of pairs of observations

P.E. is used in interpretation whether the calculated value of r is significant or not.
i) If r<P.E., it is insignificant, i.e. there is no evidence of correlation.
ii) If r>6P.E. it is significant.
iii) IF PE < r < 6PE, nothing can be concluded.

t-Test for Significance of an Observed Sample Correlation Coefficient

Suppose a random sample of size n has been drawn from a bivariate normal population and let r be the observed sample correlation coefficient. In order to test if this sample correlation coefficient r is significant of any correlation between the variables in the population or it is just due to fluctuation of sampling, we use t-Test for significance of an observed sample correlation as follows:

Null hypothesis: $H_0: \rho = 0$ i.e. the variables are not correlated in the population or the population correlation coefficient is zero.
Alternative hypothesis: $H_1: \rho \neq 0$ i.e. the variables are correlated in the population or population correlation coefficient is not zero (two tailed test).
$H_1: \rho > 0$ i.e. there is positive correlation in the population or the variables are positively correlated (right tailed test).
$H_1: \rho < 0$ i.e. there is negative correlation in the population or the variables are negatively correlated (left tailed test).

Test statistic Under H_0, the test statistic is

$$t = \frac{r}{\sqrt{1-r^2}}\sqrt{n-2} \quad \approx t_{n-2}$$

Follows t- distribution with (n-2) degree of freedom

Where, r = sample correlation coefficient and is computed by

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

n = sample size (pairs)

Level of Significance: Fix the level of significance at ά =5% unless or otherwise stated and specify whether the alternative hypothesis is one tailed or two tailed.

Critical value: Tabulated or critical value of t at ά =5% level of significance for (n-2) degrees of freedom in one/two tailed test is obtained from t-tables.

Decision: if calculated $|t| \le t_{\alpha, n-2}$, accept null hypothesis otherwise reject null hypothesis on favor of alternative hypothesis.

3.5.5 Regression Analysis

The regression analysis is used estimate the likely value of one variable from the known value of the other variable i.e. in regression analysis we establish a kind of average irreversible functional relationship between the two variables. The cause and effect relationship is clearly indicated through regression analysis than by correlation. In other words, regression analysis is a mathematical measure of the average relationship two or more variables in terms of original units of data. The main objective of regression analysis is to predict or estimate the value of dependent variable corresponding to a given value of independent variable.

Regression equation of Y on X (Simple Regression Analysis)

It is the line which gives the best estimates for the values of Y for any specified values of X.
Regression equation of Y on X is given by

Y = a + bX

Where,

Y= Dependent variable

X= Independent variable

a= Intercept of the line

b= Slope of the line (it measures the average change in the value of Y as a result of one unit change in value of X). It is also called regression coefficient of Y on X. In other words, it measures the rate of relationship.

The values of the constants b and a can be determined by solving following two normal equations (applying principle of method of least squares).

$$\sum Y = na + b \sum X \dots\dots\dots\dots\dots\dots(i)$$
$$\sum XY = a \sum X + b \sum X^2 \dots\dots\dots\dots(ii)$$

Multiple Regression Analysis

Multiple regression analysis consists of the measurement of the relationship between the dependent variable and two or more independent variables. The procedure is similar to that for simple regression, with a difference that other independent variables are added to the regression equation.

Multiple Regression equation is the algebraic relationship between one dependent variable and two or more independent variables. This relationship is used to estimate the value of dependent variable for the given values of independent variables. In this chapter, we shall limit our discussion to one dependent variable X1 and two independent variables X_2 and X_3 so that the multiple regression equation for the observed data is given by,

$$X_1 = a + b_1 X_2 + b_2 X_3 \dots\dots\dots\dots\dots(1)$$

Where,

a = Point of intercept on Y- axis = the value of X_1 when $X_2 = X_3 = 0$

$b_1 =$ slope of X_1 with variable X_2 holding variable X_3 constant = Corresponding change in X_1 for each unit change in X_2 while X_3 is held constant = the partial regression coefficient of X_1 on X_2 keeping X_3 constant.

$b_2 =$ slope of X_1 with variable X_3 holding variable X_2 constant = Corresponding change in X_1 for each unit change in X_3 while X_2 is held constant = the partial regression coefficient of X_1 on X_3 keeping X_2 constant.

The values of constants a, b_1 and b_2 are determined by solving simultaneously following three normal equations obtained by the method of least squares.

$$\sum X_1 = na + b_1 \sum X_2 + b_2 + \sum X_2 \text{.............................(1)}$$

$$\sum X_1 X_2 = a \sum X_2 + b_2 \sum X_2^2 + b_2 \sum X_2 X_3 \text{...............(2)}$$

$$\sum X_1 X_3 = a \sum X_3 + b_1 \sum X_2 X_3 + b_2 \sum X_3^2 \text{...............(3)}$$

Test of Regression Coefficient of Multiple Regression Model

Let us consider the multiple regression equation for two independent variables X_2 and X_3 as,

$$X_{1e} = a + b_1 X_2 + b_2 X_2$$

Where, X_{1e} is the estimated value of 1st variable X_1, and b_1 and b_2 is the partial regression coefficients. We can determine whether there is a significant relationship between the dependent variable and the set of independent (explanatory) variables by using F test or analysis of variance (ANOVA).

Step 1: Formulation of hypothesis

Because there is more than one explanatory variable, the null and alternative hypotheses are set up as follows:

$H_0 : b_1 = b_2 = 0$ (There is no relationship between the dependent variable and the explanatory y variable) OR (the regression equation X_1 on X_2 and X_3 is not significant)

$H_1 : b_1 \neq b_2 \neq 0$ or at least one $b_i \neq 0$ (There is linear relationship between the dependent variable and at least one of the explanatory variables) OR (the regression equation of X_1 on X_2 and X_3 is significant.)

Step 2: Calculation of test statistic

Under H_0, F statistic is given by

$$F = \frac{MSR}{MSE}$$

$$= \frac{Explained\ variation}{Unexplained\ variation}$$

Where, Explained variance $= \dfrac{\sum (X_{1e} - \bar{X})^2}{K - 1}$

K is the number of constants in regression model. Also, K is the number of total variables involved in regression model so that (K-1) is the number of explanatory variables.

Unexplained variance $= \dfrac{\sum (X_1 - X_{1e})^2}{n - K}$

n is the sample size or number of observations.

Step 3: Obtain the critical or table value of F at α level of significance for two tailed with degree of freedom (k-1, n-k)

Step 4: Decision
If calculated value of F is less then or equal to the tabulated value of F, the null hypothesis H0 is accepted.
If calculated value of F is greater than the tabulated value of F, the null hypothesis H0 is rejected.

Autocorrelation

On developing relationship between a dependent variable with some independent variables the regression model is used. In case of two variables, say, Y is dependent to independent variables X. the true linear regression is given by: $Y_i = a + bX_i + e_i$ ....(1)

Where, a = constant value of Y_i when $X_i = e_i = 0 (Y_i - \text{intercept})$

   b = regression coefficient (slope of regression)

   e_i = error or disturbance term or residual value which is a random variable.

In business and economics, regressions that involves time series data it is true that effect of error of one period carries to its following period. Thus error for the ith time period often correlated with the error for the preceding period e_{i-1}. The correlation of errors in successive periods is known as order autocorrelation. The presence of autocorrelation in the data makes some doubt in the reliability of fitting of regression model.

The presence and absence of autocorrelation of error terms can be ascertained by several statistical tests. However, for small sample, J Durbin and G.S. Watson (1951) had developed most popular test known as D-W d- statistic. The test statistic given by them is defined as

$$d = \frac{\sum_{t=2}^{n}(e_t - e_{t-1})^2}{\sum_{t=1}^{n}e_t^2}$$

It should be noted that for a positively autocorrelated error terms, the first order differences is likely to be small in absolute values in comparison to the absolute values of e_t i.e. $|e_t - e_{t-1}| < |e_t|$. But for negatively correlated error terms, the absolute value of finder order differences is likely to be large than absolute values of e_t i.e. $|e_t - e_{t-1}| > |e_t|$.

Thus, d- statistic would be small for positively autocorrelated series and would be large for negatively autocorrelated series and in between for a random series.
For positively correlated error terms the test is as follows:

i)   If d<d$_L$, $e_t's$ are positively autocorrelated .

ii)   If d>d$_u$, there is no positive auotcorrelation ijn error terms and $e_t's$ are independent.

iii)   If d$_L$ <d<d$_u$, nothing can be said about first order autocorrelation i.e. 'inconclusive'.

For negatively autocorrelated error terms the test is as follows:

i)   If d>4-d$_L$ $e_t's$ are negatively correlated.

ii)   If d<4-d$_u$ there is no negative autocorrelation and $e_t's$ are independent.

iii)   If 4-d$_u$<d<4-d$_L$ nothing can be said about the first order autocorrelation coefficient i.e. 'inconclusive'.

3.5.6 Test of Significance of Difference between Two Means

The steps that are taken in testing the significance of difference between two means in case of large samples can also be taken in testing the significance of difference between two means in case of small samples ($n \leq 30$), expect in respect of the application of the test statistic. In case of testing the significance of difference between two means of small samples, t-values are used to the t- distribution. The t-test for difference between two means is used to test whether two independent samples have been drawn from two normal populations having the same means and equal population variances or there is significant difference between population means from which the samples are drawn.

Null Hypothesis, H$_0$: $\mu_1 = \mu_2$: i.e. the samples have been drawn from normal populations with the same mean or the two population means do not differ significantly or there is no significant difference between two sample means $\bar{X}_1$ and $\bar{X}_2$.

Alternative Hypothesis, H$_1$: $\mu_1 \neq \mu_2$: i.e. the samples have not been drawn from normal populations with same means or the two population means differ significantly or there is significant difference between two sample means $\bar{X}_1$ and $\bar{X}_2$ (two tailed test).

Or, Alternative Hypothesis, H$_1$: $\mu_1 > \mu_2$ i.e. mean of one population is higher than the mean of the other population (one tailed test).

Test Statistic $t_{(\bar{X}_1 - \bar{X}_2)}$ $= \dfrac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{S_P^2 (\dfrac{1}{n_1} + \dfrac{1}{n_2})}}$

The test statistic t follows t-distribution with n$_1$+n$_2$-2 degrees of freedom.

3.5.7 The Kolmogorov-Smirnov Test of Goodness-of-Fit

The Kolmogorov–Smirnov test of goodness-of-fit is the test of goodness-of-fit. That is, it is concerned with the degree of agreement between the distribution of a set of sample values (observed scores) and some specified theoretical distribution. It determines whether the scores in a sample can reasonably be thought to have come from a population having the theoretical distribution.

Briefly, the test involves specifying the cumulative frequency distribution which would occur given the theoretical distribution and comparing that with the observed cumulative frequency distribution. The theoretical distribution represents what would be expected under H_0. The point at which these two distributions, theoretical and observed, show the greatest divergence is determined. Reference to the sampling distribution indicates whether such a large divergence is likely to occur on the basis of chance. That is, the sampling distribution indicates the likelihood that a divergence of the observed magnitude would occur if the observations were really a random sample from the theoretical distribution.

Let $F_0(X)$ be a completely specified cumulative relative frequency distribution function, the theoretical distribution under H_0. That is, for any value of X, the value of $F_0(X)$ is the proportion of cases expected to have scores equal to less than X.

Let $S_N(X)$ be the observed cumulative relative frequency distribution of a random sample of N observations. If X_1 is any possible score, then $S_N(X_i) = F_i / N$, where F_i is the number of observations which are equal to or less than X_i. $F_0(X_i)$ is the expected proportions of observations which are less than or equal to X_1.

Now under the null hypothesis that the sample has been drawn from specified theoretical distribution, it is expected that for every value X_i, $S_N(X_i)$ should be fairly close to $F_0(X_i)$. That is, when H_0 is true, we would expect the differences between $S_N(X_i)$ and $F_0(X_i)$ to be small and within the limits of random error. The Kolmogorov–Smirnov test focuses on the largest of the deviations. The largest absolute value of $F_0(X_i) - S_N(X_i)$ is called the maximum deviation D.

$$D = \max \left| F_0(X_i) - S_N(X_i) \right| \quad i = 1, 2, \ldots\ldots, N$$

3.5.8 The Fishers Exact Test For 2x2 Table

The Fisher exact probability test for 2x2 tables is a useful technique for analyzing discrete data (either nominal or ordinal) when the two independent samples are small. It is used when the scores from independent random samples all fall into or the other of two

mutually exclusive classes. In other words, every subject in each group obtains one or two possible scores. The scores are represented by frequencies in a 2x2 contingency table.

The exact probability o observing a particular set of frequencies in a 2x2 table, when the marginal totals are regarded as fixed, is given by the hyper-geometric distribution:

$$P = \frac{(A+B)!(C+D)!(A+C)!(B+D)!}{N!A!B!C!D!}$$

3.5.9 The Chi- Square test

The Chi- square test is used to see that the principles of classification of attributes are independent. In this test, the attributes are classified into a two Way table or a contingency table as the case may be. The observed frequency in each cell is known as cell frequency. The total frequency in each row or column of the two way contingency table is known as Marginal frequency. This test shows whether there is any association or relationship between two or more attributes.

Step 1: Set up the Null Hypothesis H_0 : No association exists between the two attributes or the two attributes are independent.
Alternative Hypothesis H_1: An association exists between the two attributes or the two attributes are dependent.

Step 2: Calculate the expected frequency corresponding t each cell by the formula.

$$E = \frac{RT \times CT}{N}$$
  Where, RT = Row Total
  CT = Column Total
  N = Total sample size

For example, let the contingency table (2x2) as follows

	B1	B2	Row total
A1	a	b	a+b
A2	c	d	c+d
Column total	a+c	b+d	N=a+b+c+d

The expected frequency for each cell can be obtained as follows:

$$E(a) = \frac{RT \times CT}{N} = \frac{(a+b)(a+c)}{N},$$

$$E(b) = \frac{(a+b)(b+d)}{N},$$

$$E(c) = \frac{(c+d)(a+c)}{N} \, and,$$

$$E(d) = \frac{(c+d)(b+d)}{N}$$

Step 4: Calculate χ^2 statistic by the formula, $\chi^2 = \sum \frac{(O-E)^2}{E}$. The characteristics of this distribution are completely defined by the number of degrees of freedom ν which is given by $\nu = (r-1)(c-1)$. Where, r = number of rows and c = number of columns in the contingency table.

Step 4: Find the table value of χ^2 for a given level of significance and for the degrees of freedom ν.

Step 5: Compare the computed value of χ^2 with the table value of χ^2.

If computed $\chi^2 <$ tabulated χ^2 then accept the null hypothesis χ^2.

If computed $\chi^2 >$ tabulated χ^2 then reject the null hypothesis H_0 and accept the alternative hypothesis H_1.

Remarks: Under the null hypothesis of independence of attributes, the value of χ^2 for the 2x2 contingency table can be directly computed using the formula.

$$\chi^2 = \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$$

Chapter 4: DATA PRESENTATION AND ANALYSIS

After the chapters like introduction, review of literature, and research methodology, the next chapter is the presentation and analysis of collected data.

The secondary data relevant for the study like Market Capitalization, No. of listed Companies and NEPSE index; inflation and GDP growth: MPS, EPS and P/E; and NI, TD and TL has been first presented and analyzed. Then analysis of fundamental variable (ROE) and technical variable (market prices) have been considered. This chapter ends with presentation and analysis of primary data.

4.1 Preliminary Analysis

The essential factors for the study of "Inflation and Banking Returns" have been covered in this section. In this section the market capitalization, number of listed companies, NEPSE index, inflation, GDP growth rates, MPS, EPS, P/E, ROA, NI, Total loans and total deposits etc of sample banks have been presented and analyzed.

4.1.1 Market Capitalization, No. of listed Companies and NEPSE Index

The data have been collected for 7 years from year 2002/03 to 2008/09 and this seems justifiable because the relationship between stock returns and inflation may be affected by fluctuations in the state of economy and other related variables as proposed by Boyd et al.,(2005). So, in an attempt to account such fluctuation, 7 years data have been collected. As for example, in the year 2001/02, the market capitalization, number of listed companies, NEPSE index all decreases as compared to year 2000/01; and again it increased in the year 2002/03, as shown in the graph and table below:

Table 4.1: Market Capitalization, No. of Listed Companies and NEPSE Index

Year	Market Capitalization (Rs. in million)	No. of listed Companies	NEPSE Index
2000/01	46349.4	115	348.43
2001/02	34703.9	96	227.54
2002/03	35240.4	108	204.86
2003/04	41424.3	114	222.04
2004/05	61365.9	125	286.67
2005/06	96763.7	135	386.83
2006/07	186301.3	135	683.95
2007/08	366247.56	142	963.36
2008/09	512939.07	159	749.10

Figure 4.1: Market Capitalization
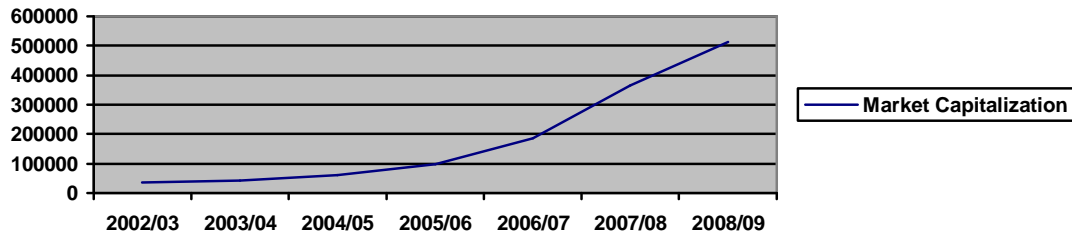
Figure 4.2: No. of Listed Companies
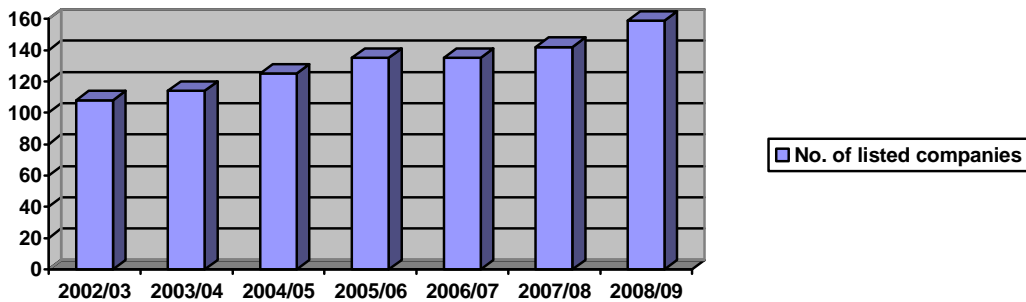
Figure 4.3: NEPSE Index
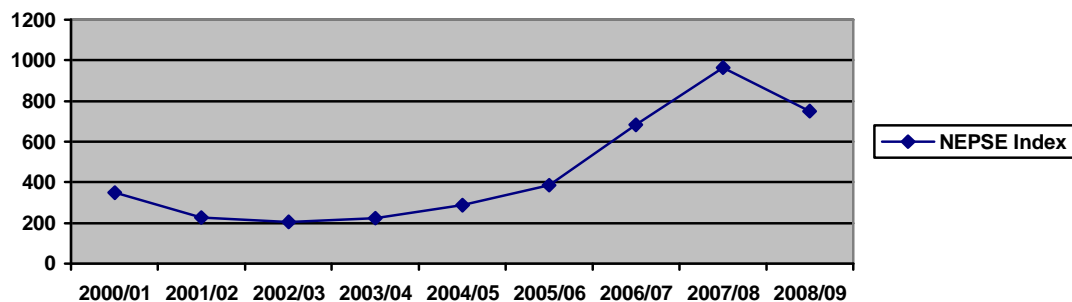
As shown in the above table and figures, the market capitalization, no. of listed companies, and NEPSE Index stood 46349.4 million, 115 and 348.43 for 2000/01 respectively. They decreased to 366247.56 millions, 142 and 963.36, for 2007/08 and then increases in each consecutive years and finally touched the height of 512939.07 millions, 159, and 749.10 in the year 2008/09 respectively.

4.1.2 Inflation and GDP growth

Another preliminary variable considered for the study are inflation and GDP growth.

Inflation
For calculating inflation, as explained in the review of literature, CPI data has been used which is presented in the following table:

Table 4.2: CPI and Inflation

Years	CPI	Inflation (%)
1999/00	134.8	
2000/01	138.1	2.4
2001/02	142.1	2.9
2002/03	148.9	4.8
2003/04	154.8	4
2004/05	161.8	4.5
2005/06	174.7	8
2006/07	185.9	6.4
2007/08	200.2	7.7
2008/09	226.7	13.24

Source: Economic Survey 2008/09

The CPI taken here is National Urban CPI taking 1995/96(2052/53) as the base year. The above table shows that CPI constantly keeps rising from the year 1999/2000 (134.8) to year 2008/09 (226.7). And in the table inflation, q has been calculated on the basis of CPI data.

$$q_E = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}}$$

Sample calculation for 2008/09

$$q = \frac{226.7 - 200.20}{200.2}$$
$$= 13.24\%$$

Since inflation (q) measures relative changes, it increased up to year 2002/03 from year 2000/01, decreased in 2003/04 (4%), rose for both years 2004/05 (4.5) and 2005/06 (80%), and finally decreases in the year 2006/07 (6.4%).

GDP
Consideration of GDP in the analysis is relevant because the relationship or degree of association between stock returns and inflation may be moderated by state of the

economy (Boyd et al., 2005). GDP data presented here is at producers' price and is at current price.

Table 4.3: GDP (Rs.in million) and GDP Growth(%)   .

Year	GDP	GDP Growth (g) %
1999/2000	383553	
2000/01	441519	15.11
2001/02	459443	4.06
2002/03	492231	7.14
2003/04	536749	9.04
2004/05	589412	9.81
2005/06	654055	10.97
2006/07	727089	11.17
2007/08	820811	12.89
2008/09	960012	16.89

Source: Statistical Year Book of Nepal 2000, and 2008; Economic Survey, 2008/09.

Sample calculation of growth in GDP for the year 2008/09

$g = (GDP_{2008/09} - GDP_{2007/08})/GDP_{2007/08}$

  $= (960012-820811)/820811$

  $=16.89\%$

4.1.3 MPS, EPS and P/E

Similarly, another preliminary variable for calculating stock returns are MPS, EPS and P/E. MPS shows the investors wealth position as rewarded in capital markets, EPS is the company's earnings after tax divided by number of shares outstanding. EPS plays significant role in MPS by affecting the demand for and supply of shares. For example, if a company has higher EPS, the demand for such share may be very high and supply low; this will increase MPS of the company.

P/E is MPS divided by EPS. P/E ratio might be another way to calculate MPS data in the absence of such. And this might be an alternative to calculate stock returns especially used by fundamental analysis. (Francis J.K., 2003:468).

$P_{i,t} = e_{i,t} * m_{i,t}$

Where $p_{i,t}$ = MPS of stock i, for time t.

     $e_{i,t}$ = EPS of stock i, for time t.

     $m_{i,t}$ = P/E of stock i, for time t.

Presentations of MPS and EPS for each sample banks have been shown in the diagram below (see appendix for table).

Figure 4.4: MPS and EPS of NABIL
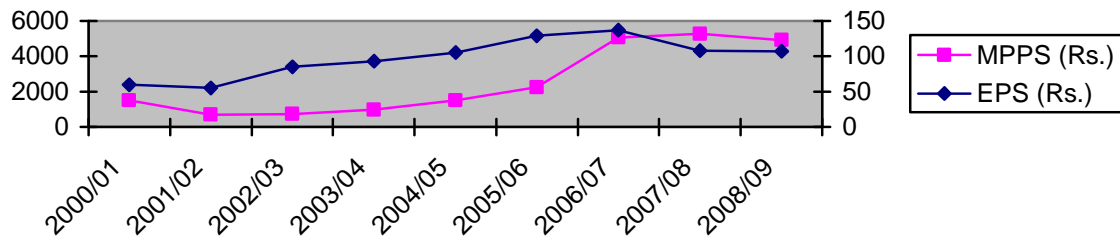
The MPS and EPS of NABIL have been plotted in the above diagram of two scales. The MPS of NABIL is Rs.740 in 2002/03; increases in the year 2003/04 (Rs.1000); and also increases in each consecutive years till 2007/08 ending with Rs.5275and decreases to Rs. 4899 in 2008/09.The EPS of NABIL follows the same trend as that of MPS. It means EPS decreases to 84.66 in 2002/03 from to Rs. 137.08 in 2006/07 and decreases each consecutive year till 2008/09. P/E ratio of NABIL however shows different trend; it increases in each year till 2002/03 from 2008/09; which increases in each year from 8.75 in 2002/03 to 45.89 in 2008/09(See appendix).

And hence similar interpretation can be done for other sample banks as shown in the following figures.

Figure 4.5: MPS and EPS of NIB
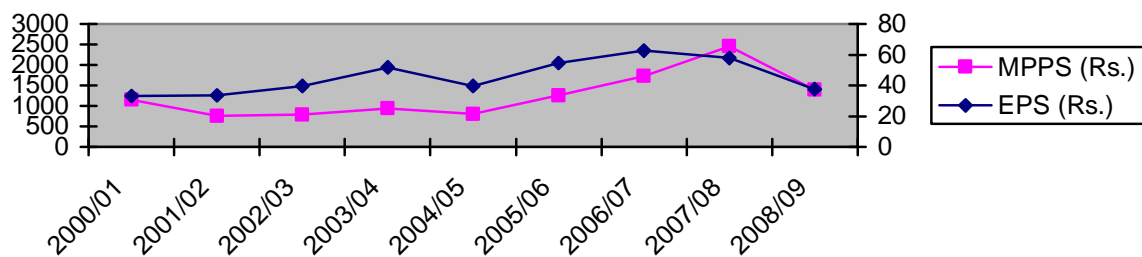
Figure 4.6: MPS and EPS of SCB
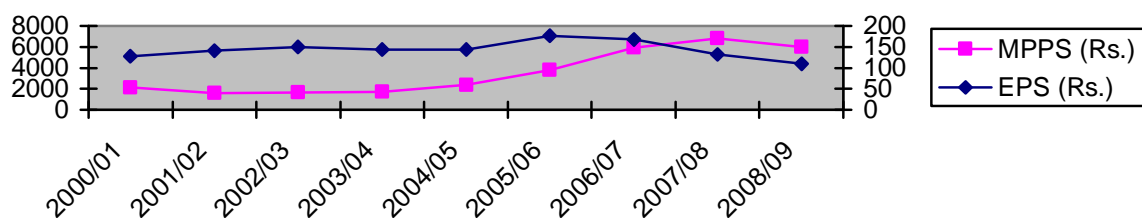
Figure 4.7: MPS and EPS of HBL
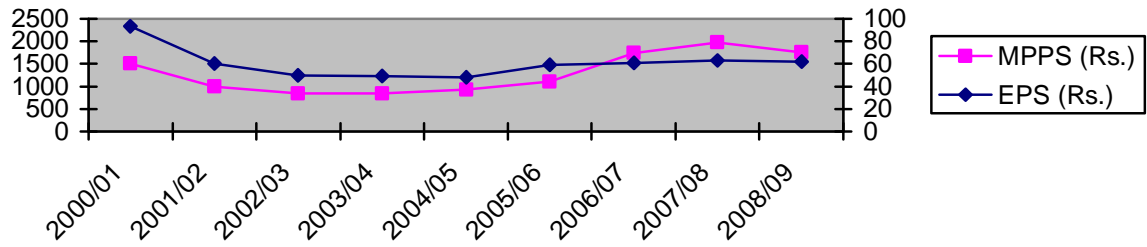
Figure 4.8: MPS and EPS of SBI
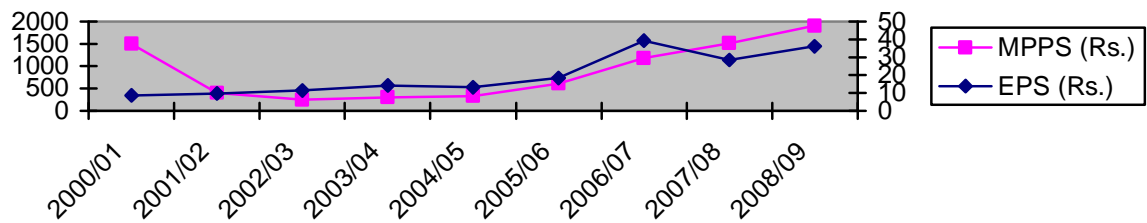
Figure 4.9: MPS and EPS of NIC
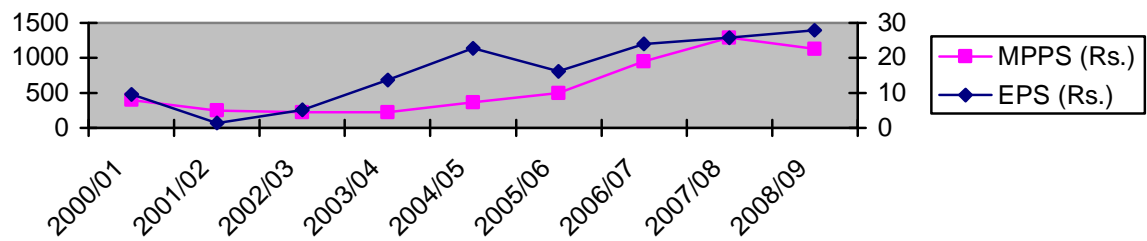
Figure 4.10: MPS and EPS of EBL
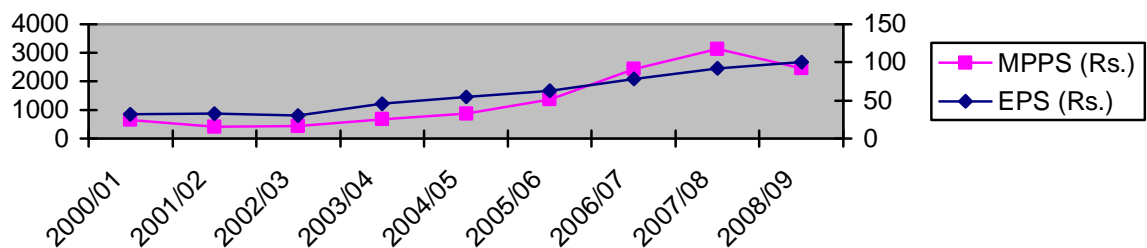
Figure 4.11: MPS and EPS of BOK
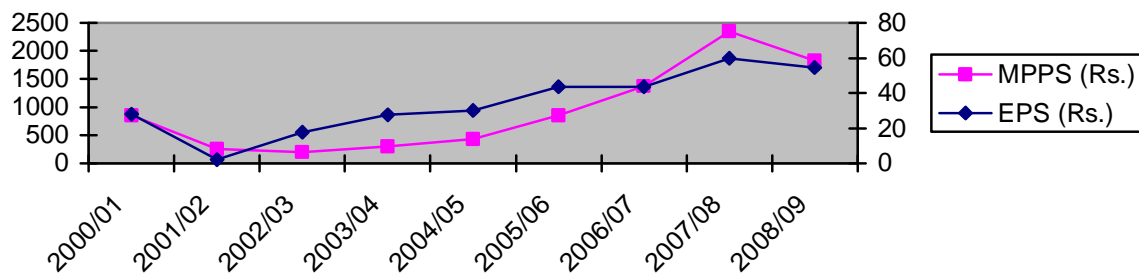
All above figures shows the trends of MPS and EPS of sample commercial banks. Knowledge about P/E the sample banks can also be gained as both MPS and EPS are included in the analysis, because P/E is MPS divided by EPS.

4.1.4 NI, TD and TL

Another group of preliminary variables are NI, TD and TL. This is because ROE is taken as an important variable representing banking return. This ROE is determined by NI. Moreover for commercial banks the major source of their income come from difference in the interest charged on total loans and interest provided on total deposits.

Hence NI, TD, and TL for 8 sample commercial banks are presented in the following diagrams.

As shown in the figure 4.12, the NI of NABIL for has been steadily rising from 2002/03 (Rs.418346183) to 2008/09 (Rs.1031053098). The same is the story of NIB, SCB, SBI and BOK, i.e. net income of these banks keep on increasing in each consecutive period. However, NI of HBL, NIC and EBL show erratic trends.

Figure 4.12: Net Income of Sample Commercial Banks (Rs. in million)
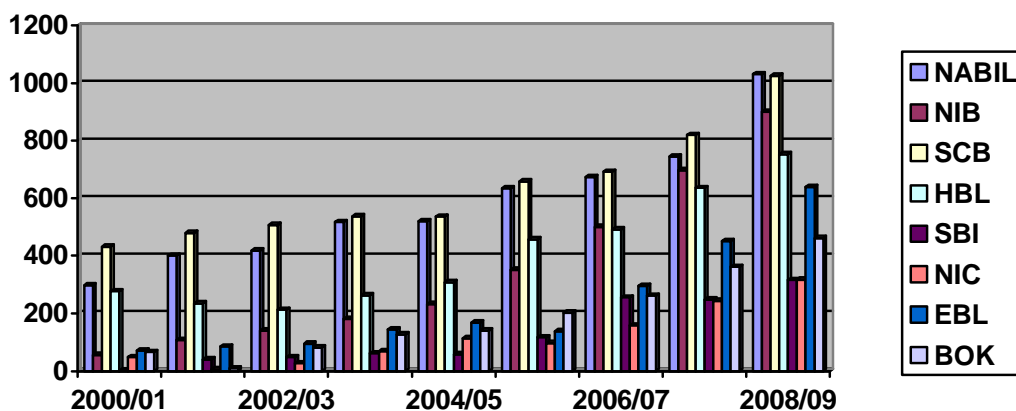
Figure 4.13: Total Deposits of Sample Commercial Banks (Rs. In million)
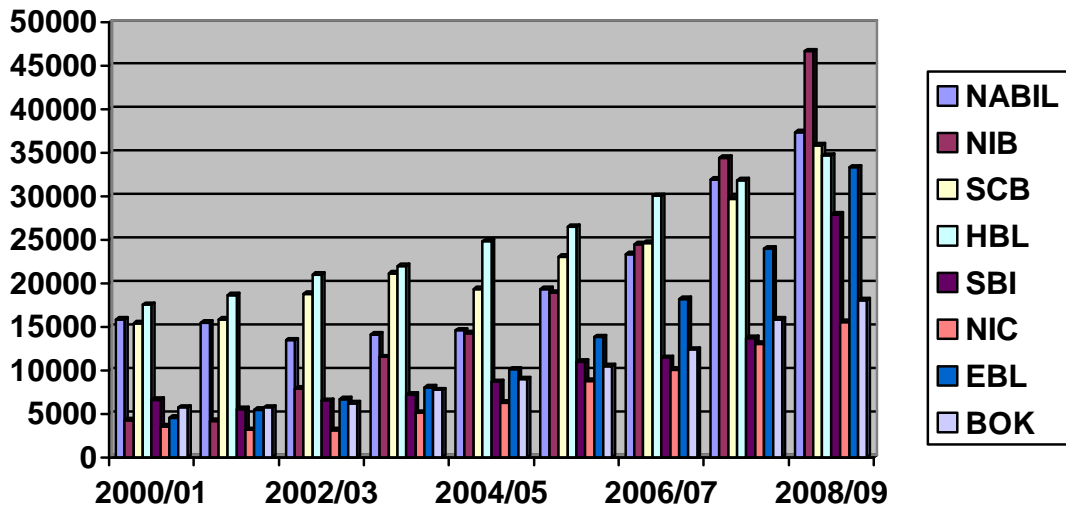
The total deposits of NABIL decreases till 2005/06 from 2002/03; and then keeps rising till the end of the 2008/09 as shown in the figure 4.13. The TD of HBL and EBL keep on continuously rising over the period. However, TD of other banks do not follow consistent pattern over the period.

Figure 4.14: Total Loans of Sample Commercial Banks (Rs. In million)
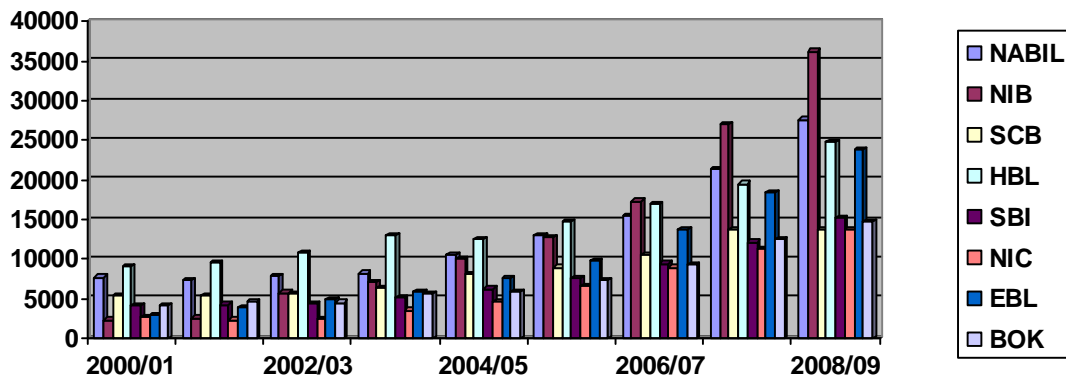
As shown in the above figure, total loans of NABIL also kept rising for all the periods. The remaining banks follow same predictable pattern showing continuous rise in total loans. (See appendix for further details).

4.2 Fundamental Analysis

After analysis of preliminary variables, the next step is to analyze the fundamental variable, ROE. Here, ROE has been taken as the stock returns, because stock returns and ROE are essentially same. Stock return is the returns to shareholders, and ROE is return on equity portion of the total capital. And shareholders have equity participation in the corporation. Further company's earnings, its products, forthcoming legislation that might affect the firm etc. are all fundamental facts of the company (Francis J.K., 2003:521).

This section starts with the calculation of the nominal stock returns (ROE), then real stock returns for each sample banks and portfolio stock nominal returns and real returns. The sample calculation for NABIL bank is as follows: (see appendix for calculation of other banks.)

Sample calculation of NABIL for year 2002/03
Nominal ROE = NI/Total Equity
$$= 418346183/1314187456$$
$$= 31.83\%$$
Real ROE, rr = $\left(\dfrac{1+R}{1+q}\right) - 1$ = $(\dfrac{1+0.3183}{1+0.048})$-1 = 25.79%

Table 4.4: ROE of NABIL

Year	NABIL	
	R	rr
2002/03	31.83	25.79
2003/04	34.88	29.70
2004/05	31.38	25.72
2005/06	33.88	23.96
2006/07	32.76	24.78
2007/08	30.63	21.29
2008/09	32.94	17.40

R =Nominal ROE in percent
rr= Real ROE in percent
Nominal ROE of NABIL Bank Ltd. for the year 2002/03 stood at 31.83%. It increases to 34.88% in 2003/04; decreases to 31.37 in 2004/05, again increases to 33.88% in 2005/06, then decreases to 30.63 in 2007/08, yet again decreases to 30.63 in 2007/08 and finally increases to 32.94 in 2008/09 as shown in the above table.

The inflation for the review period 2002/03, 2003/04, 2004/05, 2005/06, 2006/07 2007/08, and 2008/09, stood at 2.4%, 2.9%, 4.8%, 4.0%, 4.5%, 8.0% , 6.4% 7.7% and 13.24% respectively. This inflation rates when adjusted to nominal returns, the real

returns (ROE) of NABIL bank stood at 25.79%, 29.71%, 25.72%, 23.96%, 24.75% 21.29%, and 17.40%, respectively for the successive years.

Similarly nominal ROE and real ROE for the sample commercial banks have been calculated and presented. (See appendix)

Portfolio ROE for 2002/03

This portfolio consists of all sample banks' nominal return with equal weights i.e. Nominal ROE for 2002/03.

$$= (R_{NABIL} + R_{NIB} + R_{SCB} + R_{HBL} + R_{SBI} + R_{NIC} + R_{EBL} + R_{BOK})/8$$

$$= \frac{31.83 + 22. + 37.03 + 19.95 + 8.55 + 4.70 + 15.37 + 14.18}{8}$$

$$= 19.20\%$$

Similarly portfolio real ROE is average real ROE of 8 sample banks i.e. portfolio real ROE for 2000/01

$$= \frac{25.79 + 16.41 + 30.76 + 14.46 + 3.58 - 0.097 + 10.08 + 8.95}{8}$$

$$= 13.74\%$$

4.2.1 Mean, Standard Deviation and Coefficient of Variation

After calculation of each sample bank's nominal and real stock returns (ROE), the next step is Calculation of Mean, Standard Deviation and Coefficient of Variation of such nominal ROE and real ROE:

Sample calculation for NABIL Bank

Table 4.5: Mean, SD, and CV of NABIL

Year	R	R^2	rr	rr^2
2000/01	28.02	785.1204	25.02	626.0004
2001/02	34.89	1217.312	31.07	965.3449
2002/03	31.83	1013.149	25.79	665.1241
2003/04	34.88	1216.614	29.7	882.09
2004/05	31.38	984.7044	25.72	661.5184
2005/06	33.88	1147.854	23.96	574.0816
2006/07	32.76	1073.218	24.78	614.0484
2007/08	30.63	938.197	21.29	453.264
2008/09	32.94	1085.044	17.40	302.76
Total	228.30	7458.78	168.61	4152.89

$$\sum R = 228.20 \quad \sum R^2 = 7458.78 \quad \sum rr = 168.61 \quad \sum rr^2 = 4152.89$$

$\therefore$ Mean Nominal return

$$\bar{R} = \frac{\sum R}{n}$$
$$= \frac{228.30}{7}$$
$$= 32.614\%$$

Standard deviation of nominal returns

$$\sigma_R = \sqrt{\frac{\sum R^2}{n} - \left(\frac{\sum R}{n}\right)^2}$$

$$= \sqrt{\frac{7458.78}{7} - \left(\frac{228.30}{7}\right)^2} = 1.36\%$$

And coefficient of variation of nominal returns

$$CV_R = \frac{\sigma R}{\bar{R}} \times 100$$

$$= \frac{1.36}{32.614} \times 100$$
$$= 4.0412\%$$

Similarly calculation of mean, standard deviation, and coefficient variation of real returns has been done as follows:

$$\bar{rr} = \frac{48.06}{7}$$
$$= 6.87\%$$

$$\sigma_{rr} = 3.825\%$$

$$CV_{rr} = \frac{3.825}{6.87} \times 100 \quad = 56.04\%$$

Calculation of mean, standard deviation and coefficient of variation have been done to facilitate comparison across the sample commercial banks. Since cross comparison is not possible with, just mean and standard deviation as they are of absolute values, the relative measure C.V. has been calculated. CVs have been calculated for both nominal data and real data…

And hence, nominal ROE CV (CV_R) of NABIL bank is 4.0412%, and real ROE CV (CVrr) is 56.04%. Similarly, calculation of nominal and real mean, SD and CV has been done for sample banks as well and results presented in the table 4.6.

Table 4.6: Nominal Return based Mean, SD and CV of each Sample Banks

Banks	$\bar{R}$	σ_R	CV_R	Rank
NABIL	32.61	1.318	4.0412	1
NIB	23.85	2.263	9.49	3
SCB	34.79	1.871	5.38	2
HBL	22.58	2.445	10.83	4
SBI	13.77	5.059	36.74	8
NIC	14.28	4.815	33.72	7
EBL	22.64	3.97	17.54	5
BOK	22.49	4.532	20.15	6

Table 4.7: Real Return based Mean, SD and CV of each Sample Banks

Banks	$\bar{rr}$	σ_{rr}	CV_{rr}	Rank
NABIL	24.09	3.617	15.02	2
NIB	15.88	3.444	21.69	5
SCB	26.14	4.206	16.09	3
HBL	14.66	2.174	14.83	1
SBI	6.83	3.807	59.67	8
NIC	6.87	3.825	56.04	7
EBL	15.51	2.729	17.60	4
BOK	14.54	3.195	21.97	6

The above table shows that, comparison among sample banks with regard to nominal ROE by calculating C.V. of return; NABIL, SCB, NIB, HBL, EBL, BOK, NIC, and SBI stands 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th respectively. However, while comparison is made taking into account their real ROE data. HBL, NABIL, SCB, EBL, NIB, BOK, NIC, and SBI stands 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th respectively. This clearly shows that in this inflationary world nominal ROE may not provide accurate result of the situation, and hence the return after taking inflation into consideration should be used to have clear picture.

Therefore, from this onwards, real return of the respective samples would be used for further analysis.

4.2.2 Correlation Analysis: Portfolio Real Return (ROE) and Inflation

The association between inflation and average stock real returns or portfolio stock returns (portfolio consisting of 8 sample commercial banks) is relevant. This is because the principal hypothesis of the research is stock returns compose of real return and expected rates of inflation rates (Fisher's hypothesis). Hence degree of correlation between inflation and portfolio stock real returns have been calculated taking data extending from the year, 2000/01 to 2006/07.

Table 4.8: Correlation between Portfolio Real ROE and Inflation

Year	Inflation (X)	Portfolio real return(Y)	X^2	Y^2	XY
2002/03	4.8	13.74	23.04	188.7876	65.952
2003/04	4	17.42	16	303.4564	69.68
2004/05	4.5	15.96	20.25	254.7216	71.82
2005/06	8	15.2	64	231.04	121.6
2006/07	6.4	18.14	40.96	328.3344	115.968
2007/08	7.7	16.21	59.29	262.76	124.817
2008/09	13.24	11.87	175.30	140.8969	157.159
Total	$\sum X = 48.64$	$\sum y = 108.54$	$\sum X^2 = 398.84$	$\sum Y^2 = 1710.73$	$\sum XY = 727.13$

Karl Pearson's Correlation Coefficient

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

$$= \frac{7*727.13 - 48.64*108.54}{\sqrt{7*398.84 - (48.64)^2}\sqrt{7*1710.73 - (108.54)^2}}$$

$$= \frac{-189.48}{\sqrt{426.03}\sqrt{194.18}}$$

$$= -0.66$$

This show there exist moderate degree of negative correlation between stock returns and inflation.

And the coefficient of determination, $R^2 = (-0.66)^2 = 43.56\%$

The coefficient of determination calculated here signifies that only 43.56% of the variation on stock returns is accounted for inflation. And the remaining 56.44% of the changes in stock returns is explained by other variables not considered here.

t-Test Significance of an Observed Sample Correlation Coefficient

The test whether, the calculated correlation coefficient of sample data i.e. sample data of portfolio stock real returns(ROE) and inflation is also statistically significant with regard

to population data, t-test for significance of an observed sample correlation coefficient is to be done. In other words, it tests whether variable in the population is accordingly associated as it is in the sample data.

Null Hypothesis, H_0: $\rho=0$ i.e. the variables are not correlated in the population.
Alternative Hypothesis, H_1: $\rho \neq 0$ i.e. the variables in the population is correlated.

Test statistic,

$$t = \frac{r}{\sqrt{1-r^2}}\sqrt{n-2}$$

$$= \frac{-0.66}{\sqrt{1-(-0.67)^2}} \times \sqrt{7-2}$$

$$= \frac{-0.67}{\sqrt{0.56}} \times \sqrt{5}$$

$$= -2.61$$

$$|t| = 2.61$$

Degrees of freedom = n-2
$$= 7-2$$
$$= 5$$

Critical value: The tabulated value of t @ 5% level of significance for two tailed test and for 5 degrees of freedom is 2.571.

Decision: Since the calculated value of t is smaller than the tabulated value, the Null Hypothesis, H_0 is accepted i.e. the variables are not correlated in the population.

4.2.3 Regression Analysis between Portfolio real return (ROE) and Inflation.

The principle hypothesis of the research is stock returns compose of real returns and the expected inflation, and the real return is independent of inflation. For this first of all, the regression equation of stock returns on inflation is needed to be ascertained, and then the testing hypothesis of independency of real stock returns on inflation has been tested in the following section. The regression equation is essentially about knowing the dependence of stock returns on inflation.
Y=a+bX
Using method of least square, two normal equations to estimate the value of regression coefficient b and a, are as follows:

$$\sum Y = na + b\sum X$$

$$\sum XY = a\sum X + b\sum X^2$$

Substituting the value from the table
108.54=7a + 48.64b………………. (i)

727.13=48.64a + 398.84b…………. (ii)

Solving these two equations

a =18.60 b=-.44

∴ The estimated regression equation of Y on X is

Y_e= 18.60- 0.44X

The regression coefficient of Y (stock returns) on X (inflation) b_{yx} is here is -0.43; this means taking the effect of other factors being constant, 1% increase in inflation would bring 0.43% decrease in stock returns. This regression coefficient is consistent with the calculated correlation coefficient relationship between stock returns and inflation as it has negative sign.

This means if 2007/08 inflation is 7.7%*, the stock returns for the same period is estimated to be

Y=18.60-0.44×13.24

 =12.77%

* CPI for 2007/08 i.e. $q_{2007/08} = \dfrac{200.2-185.9}{185.9} = 7.7\%$

 (Source: Monetary Policy of FY 2065/66; NRB).

Test of Significance of Regression Coefficient of Y on X

As stated above, the hypothesis of independency between real stock returns and inflation has been tested, which is also known as the test of significance of regression coefficient. For determining the significance of regression coefficients calculation of total variation, explained variation, and unexplained variation is necessary which is presented as follows:

Similarly, to test the significance o regression coefficient b, the F- statistics under H_0 i.e. $F = \dfrac{MSR}{MSE}$, has been applied.

Table 4.9: Test of Regression coefficient of portfolio real ROE on Inflation

Year	Y	X	$Y_e = 18.60 - 0.44X$	$(Y-Y_e)^2$	$(Y_e - \bar{Y})^2$	$(Y - \bar{Y})^2$
2002/03	13.74	4.8	16.48	7.51	0.94	3.13
2003/04	17.42	4	16.84	0.34	1.77	3.65
2004/05	15.96	4.5	16.62	0.44	1.23	0.20
2005/06	15.2	8	15.08	0.01	0.18	0.10
2006/07	18.14	6.4	15.78	5.57	0.07	6.92
2007/08	16.21	7.7	15.21	1.00	0.09	0.49
2008/09	11.87	13.24	12.77	0.81	7.51	13.47
	$\sum Y = 108.54$			$\sum (Y-\bar{Y})^2$ $=15.68$	$\sum Y_e - \bar{Y})^2$ $=11.79$	$\sum (Y-Y_e)^2$ $=27.96$

$$\bar{Y} = \frac{108.54}{7}$$
$$= 15.51$$

Null Hypothesis, H_0: b=0: There is no relationship between the dependent variable (real stock returns) and explanatory variable (inflation) or the regression coefficient of Y on X is not significant.

Alternative Hypothesis, $H_1 : b \neq 0$:   There is linear relationship between the dependent variable (real stock returns)   and explanatory variable (inflation)   or the regression equation of explanatory variable or the regression equation of on X significant.

Test statistic, $F, = \frac{MSR}{MSE}$ where,

MSR= Mean sum of square due to regression =Explained variation.
MSE= Mean sum of square due to error =Unexplained variation.

$$F = \frac{MSR}{MSE}$$

Table 4.10: ANOVA for Test of Regression Coefficient

Sources of Variation	Sum of square	Degree of freedom	Mean sum of square	F-ratio
Explained	11.78	2-1=1	11.78/1=11.78	F=11.78/3.92=3.00
Unexplained	15.68	7-2=5	15.68/4=3.92	
Total	27.96	7-1=6		

Critical value: Table value of F at 5% level of significant for 1, 5 degrees of freedom is 6.61.

Decision: Since the calculated value of F is less than the tabulated value, the null hypothesis Ho is accepted. This means the regression coefficient of Y on X is not significant. So, it can be concluded that the calculated regression coefficient (-0.43) of real stock returns (ROE) on inflation is not significant.

Test of Autocorrelation

The regression equation may lose its reliability if the variables not considered in the regression equation is significant correlated. In our case inflation has been considered as the explanatory variable and there may be many variables beside inflation that may affect the real stock returns, which are termed as error variables. For this reason to make sure that whether the error terms (variable outside regression equation) are statistically dependent or independent test of autocorrelation has been carried out.

Null Hypothesis, H_0, ρ=0 i.e. there is no positive autocorrelation in the residuals. In other words, the error terms are statistically independent.

Alternative Hypothesis, H_1: $\rho>0$, i.e. there is positive correlation in the residuals. In other words the error terms are not statistically independent.

Table 4.11: Test of Autocorrelation of Portfolio Stock Real Returns (ROE) on Inflation

Years	X	Y	$Y_e = 18.67 - 0.43X$	$e_t = Y - Y_e$	e_{t-1}	$e_t^{\,2}$	$(e_t - e_{t-1})^2$
2002/03	4.8	13.74	16.48	-2.74		7.51	
2003/04	4	17.42	16.84	0.58	-2.74	0.34	11.02
2004/05	4.5	15.96	16.62	-0.66	0.58	0.44	1.54
2005/06	8	15.2	15.08	0.12	-0.66	0.01	0.61
2006/07	6.4	18.14	15.78	2.36	0.12	5.57	6.30
2007/08	7.7	16.21	15.21	1.00	2.36	1	1.85
2008/09	13.24	11.87	12.77	-0.9	1.00	0.81	3.61
						$\sum e_t^{\,2} = 15.68$	$\sum(e_t - e_{t-1})^2 = 24.93$

Durbin-Watson test statistic

$$d = \frac{\sum(e_t - e_{t-1})^2}{\sum e_t^{\,2}}$$
$$=24.93/15.68$$
$$=1.59$$

Critical Value: The tabulated value of d for n=7 and k'=1 at 5% level of significance, d_L=0.7 and d_U=1.356

Decision: Since $d > d_U$ i.e. 1.65 > 1.356; there is no positive autocorrelation in the residual terms. Hence, the null hypothesis H_0 is accepted.

Again,
Null Hypothesis, H_0, ρ=0 i.e. there is no positive autocorrelation in the residuals. In other words, the error terms are statistically independent.
Alternative Hypothesis, H_1: ρ<0, i.e. there is negative correlation in the residuals. In other words the error terms are not statistically independent.

Durbin-Watson Statistic, $d = \dfrac{\sum(e_t - e_{t-1})^2}{\sum e_t^{\,2}}$
$$=1.59$$

Critical Value: The tabulated value of d for n=7 and k'=1 at 5% level of significance, d_L=0.7 and d_U=1.356
4-d_L=4-07=3.3
4-d_U=4-1.356=2.644

Decision: Since, calculated d<4-d$_U$ i.e., 1.65<2.644, there is no negative autocorrelation in the residual terms. Hence, the null hypothesis H$_0$ is accepted i.e. e$_t$ is statistically independent.

Taking Inflation as Dependent and Stock Returns as Independent Variable

As it is only a hypothetical statement that real returns are dependent on expected inflation, either way is possible. This means, it is also equally likely that, inflation may depend on stock returns. Because of this reason, regression equation of inflation on stock returns has been estimated.

The regression equation of inflation, X on stock Returns, Y is
$$X = a + bY$$
$$\sum X = na + b\sum Y$$
$$\sum XY = a\sum Y + b\sum Y^2$$
Substituting the values from the above table
$$48.64 = 7a + 108.54Y ....(i)$$
$$727.13 = 108.54a + 1710.73Y ....(ii)$$
$$a = 22.08b = -0.98$$

$$\therefore X_e = 22.08 - 0.98Y$$
If Y is given as 15.36 for the year2007/08, estimated inflation (X) for the same period is

$$X_e = 22.08 - 0.98 \times 11.87$$
$$= 10.45\%$$

Similarly, the regression coefficient of X on Y can also be tested.
Table 4.12: Test of regression coefficient of Inflation on Stock Returns

Years	X	Y	$X_e = 9.6 - 0.294$	$(X - \bar{X})^2$	$(X_e - \bar{X})^2$
2002/03	4.8	13.74	8.61	4.62	2.76
2003/04	4	17.42	5.01	8.70	3.76
2004/05	4.5	15.96	6.44	6.00	0.26
2005/06	8	15.2	7.18	1.10	0.05
2006/07	6.4	18.14	4.30	0.30	6.60
2007/08	7.7	16.21	6.19	0.56	0.58
2008/09	13.24	11.87	10.47	39.56	12.39
	$\sum X = 48.64$	108.54		$\sum(X - \bar{X})^2 = 60.84$	$\sum\left(X_e - \bar{X}\right)^2 = 26.35$

$$\bar{X} = \frac{48.64}{7} = 6.95$$

$$Total\,vaiation = \sum (X - \bar{X})^2 = 60.84$$

$$Explained\,variation = \sum (X_e - \bar{X})^2 = 26.35/2.86$$

$$Un\,explained\,variation = \sum (X - X_e)^2 = 60.84 - 26.35 = 34.49/22.85 - 2.86 = 19.99$$

Null hypothesis, H_0: b=0; There is no relationship between the dependent and explanatory variable or the regression equation of inflation, X on real stock returns, Y is not significant.

Alternative Hypothesis, H_1: b≠0; There is linear relationship between the dependent variable (inflation) and explanatory variable (real stock returns) or the regression equation of X on Y is significant.

Test statistic,

$$F = \frac{MSR}{MSE}$$
$$= \frac{26.35 / (2 - 1)}{34.49 / (7 - 2)}$$
$$= 3.82$$

Critical value: Table value of @ 5% level of significance for 1,5 degree of freedom is 6.61.

Decision: Since the calculated value of F is less than the tabulated value, the null hypothesis Ho is accepted. This means the regression coefficient of X on Y is not significant. This means change in the inflation is not explained by real stock return and hence, the hypothesis of the dependency of inflation on real stock returns should be dropped.

4.2.4 t-Test for Test of Significance of Difference between two Means

The values of real stock returns and inflation are different. Real stock returns are as high as 20.84% from as low as 13.74% while inflation ranges from 2.4% to 8.0%. It might be an interesting fact to know whether there is significant difference between the averages of these two variables. This is because if average of stock returns is greater than that of inflation, it can be safely concluded that returns from stock investment provides hedge against inflation.

The mean of sample stock returns is 16.64 and that of inflation is 4.71, obviously sample mean of stock return is greater than that of sample mean of inflation (16.64> 4.71). The question here is if the same is true for the population data. For this, test of significance of difference between two means should be used. Since, our case is sample size is less than 30, Z – test cannot be used and the appropriate test is t–test under which hypothesis are formulated as follows:

Null Hypothesis, $H_0 : \mu_1 = \mu_2$ There is no significant difference between average real stock returns and average inflation.

Alternative Hypothesis, H_1: $\mu_1 > \mu_2$ i.e. the average real stock return is greater than average inflation.

Test Statistic, $t_{\bar{X}_1 - \bar{X}_2} = \dfrac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{S_P^2 (\dfrac{1}{n_1} + \dfrac{1}{n_2})}}$

Table 4.13: Test of Significance of Difference between Mean of Stock Returns (ROE) and Inflation:

Year	Stock Returns ,X_1	Inflation,X_2
2002/03	13.74	4.8
2003/04	17.42	4
2004/05	15.96	4.5
2005/06	15.2	8
2006/07	18.14	6.4
2007/08	16.21	7.7
2008/09	11.87	13.24

$\bar{X}_1 = 15.51$

$\bar{X}_2 = 6.95$

$s_1 = 3.96$

$s_2 = 8.7$

$S_P^2 = \dfrac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2} = 7.39$

$t = \dfrac{(15.51 - 6.95)}{\sqrt{7.39(\dfrac{1}{7} + \dfrac{1}{7})}} = 5.9$

Degrees of Freedom = $n_1 + n_2 - 2 = 7 + 7 - 2 = 12$
Level of Significance = 5%

Critical Value: The tabulated value of t for one tailed test at 5% level of significance and for 12 d.f. is 1.782.

Decision: Since the calculated value of t (5.9) is greater than the tabulated value of t (1.782), the null hypothesis is rejected and hence the alternative hypothesis is accepted. That is the average real stock return is greater than average inflation.

As the hypothesis testing result shows that the average real stock return is greater than average inflation not only in sample but as a whole in population the accompanying conclusion might be that stock returns provide hedge against inflation.

4.2.5 Introduction of another Variable: GDP

Introduction of GDP in the analysis between stock returns and inflation is relevant because the relationship or degree of association between stock returns and inflation may be moderated by several other variables. And here growth in GDP is specifically considered because there is strong relationship between stock prices and macroeconomic news such as GDP (McQueen and Roley, 1993).

Multiple Correlation between Stock Returns (X_1), Inflation(X_2) and GDP growth (X_3)

Calculation of the growth in GDP from the year 200/01 to 2006/07 has been done in the preliminary analysis part. The next step here is to see the relationship between stock returns and inflation and GDP taken together. This means stock returns are taken as independent variables. Hence, the multiple correlations between the above specified variables are as follows:

Table 4.14: Multiple Correlation between Stock Returns (ROE), Inflation and GDP growth

Years	X_1	X_2	X_3	X_1^2	X_2^2	X_3^2	$X_1 X_2$	$X_2 X_3$	$X_1 X_3$
2002/03	13.74	4.8	7.14	188.79	23.04	50.98	65.95	34.27	98.10
2003/04	17.42	4	9.04	303.46	16.00	81.72	69.68	36.16	157.48
2004/05	15.96	4.5	9.81	254.72	20.25	96.24	71.82	44.15	156.57
2005/06	15.2	8	10.97	231.04	64.00	120.34	121.60	87.76	166.74
2006/07	18.14	6.4	11.17	329.06	40.96	124.77	116.10	71.49	202.62
2007/08	16.21	7.7	12.89	262.76	59.29	166.15	124.82	99.25	208.95
2008/09	11.87	13.24	16.89	140.90	175.30	285.27	157.16	223.62	200.48

$\sum X_1 = 108.54$ $\sum X_2 = 48.64$ $\sum X_3 = 77.91$

$\sum X_1^2 = 1710.73$ $\sum X_2^2 = 398.84$ $\sum X_3^2 = 925.47$

$\sum X_1 X_2 = 727.12$ $\sum X_2 X_3 = 596.70$ $\sum X_1 X_3 = 1190.95$

$r_{12} = -0.66$ $r_{23} = 0.93$ $r_{13} = 0.43$

Multiple Correlation Coefficients of X_1, X_2 and X_3 is

$$R_{1.23} = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1 - r_{23}^2}}$$

$$= \sqrt{\frac{(-0.66)^2 + (-0.43)^2 - 2 \times (-0.66) \times 0.93 \times (-0.43)}{1 - 0.93^2}}$$

$$= \sqrt{\frac{0.093}{0.135}}$$

$$= 0.83$$

The multiple coefficient of 0.90 means that there exists very high positive correlation between a dependent variable stock returns and two independent variables, inflation and of GDP growth. This means increase in inflation and GDP growth, is accompanied by increase in stock returns and decrease in inflation and GDP growth is accompanied in stock returns accordingly. More specifically, 1 unit change in inflation and GDP growth brings 0.90 unit changes in stock returns in the same direction.

Degree of Multiple Determination $= (0.83)^2 = 69\%$.
Further the degree of multiple determination is calculated to be 69%. This means 69% of the variation in stock returns is explained by both inflation and GDP growth. And the remaining 31% changes in stock return are determined by other variables not considered in the framework.

t-Test for Significance of an Observed Sample Correlation Coefficient

The test whether, the calculated multiple correlation coefficient of sample data i.e. sample data of portfolio stock real returns(ROE), and inflation and GDP growth is also statistically significant with regard to population data, t-test for significance of an observed sample correlation coefficient is to be done. In other words, it tests whether variable in the population is accordingly associated as it is in the sample data.

Null Hypothesis, H_0: $\rho=0$ i.e. the variables are not correlated in the population.
Alternative Hypothesis, H_1: $\rho \neq 0$ i.e. the variables in the population is correlated.

Test statistic, t
$$= \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2}$$

$$= \frac{0.83}{\sqrt{1-0.83^2}} \times \sqrt{7-2}$$

$$= 3.33$$

Degree of freedom =n-2

=7-2

=5

Critical value: The tabulated value of t @ 5% level of significance for two tailed test and for 5 degrees of freedom is 2.571.

Decision: Since the calculated value of t is greater than the tabulated value, the Null Hypothesis, H_0 is rejected i.e. the variables in the population are correlated.

Further the alternative hypothesis may be developed as an one way test i.e. H_1:p>0 i.e. the stock returns, inflation and GDP growth are positively correlated in the population (right tailed) as against just correlated in the population (two-tailed). The critical value for one tailed test at 5% level of significance and 5 degree of freedom is 2.015. Again this suggests that calculated value is greater than the tabulated value i.e.4.62>2.015, H_0 is rejected and alternative hypothesis is accepted; meaning stock returns, and inflation and GDP growth rates are positively correlated in the population.

Calculation of Regression Equation of X_1 on X_2 and X_3

Further to gain clear picture about the dependent and independent relationships among stock returns, and inflation and GDP growth. The multiple regression equation of stock returns (X_1) on inflation (X_2) and GDP growth (X_3) is calculated.

$X_1 = b_1 + b_2X_2 + b_3X_3$

Using method of least squares, 3 normal equations are required to solve value of regression coefficients b_1, b_2 and b_3. They are:

$$\sum X_1 = nb_1 + b_2 \sum X_2 + b_3 + \sum X_3 \dots\dots\dots\dots\dots\dots\dots(1)$$

$$\sum X_1 X_2 = b_1 \sum X_2 + b_2 \sum X_2^2 + b_3 \sum X_2 X_3 \dots\dots\dots\dots(2)$$

$$\sum X_1 X_3 = b_1 \sum X_3 + b_2 \sum X_2 X_3 + b_3 \sum X_3^2 \dots\dots\dots\dots(3)$$

Substituting the calculated sum values from table 4.13

$116.45 = 7b_1 + 33b_2 + 67.3b_3$

$539.1 = 33b_1 + 178.42b_2 + 321.86b_3$

$1157.92 = 67.3b_1 + 324.86b_2 + 718.84b_3$

Here, calculated values of regression coefficient are as follows:

$b_1 = 13.74$

$b_2 = -0.55$

$b_3 = 0.57$

Therefore, the regression equation of X_1 on X_2 and X_3 is
$X_{1e} = 13.74 - 0.55X_2 + 0.57X_3$

The computed regression coefficients b_1 suggest that the stock returns would be 13.74 given the value of X_2 and X_3 as zero. This means even if X_2 and X_3 takes 0 values, stock returns be a constant of 13.74

And b_2 of -0.55 means that keeping the effect of X_3 as constant every 1 unit change in inflation (X_2) would bring 0.55 unit changes in stock returns but in opposite direction. This negative coefficient suggests that existence of negative correlation coefficient between inflation and stock returns which is true (as correlation coefficient between inflation and stock return is -0.36.

Finally b_3 of 0.57 means keeping other things as equal every unit change in GDP growth brings corresponding change of 0.57 in stock return in same direction. That is, there exists positive correlation between stock returns and GDP growth as indicated by the positive sign of regression coefficient.

Since the estimated multiple regression equation is $X_{1e} = 13.74 - 0.55X_2 + 0.57X_3$; if the value of inflation is given as 7.7% (actual inflation of 2007/08) and GDP growth of 16.89% i.e. ($\dfrac{820814 - 7270897}{727089}$); preliminary for the year 2007/08 (Economic Survey 2007/08), the estimated stock return for the same period would be

$X_{1e} = 13.74 - 0.55 \times 7 + 0.57 \times 16.89$

$= 17.24\%$

Test of Regression Coefficient of Multiple Regression Model

The regression coefficient of stock returns on inflation and GDP growth has been previously computed. This calculation however is not known to be significant or not. For this, test of regression coefficient of multiple regression model have to done to know whether both calculated coefficients are zero or at least one is non-zero.

Null Hypothesis, H_0: $b_2 = b_3 = 0$: There is no relationship between the dependent variable and explanatory variables or the regression coefficient of X_1 on X_2 and X_3 is not significant.
Alternative Hypothesis, $H_1 : b_2 \neq b_3 \neq 0; b_i \neq 0$: There is linear relationship between the dependent variable and explanatory variables or the regression equation of X_1 on X_2 and X_3 is significant.

Test statistic, $F, = \dfrac{MSR}{MSE}$

Where,

MSR= Mean sum of square due to regression =Explained variation.

MSE= Mean sum of square due to error =Unexplained variation.

Table 4.15: Test of Regression Coefficient of Stock Returns (ROE) on Inflation and GDP growth

X_1	X_2	X_3	$X_{1e} = 13.74 - 0.55 X_2 + 0.57 X_3$	$(X_1 - \bar{X})^2$	$(X_{1e} - \bar{X_1})^2$	$X_1 - X_{1e}$
20.84	2.4	15.11	21.03	17.64	19.27	-0.19
15.15	2.9	4.06	14.46	2.22	4.75	0.69
13.74	4.8	7.14	15.17	8.41	2.16	-1.43
17.42	4	9.04	16.69	0.61	0.0025	0.73
15.96	4.5	9.81	16.86	0.46	0.05	-0.09
15.2	8	10.97	15.59	2.07	1.1	-0.39
18.14	6.4	11.17	16.59	2.25	0.0025	1.55
				$\sum (X_1 - \bar{X_1})^2$ $= 33.66$	$\sum (X_{1e} - \bar{X})^2$ $= 27.34$	

$$F = \dfrac{MSR}{MSE}$$

$$= \dfrac{Explained\ variation / k - 1}{Un\exp lained\ variation / n - k}$$

$$= \dfrac{27.34 / (3 - 1)}{6.32 / (7 - 3)}$$

$$= \dfrac{13.67}{1.58}$$

$$= 8.65$$

$Total\ variation = \sum (Y - \bar{Y})^2 = 33.66$

$Explained\ variation = \sum (Y_e - \bar{Y})^2 = 27.34$

$Un\exp lained\ variation = \sum (y - Y_e)^2 = 6.32$

Critical value: Table value of @ 5% level of significance for 2, 4 degrees of freedom is 6.94.

Decision: Since the calculated value of F is greater than the tabulated value, the null hypothesis Ho is rejected. This means the regression equation of X_1 on X_2 and X_3 is significant.

Test of Autocorrelation

In the multiple regression equation of stock returns, and inflation and GDP growth, only two variables namely inflation and GDP growth have been specified as explanatory variables of stock returns. The fact however is that stock returns are affected by several other factors as well. So, all those factors not considered in the regression model may be termed as error variables. The presence of correlation among such error variables may potentially affect the out come of the developed regression model. So, test of autocorrelation is deemed necessary to test the presence of correlation among error variables.

Null Hypothesis, H_0: $\rho=0$ i.e. there is no positive autocorrelation in the residuals. In other words, the error terms are statistically independent.
Alternative Hypothesis, H_1: $\rho>0$, i.e. there is positive autocorrelation in the residuals. In other words the error terms are not statistically independent.

Table 4.16: Test of Autocorrelation of Stock Returns (ROE) on Inflation and GDP growth

X_{1e}	$e_t = (X_1 - X_{1e})$	e_{t-1}	$e_t - e_{t-1}$	$(e_t - e_{t-1})^2$	e_t^2	x1
21.03	-0.19	-	-		0.04	20.84
14.46	0.99	-0.19	1.18	1.39	0.98	15.15
15.17	-1.43	0.99	-2.42	5.87	2.04	13.74
16.69	0.73	-1.43	2.16	4.67	0.53	17.42
16.86	-0.90	0.73	-1.63	2.67	0.81	15.96
15.59	-0.39	-0.90	0.51	0.26	0.15	15.2
16.59	1.55	-0.39	1.94	3.76	2.40	18.14
			18.62	18.62	6.91	

Darbin-Watson test statistic, d = $\dfrac{\sum (e_t - e_{t-1})^2}{\sum e_t^2}$

$$=18.62/6.91$$
$$=2.69$$

Critical Value: The tabulated value of d for n=7 and k'=2 at 5% level of significance, d_L=0.467 and d_U=1.896

Decision: Since $d > d_U$ i.e. 2.69>1.896; there is no positive autocorrelation in the residual terms. Hence, the null hypothesis H_0 is accepted. This means the error variables not considered in the regression framework are not statistically correlated, and hence such variables can not question the validity of our results.

4.3 Technical Analysis

In this section the stock returns have been calculated taking into account the market prices of shares (as opposed to the previous section where stock returns were considered as ROE). And the term technical variable is chosen because the essence of technical analysis is study of trends in prices of a security. Further technical analysis believes that these innumerable fundamental facts are summarized and represented by the market prices of the security (Francis J.K., 2003:521). So, to calculate stock returns, these market prices are adjusted for stock dividends to determine amount of wealth and finally cash dividends are adjusted to calculate stock returns. This is because
Stock Returns = Dividend Yield + Capital Gain Yield.

The total returns calculated and presented in this section is only sample calculation for NABIL Bank Ltd., the details of such calculation for each sample banks have been presented in the appendix.

Table 4.17: Dividends, MPS, and Wealth of NABIL

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS	700	740	1000	1505	2240	5050	5275	4899
Stock dividend	30	50	65	70	85	140	100	85
Cash dividend	30	50	65	70	85	100	60	35
Wealth	1457	2310.39	5151.54	13180.21	36291.56	196363.28	410224.28	704819.75

The year end MPS is Rs.1500, suppose at the beginning of this year , an investor had 1 unit of share of NABIL, s/he would have 1*1.6011=1.6011 units of NABIL's share at the end of the year with 60.11% stock dividends. Hence, s/he would have the wealth equivalent of 1.6011*1500=2401.65(i.e. No. of shares * MPS).And similarly calculation for other years has been done.

Calculation of Capital Gain Yield

Capital gain yield, $g = \dfrac{P_1 - P_0}{P_0} \, or \, \dfrac{P_t - P_{t-1}}{P_{t-1}}$

Therefore, capital gain for the year 2000/01 is (2401.65-1400)/1400 = 71.55%
And similarly calculation for the subsequent years has been done.

Table 4.18: Capital Gain Yield (g) of NABIL

Year	Wealth	Capital Gain Yield,g
1999/2000	1*1400=1400	-
2000/2001	1*1.6011*1500=2401.65	71.55
2001/2002	1*1.6011*1.3*700=1457.0	-39.33
2002/2003	1*1.6011*1.3*1.5*740=2310.39	58.57
2003/2004	1*1.6011*1.3*1.5*1.65*1000=5151.54	122.97

2004/2005	1*1.6011*1.3*1.5*1.65*1.7*1505*13180.21	155.85
2005/2006	1*1.6011*1.3*1.5*1.65*1.7*1.85*2240=36291.56	175.35
2006/2007	1*1.6011*1.3*1.5*1.65*1.75*1.85*2.4*5050=196363.28	441.08
2007/08	1*1.6011*1.3*1.5*1.65*1.75*1.85*2.4*2.0*5275=410224.28	108.91
2008/09	1*1.6011*1.3*1.5*1.65*1.75*1.85*2.4*2.0*1.85*4899=704819.75	71.81

Calculation of Dividend Yield

To incorporate the cash dividend factor in the stock returns, dividend yield is needed to be calculated.

We know that dividend yield $= \dfrac{D_t}{P_{t-1}}$

Dividend yield for the year 2000/01 is 40/1400 = 2.86 %(i.e. the cash dividends for the year 2000/01 is 40%, which becomes Rs.40 as par value of a share is Rs.100).
And similarly calculations for the subsequent years are.

Table 4.19: Dividend Yield, Capital Gain Yield, and Total Returns of NABIL

Year	Dividend yield %	Capital gain(g) %	Total Return %
1999/2000			
2000/2001	40/1400 = 2.86	71.55	74.41
2001/2002	30/2401.65=1.25	-39.33	-38.08
2002/2003	50/1457 = 3.43	58.57	62
2003/2004	65/2310.89 = 2.81	122.97	125.78
2004/2005	70/5151.54 = 1.36	155.85	157.21
2005/2006	85/13180.21=0.64	175.35	175.99
2006/2007	100/3629.56 =2.76	441.08	443.84
2007/2008	60/196363.28=0.03	108.91	108.94
2008/2009	35/410224.28=0.00001	71.81	71.82

And as we know that Total Returns

$$= \dfrac{D_t + P_t - P_{t-1}}{P_{t-1}}$$

$$or \, \dfrac{D_t}{P_{t-1}} + \dfrac{P_t - P_{t-1}}{P_{t-1}}$$

i.e. Total yield (Returns) = Dividend yield + Capital gain yield
For the year 2008/09, total return of NABIL =0.001 +71.81 = 71.82%

Similarly, Calculation of Capital Gain, Dividend Yield, and Total Returns have been done for other sample banks as well (see appendix). However, it should be noted that the calculated values are simply nominal stock returns and again real stock returns are needed to be calculated as done in the previous section.

4.3.1 Mean, Standard Deviation and Coefficient of Variation

Calculation of mean, standard deviation and coefficient of variation has been done to facilitate comparisons among the sample banks.

Table 4.20: Mean, Standard Deviation and Coefficient of Variation of Nominal Stock Returns

Year	NABIL	NIB	SCB	HBL	SBI	NIC	EBL	BOK	Portfolio
2000/01	74.41	-17.92	121.06	40.59	54.51	-18.38	-33.67	-14.83	25.72
2001/02	-38.08	-14.09	49.25	-8.94	-73.27	-38.6	-25.23	-67.13	-27.01
2002/03	62	27.55	130.83	4.56	-29.66	-10.2	14	-18.47	22.58
2003/04	125.78	37.18	124.21	20.57	20.39	-0.9	56.56	53.58	54.67
2004/05	157.21	-3.52	196.01	44.54	9.12	122.43	53.5	48.84	78.52
2005/06	175.99	146.1	286.49	62.19	92.97	49.89	60.53	159.09	129.16
2006/07	443.84	78.52	259.49	121.69	185.11	131.98	129.58	62.58	176.6
2007/08	108.94	99.67	166.26	65.52	28.11	63.67	67	191.56	98.97
2008/09	71.82	-31.88	76	27.66	78.77	1.05	2.29	14.57	30.04
x	163.65	150.52	177.04	49.53	54.97	51.13	54.91	73.11	
σ	120.65	57.01	70.09	35.83	65.61	54.45	19.72	70.12	
C.V.	73.72	112.84	66.06	72.34	119.36	106.49	35.91	95.91	
Rank	4	7	2	3	8	6	1	5	

Table 4.21: Mean, Standard Deviation and Coefficient of Variation of Real Stock Returns

Year	q	NABIL	NIB	SCB	HBL	SBI	NIC	EBL	BOK	Portfolio
2000/01	2.4	70.32	-19.84	115.88	37.29	50.89	-20.29	-35.22	-16.83	22.78
2001/02	2.9	-39.83	-16.51	45.04	-11.51	-74.02	-40.33	-27.34	-68.06	-29.07
2002/03	4.8	54.58	21.71	120.26	-0.23	-32.88	-14.31	8.78	-22.2	16.96
2003/04	4	117.1	31.9	115.59	15.93	15.76	-4.71	50.54	47.67	48.72
2004/05	4.5	146.1	-7.67	183.2	38.32	4.42	112.85	46.89	42.43	70.83
2005/06	8	155.6	127.86	257.86	50.18	78.68	38.79	48.64	139.9	112.18
2006/07	6.4	411.1	67.78	237.87	108.36	167.96	118.03	115.77	52.8	159.96
2007/08	7.7	94	85.54	147.22	53.69	18.95	51.97	55.99	170.72	84.76
2008/09	13.24	51.76	-39.85	55.42	12.73	57.87	-10.76	-9.67	1.72	14.90
x		147.24	41.70	159.83	39.90	44.42	41.84	45.32	61.82	
σ		114.07	52.36	66.06	33.56	60.51	52.03	36.75	64.71	
C.V.		77.47	125.56	41.33	84.10	136.22	124.36	81	104.66	
Rank		2	7	1	4	8	6	3	5	

The above table shows that, comparison among sample banks with regard to nominal stock returns by calculating CV of return: EBL, SCB, HBL, NABIL, BOK, NIC, NIB, and SBI stands 1st, 2nd,3rd, 4th, 5th, 6th, 7th and 8th respectively
 And similarly, while comparison is made taking into account their real stock returns data, the banks i.e. SCB, NABIL, EBL, HBL, BOK, NIC, NIB, SBI and stands 1st, 2nd,3rd,

4th, 5th, 6th, 7th and 8th respectively. This clearly shows consistent ranking by both real returns and nominal return data; and hereafter real returns data would be used.

4.3.2 Correlation Analysis between Portfolio Real Return and Inflation

The association between inflation and average stock real returns or portfolio stock returns (portfolio consisting of 8 sample commercial banks) is relevant. This is because the principal hypothesis of the research is stock returns compose of real return and expected rates of inflation rates (Fisher's hypothesis). Hence degree of correlation between inflation and portfolio stock real returns have been calculated taking data extending from the year, 2000/01 to 2006/07.

Table 4.22: Correlation between Portfolio Real Stock Returns and Inflation

Year	Inflation(X)	Stock Returns(Y)	$X \times X$	$Y \times Y$	$X \times Y$
2002/03	4.8	16.96	23.04	287.6416	81.408
2003/04	4	48.72	16	2373.638	194.88
2004/05	4.5	70.83	20.25	5016.889	318.735
2005/06	8	112.18	64	12584.35	897.44
2006/07	6.4	159.96	40.96	25587.2	1023.744
2007/08	7.7	84.76	59.29	7184.26	652.65
2008/09	13.24	14.90	175.30	222.01	197.28
Total	48.64	508.31	398.84	53256	3366.14

Karl Pearson's Correlation Coefficient, r = -0.17
This show there exist high degree of positive correlation between portfolio real stock returns and inflation.
And the coefficient of determination, $R^2 = (0.17)^2 = 2.89\%$
The coefficient of determination calculated here signifies that 2.89% of the variation on stock returns is accounted for inflation. And the remaining 97.21% of the changes in stock returns is explained by other variables not considered here.

t-Test Significance of an Observed Sample Correlation Coefficient

The test whether, the calculated correlation coefficient of sample data i.e. sample data of portfolio stock real returns and inflation is also statistically significant with regard to population data, t-test for significance of an observed sample correlation coefficient is to be done. In other words, it tests whether variable in the population is accordingly associated as it is in the sample data.

Null Hypothesis, H_0: ρ=0 i.e. the variables are not correlated in the population.
Alternative Hypothesis, H_1: ρ≠0 i.e. the variables in the population is correlated.

Test statistic,

$$t = \frac{r}{\sqrt{1-r^2}} \sqrt{n-2}$$

$$= \frac{0.17}{\sqrt{1-(0.17)^2}} \times \sqrt{7-2}$$

$$= -.38$$

$$|t| = 0.38$$

Degrees of freedom = n-2

$$=7-2$$

$$=5$$

Critical value: The tabulated value of t @ 5% level of significance for two tailed test and for 5 degrees of freedom is 2.571.

Decision: Since the tabulated value of t is greater than calculated the value, Alternative Hypothesis the, H_1 is rejected and hence, Null Hypothesis, H_0 is accepted i.e. the variables are significantly not correlated in the population.

4.3.3 Regression Analysis between Portfolio Real Return and Inflation.

The principle hypothesis of the research is that the stock returns compose of real returns and the expected inflation, and the real return is independent of inflation. And since the stock returns considered in this section is market prices based (as opposed to previous one, which is ROE). For this, first of all the regression equation of real stock returns on inflation is needed to be ascertained. This is because regression equation is essentially about knowing the dependence of stock returns on inflation. And after ascertaining the value of regression coefficient, the hypothesis of independency has been tested in the succeeding section.

Y=a+bX
Using method of least square, two normal equations to estimate the value of regression coefficient b and a, are as follows:

$$\sum Y = na + b\sum X$$

$$\sum XY = a\sum X + b\sum X^2$$

508.31y=7a+48.64b
3366.14=48.64a+398.84b
Using the sum values calculated in the table 4.22, the estimated regression of portfolio real stock returns on inflation is given as:

Y_e=91.56-2.73 X

This means if 2008/09 inflation is 13.24%*, the stock returns for the same period is estimated to be

Y= 91.56-2.73*13.24
  =55.41%

* CPI for 2007/08 i.e. $q_{2007/08} = \dfrac{200.2 - 185.9}{185.9} = 7.7\%$

 (Source: Monetary Policy of FY 2065/66; NRB).

Test of Significance of Regression Coefficient of Y on X

In this section the hypothesis of whether real stock returns are dependent or independent of inflation has been tested. In other words, the test of significance of regression coefficient of real stock returns on inflation has carried. For determining the significance of regression coefficient, calculation of total variation, explained variation, and unexplained variation is necessary which is presented as follows:

Table 4.23: Test of Regression Coefficient of Portfolio Real Stock Returns on Inflation

Year	X	Y	Y_e = -91.5-2.7 X	$(Y - \bar{Y})^2$	$(Y_e - \bar{Y})^2$	$(Y - Y_e)$
2002/03	4.8	16.96	78.46	3098.04	34.12	-61.5
2003/04	4	48.72	80.64	571.21	64.32	-32.92
2004/05	4.5	70.83	79.28	3.20	44.36	-8.45
2005/06	8	112.18	69.72	1565	8.41	42.46
2006/07	6.4	159.96	74.09	7628.28	2.16	85.87
2007/08	7.7	84.76	70.53	147.38	4.37	14.23
2008/09	13.24	14.90	55.41	333	296.18	-40.51
Total	508.31	509.27		16344.70	453.90	

Null Hypothesis, H_0: b=0: There is no relationship between the dependent variable and explanatory variable or the regression coefficient of Y on X is not significant.
Alternative Hypothesis, $H_1 : b \neq 0$:   There is linear relationship between the dependent variable and explanatory variable or the regression equation of explanatory variable of Y on X is significant.

Test statistic, $F, = \dfrac{MSR}{MSE}$
Where,
MSR= Mean sum of square due to regression =Explained variation.
MSE= Mean sum of square due to error =Unexplained variation.

$$F = \dfrac{MSR}{MSE}$$

$$= \frac{Explained\ var\,iation\,/\,k-1}{Un\exp lained\ var\,iation\,/\,n-k}$$

$$= \frac{453.9\,/(2-1)}{15890.80(7-2)}$$

$$= 14.28$$

$$Total\ var\,iation = \sum(Y - \bar{Y})^2 = 16344.70$$

$$Explained\ var\,iation = \sum(Y_e - \bar{Y})^2 = 453.90$$

$$Un\exp lained\ var\,iation = \sum(y - Y_e)^2 = 15890.80$$

Critical value: Table value of at 5% level of significance for 1, 5 degree of freedom is 6.61.

Decision: Since the calculated value of F is greater than the tabulated value, the null hypothesis Ho is rejected. This means the regression coefficient (2.89) of Y on X is significant. This results supports to some extend that stock returns are dependent on inflation and such association is of positive nature.

Test of Autocorrelation

The regression equation may lose its reliability if the variables not considered in the regression equation are significantly correlated. For this reason to make sure that whether the error terms (variable outside regression equation) in our regression equation of stock returns on inflation are statistically dependent or independent, test of autocorrelaion has been carried out.

Null Hypothesis, H_0, $\rho=0$ i.e. there is no positive autocorrelation in the residuals. In other words, the error terms are statistically independent.
Alternative Hypothesis, H_1: $\rho>0$, i.e. there is positive correlation in the residuals. In other words the error terms are not statistically independent.

Durbin-Watson test statistic, $d = \dfrac{\sum(e_t - e_{t-1})^2}{\sum e_t^{\,2}}$

Table 4.24: Test of Autocorrelation of Portfolio Real Stock Returns on Inflation

Year	X	Y	$e_t = (Y - Y_e)$	e_{t-1}	$e_t - e_{t-1}$	$(e_t - e_{t-1})^2$	e_t^2
2002/03	4.8	16.96	-61.5	-			3782.25
2003/04	4	48.72	-32.92	-61.5	28.58	816.82	10833.73
2004/05	4.5	70.83	-8.45	-32.92	24.47	598.78	71.40
2005/06	8	112.18	42.46	-8.45	50.91	2591.83	1802.85
2006/07	6.4	159.96	85.87	42.46	43.41	1884.43	7373.66
2007/08	7.7	84.76	14.23	85.87	-71.64	5132.29	202.49
2008/09	13.24	14.90	-40.51	14.23	-54.33	2954.75	1608.01
						$\sum(e_t - e_{t-1})^2$ = 13975.89	$\sum e_t^2 = $ 12142.14

$$d = \frac{13975.89}{12142.14} = 1.15$$

Critical Value: The tabulated value of d for n=7 and k'=1 at 5% level of significance, d_L=0.7 and d_U=1.356

Decision: Since d> d_U i.e 1.15>1.356; there is no positive autocorrelation in the residual terms. Hence, the null hypothesis H_0 is accepted i.e. e_{ts} are statistically independent.

Taking Inflation as dependent and Stock Returns as independent variable

As it is only a hypothetical statement that real returns is independent of expected inflation, either way is possible. This means, it is also equally likely that, inflation may dependent on stock returns. Because of this reason, regression equation of inflation on stock returns b_{XY} is calculated.

The regression equation of inflation (X) on stock Returns (Y) , and using the method of least squares, two normal equations to estimate the regression equation of X on Y are as follows:

$$X = a + bY$$
$$\sum X = na + b\sum Y$$
$$\sum XY = a\sum Y + b\sum Y^2$$

48.64 = 7a +508.31b
3366.14 = 508.31a +53256b

Therefore,

a = 7.69,   b = -0.01

X_e = 7.69-0.01Y

If Y is given as 14.9 for the year2008/09, estimated inflation (X) for the same period is

$$X_e = 7.69 - 0.01 \times 14.90 = 7.54\%$$

Similarly, the regression coefficient of X on Y can also be tested.

Table 4.25: Test of Regression Coefficient of Inflation on Stock Returns

Year	X	Y	X=7.70-0.01y	$(X - \bar{X})^2$	$(X_e - \bar{X})^2$
2002/03	4.8	16.96	7.52	4.62	0.32
2003/04	4	48.72	7.20	8.7	0.06
2004/05	4.5	70.83	6.98	6	0.001
2005/06	8	112.18	6.57	1.10	0.14
2006/07	6.4	159.96	6.09	0.30	0.74
2007/08	7.7	84.76	6.84	0.56	0.01
2008/09	13.24	14.90	7.54	39.56	0.01
				60.86	1.63

$\bar{X} = 6.95$

Total Variation = 60.86

Explained Variation = 1.64

Unexplained Variation = 59.22

Null Hypothesis, H_0: b=0: There is no relationship between the dependent variable and explanatory variable or the regression coefficient of X on Y is not significant.

Alternative Hypothesis, $H_1 : b \neq 0$: There is linear relationship between the dependent variable and explanatory variable or the regression equation of explanatory variable of X on Y is significant.

Test statistic, $F, = \dfrac{MSR}{MSE}$ where,

MSR= Mean sum of square due to regression =Explained variation.

MSE= Mean sum of square due to error =Unexplained variation.

$$F = \frac{1.64/2 - 1}{59.22/7 - 2} = 0.1385$$

Critical value: Table value of @ 5% level of significance for 1,5 degree of freedom is 6.61.

Decision: Since the calculated value of F is lesser than the tabulated value, the null hypothesis Ho is accepted. This means the regression coefficient of X on Y is not significant.

The result here is in line with our assumption that inflation is independent variable and stock returns are dependent variable.

4.3.4 t-Test for Test of Significance of Difference between two Means

The values of stock returns and inflation are different. Stock returns (real) are as high as 159.96% from as low as -29.07% while inflation ranges from 2.4% to 8.0%. It might be an interesting fact to know whether there is significant difference between the averages of these two variables. This is because if average of stock returns is greater than that of inflation, it can be safely concluded that returns from stock investment provides hedge against inflation.

The mean of sample stock returns is 16.64 and that of inflation is 4.71, obviously sample mean of stock return is greater than that of sample mean of inflation (16.64 > 4.71). The question here is if the same is true for the population data. For this, test of significance of difference between two means should be used. Since, our case is sample size is less than 30, Z – test cannot be used and the appropriate test is t–test under which hypothesis are formulated as follows:

Null Hypothesis, H_0: $\mu_1 = \mu_2$ There is no significant difference between average real stock returns and average inflation.

Alternative Hypothesis, H_1: $\mu_1 > \mu_2$ i.e. the average real stock return is greater than average inflation.

Test Statistic, $t_{\bar{X}_1 - \bar{X}_2} = \dfrac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{S_P^2 \left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$

Table 4.26: Test of Significance of Difference between Means of Stock Returns, and Inflation:

Year	Stock Returns,X_1	InflationX_2
2002/03	16.96	4.8
2003/04	48.72	4
2004/05	70.83	4.5
2005/06	112.18	8
2006/07	159.96	6.4
2007/08	84.76	7.7
2008/09	14.90	13.24

$$\overline{X}_1 = 72.62$$

$$\overline{X}_2 = 6.95$$

$$s_1 = 48.32$$

$$s_2 = 2.95$$

$$S_P^2 = \frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2} = 1366.89$$

$$t = \frac{(72.62 - 6.95)}{\sqrt{1366.89(\frac{1}{7} + \frac{1}{7})}} = 3.32$$

Critical Value: The tabulated value of t for one tailed test at 5% level of significance and for 12 d.f. is 1.782.

Decision: Since the calculated value of t (3.32) is greater than the tabulated value of t (1.782), the null hypothesis is rejected and hence the alternative hypothesis is accepted. That is the average real stock return is greater than average inflation.
As the result of testing of hypothesis shows that the average real stock return is greater than average inflation not only in sample but as a whole in population the accompanying conclusion might be that stock returns provide hedge against inflation.

4.3.5 Introduction of another Variable: GDP

Introduction of GDP in the analysis between stock returns and inflation is relevant because the relationship or degree of association between stock returns and inflation may be moderated by several other macroeconomic variables other than inflation. And here growth in GDP is specifically considered.

Multiple Correlation between Stock Returns (X_1), Inflation(X_2) and GDP growth (X_3)

Calculation of the growth in GDP from the year 200/01 to 2006/07 has been done in the preliminary analysis part. The next step here is to see the relationship between stock returns and inflation and GDP taken together. This means stock returns are taken as independent variables. Hence, the multiple correlations between the above specified variables are as follows:

Table 4.27: Multiple Correlation between Stock Returns, Inflation and GDP growth

Year	Returns(X_1)	Inflation(X_2)	GDP(X_3)
2002/03	16.96	4.8	7.14
2003/04	48.72	4	9.04
2004/05	70.83	4.5	9.81
2005/06	112.18	8	10.97
2006/07	159.96	6.4	11.17
2007/08	84.76	7.7	12.89
2008/09	14.90	13.24	16.96

$$\sum X_1 = 508.31, \qquad \sum X_2 = 48.64, \qquad \sum X_3 = 77.98$$

$$\sum X_1^2 = 53256, \qquad \sum X_2^2 = 398.84, \qquad \sum X_3^2 = 927.84$$

$$\sum X_1 X_2 = 3366.14, \qquad \sum X_2 X_3 = 597.63, \qquad \sum X_1 X_3 = 5619$$

$r_{12} = 0.74 \qquad\qquad r_{23} = 0.98 \qquad\qquad r_{13} = 0.81$

Multiple Correlation coefficients of $\sum X_3$

$$R_{1.23} = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1 - r_{23}^2}}$$

$$= \sqrt{\frac{(0.74)^2 + (0.81)^2 - 2 \times 0.74 \times 0.81 \times 0.98}{1 - (0.98)^2}} = 0.85$$

$$\therefore R_{1.23}^2 = 72.25\%$$

The multiple coefficient of 0.85 means that there exists very high positive correlation between a dependent variable stock returns and two independent variables, inflation and of GDP growth. This means increase in inflation and GDP growth, is accompanied by increase in stock returns and decrease in inflation and GDP growth is accompanied in stock returns accordingly.

Further the degree of multiple determination is calculated to be 72.25%. This means 72.25% of the variation in stock returns is explained by both inflation and GDP growth. And the remaining 27.75% changes in stock return are determined by other variables not considered in the framework.

t-Test for Significance of an Observed Sample Correlation Coefficient

The test whether, the calculated multiple correlation coefficient of sample data i.e. sample data of portfolio stock real returns, and inflation and GDP growth is also statistically significant with regard to population data, t-test for significance of an

observed sample correlation coefficient is to be done. In other words, it tests whether variable in the population is accordingly associated as it is in the sample data.

Null Hypothesis, H_0: $\rho=0$ i.e. the variables are not correlated in the population.

Alternative Hypothesis, H_1: $\rho \neq 0$ i.e. the variables in the population is correlated.

Test statistic, t

$$= \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2}$$

$$= \frac{0.85}{\sqrt{1-0.85^2}} \times \sqrt{7-2}$$

$$= 3.61$$

Degree of freedom =n-2
=7-2
=5

Critical value: The tabulated value of t @ 5% level of significance for two tailed test and for 5 degrees of freedom is 2.571.

Decision: Since the calculated value of t is greater than the tabulated value, the Null Hypothesis, H_0 is rejected i.e. the variables in the population are correlated.

Further the alternative hypothesis may be developed as an one way test i.e. H_1:p>0 i.e. the stock returns, inflation and GDP growth are positively correlated in the population (right tailed) as against just correlated in the population (two-tailed). The critical value for one tailed test at 5% level of significance and 5 degree of freedom is 2.015. Again this suggests that calculated value is greater than the tabulated value i.e. 9.26>2.015, H_0 is rejected and alternative hypothesis is accepted; meaning stock returns, and inflation and GDP growth rates are positively correlated in the population.

Calculation of Regression Equation of X_1 on X_2 and X_3

Further to gain clear picture about the dependent and independent relationships among stock returns, and inflation and GDP growth. The multiple regression equation of stock returns (X_1) on inflation (X_2) and GDP growth (X_3) is calculated.

$X_1 = b_1 + b_2 X_2 + b_3 X_3$

Using method of least squares, 3 normal equations are required to solve value of regression coefficients b_1, b_2 and b_3. They are:

$$\sum X_1 = nb_1 + b_2 \sum X_2 + b_3 + \sum X_3 \dots\dots\dots\dots\dots\dots(1)$$

$$\sum X_1 X_2 = b_1 \sum X_2 + b_2 \sum X_2^2 + b_3 \sum X_2 X_3 \dots\dots\dots(2)$$

$$\sum X_1 X_3 = b_1 \sum X_3 + b_2 \sum X_2 X_3 + b_3 \sum X_3^2 \dots\dots\dots(3)$$

Substituting the calculated sum values from table 4.26

$$508.31 = 7b_1 + 48.64b_2 + 77.98b_3$$

$$3366.14 = 48.64b_1 + 398.84b_2 + 597.63b_3$$

$$5619 = 77.98b_1 + 597.63b_2 + 927.84b_3$$

Here, calculated values of regression coefficient are as follows:

$b_1 = 27.02$

$b_2 = -15.12$

$b_3 = 13.53$

Therefore, the regression equation of X_1 on X_2 and X_3 is

$X_{1e} = 27.02 - 15.12 X_2 + 13.53 X_3$

The computed regression coefficients b_1 suggest that the stock returns would be 27.02 given the value of X_2 and X_3 as zero. This means even if X_2 and X_3 takes 0 values, stock returns be a constant of 27.02.

And b_2 of -15.12 means that, keeping the effect of X_3 as constant, every 1 unit changes in inflation (X_2) brings 24.36 unit changes in stock returns and in the opposite direction. This negative coefficient suggests that existence of negative correlation coefficient between inflation and stock returns which is true (as correlation coefficient between inflation and stock return is 0.74).

Finally b_3 of 13.53 means keeping other things as equal every unit change in GDP growth brings corresponding change of 13.53 in stock return in same direction. That is, there exists positive correlation between stock returns and GDP growth as indicated by the positive sign of regression coefficient.

Since the estimated multiple regression equation is $X_{1e} = 27.02 - 15.12 X_2 + 13.53 X_3$; if the value of inflation is given as13.24% (actual inflation of 2008/09) and GDP growth of 16.89% i.e. $(\frac{960012 - 820811}{820811})$; preliminary for the year 2008/09 (Economic Survey 2008/09), the estimated stock return for the same period would be

$X_{1e} = 27.02 - 15.12 * 13.24 + 13.53 \times 12.89$

$= 55.35\%$

Test of Regression Coefficient of Multiple Regression Model

The regression coefficient of stock returns on inflation and GDP growth has been previously computed. This calculation however is not known to be significant or not. For this, test of regression coefficient of multiple regression model have to done to know whether both calculated coefficients are zero or at least one is non-zero.

Null Hypothesis, H_0: $b_2 = b_3 = 0$: There is no relationship between the dependent variable and explanatory variables or the regression coefficient of X_1 on X_2 and X_3 is not significant.

Alternative Hypothesis, $H_1 : b_2 \neq b_3 \neq 0; b_i \neq 0$: There is linear relationship between the dependent variable and explanatory variables or the regression equation of X_1 on X_2 and X_3 is significant.

Test statistic, $F, = \dfrac{MSR}{MSE}$ $X_{1e} = 27.02 - 15.12X_2 + 13.53X_3$

Where,

MSR= Mean sum of square due to regression =Explained variation.
MSE= Mean sum of square due to error =Unexplained variation.
$27.02 - 15.12X_2 + 13.53X_3$

Table 4.28: Test of Regression Coefficient of Stock Returns on Inflation and GDP growth

X_1	X_2	X_3	X_{1e}	$X_1 - \bar{X}_1$	$(X_1 - \bar{X}_1)^2$	$(X_{1e} - \bar{X})^2$	$X_1 - X_{1e}$
16.96	4.8	7.14	51.05	-55.66	3098.04	465.26	-34.09
48.72	4	9.04	88.85	-23.9	571.21	263.41	-40.13
70.83	4.5	9.81	91.71	-1.79	3.20	364.43	-20.88
112.18	8	10.97	54.48	39.56	1565	329.06	57.7
159.96	6.4	11.17	81.38	87.34	7628.28	76.74	78.58
84.76	7.7	12.89	85.00	12.14	147.38	153.26	-0.24
14.90	13.24	16.89	55.35	-57.72	3331.60	298.25	-40.45
					16344.70	1950.42	

$$F = \dfrac{MSR}{MSE}$$

$$= \frac{Explained \; variation / k - 1}{Unexplained \; variation / n - k}$$

$$= \frac{1950.42 / (3 - 1)}{14397.28 / (7 - 3)}$$

$$= 0.27$$

$$Total \; variation = \sum (Y - \bar{Y})^2 = 16344.70$$

$$Explained \; variation = \sum (Y_e - \bar{Y})^2 = 1950.42$$

$$Unexplained \; variation = \sum (y - Y_e)^2 = 14394.28$$

Critical value: Table value of @ 5% level of significance for 2,4 degree of freedom is 6.94.

Decision: Since the calculated value of F is greater than the tabulated value, the null hypothesis H_o is rejected and hence the alternate hypothesis H_1 is accepted. This means the regression equation of X_1 on X_2 and X_3 is significant.

Test of Autocorrelation

In the multiple regression equation of stock returns, and inflation and GDP growth, only two variables namely inflation and GDP growth have been specified as explanatory variables of stock returns. The fact however is that stock returns are affected by several other factors as well. So, all those factors not considered in the regression model may be termed as error variables. The presence of correlation among such error variables may potentially affect the out come of the developed regression model. So, test of autocorrelation is deemed necessary to test the presence of correlation among error variables.

Null Hypothesis, H_0: $\rho = 0$ i.e. there is no positive autocorrelation in the residuals. In other words, the error terms are statistically independent.

Alternative Hypothesis, H_1: $\rho > 0$, i.e. there is positive autocorrelation in the residuals. In other words the error terms are not statistically independent.

Table 4.29: Test of Autocorrelation of Stock Returns (ROE) on Inflation and GDP growth

$e_t = (X_1 - X_{1e)}$	e_{t-1}	$(e_t - e_{t-1})$	$(e_t - e_{t-1})^2$	e_t^2
-34.09				1162.13
-40.13	-34.09	-6.04	36.48	1610.42
-20.88	-40.13	19.25	370.56	435.97
57.7	-20.88	78.58	6174.82	3329.29
78.58	57.7	20.88	435.94	6174.82
-0.24	78.58	-78.82	6212.59	0.08
-40.45	-0.24	-40.26	1620.87	1636.20
			14851.26	14348.91

$$d = \frac{14924.57}{14426.64} = 1.03$$

Critical Value: The tabulated value of d for n=7 and k'=2 at 5% level of significance, d_L=0.467 and d_U=1.896

Decision: Since d< d_U i.e 1.03<1.896; there is positive autocorrelation in the residual terms. Hence, the null hypothesis H_0 is rejected. This means the error variables are considered in the regression framework are statistically correlated, and hence there is possibility that such variables can question the validity of our results.

4.4 Analysis of Primary Data

To know the market participants and market makers perception towards the current situation of inflation and banking returns analysis through primary data is necessary. For this primary data have been collected using questionnaire and interview method.

A structured questionnaire consisting 12 closed-end questions were circulated among the investors of several securities businessperson's offices. 30 persons responded the questionnaire. The chart showing the responses is as follows:

Table 4.30: Reponses Collected from the Securities Businesspersons' Office

S.N.	Name of Securities businessperson	No. of Responses
1	Arun securities (P) Ltd	5
2	Agrawal securities (P) Ltd	8
3	Primo securities (P) Ltd	5
4	Sagarmatha securities (P) Ltd	7
5	Sweta securities (P) Ltd	5
	Total Number of Respondents	30

And semi–structured interviews were conducted with SEBO, NRB authorities, bankers, securities businessperson and investors.

4.4.1 Analysis of the Questionnaire

All the respondents responded with yes to question number one. (Are you an investor?) This means the responses collected reflect the perception of investors.

The second question is related with the ranking of four investment options namely real estate, gold and silver, deposit accounts with banks and FIs, and financial assets. There response has been charted as follows:

Table 4.31: Rank of Real Estate

Rank(X)	Frequency(f)	fX
1	0	0
2	12	24
3	11	33
4	7	28
	30	85

$$\overline{X} = 85/30 = 2.83$$

Table 4.32: Rank of Gold & Silver

Rank(X)	Frequency(f)	fX
1	0	0
2	7	14
3	15	45
4	8	32
	30	91

$$\overline{X} = 91/30 = 3.03$$

Table 4.33: Rank of Deposit accounts with Banks and FIs

Rank(X)	Frequency(f)	fX
1	2	2
2	9	18
3	4	12
4	15	60
	30	92

$$\overline{X} = 92/30 = 3.07$$

Table 4.34: Rank of Financial Assets

Rank(X)	Frequency(f)	fX
1	28	28
2	2	4
3	0	0
4	0	0
	30	32

$\overline{X} = 32/30 = 1.07$

Ranks 1 to 4 are allowed to be assigned for ranking the most preferable investment to the least preferable investment options. The frequency denotes the number of investor ranking the particular investment option. It can be clearly noted from the table that 2 investors assigned Rank 1, to deposit accounts with banks and FIs, while 28 assigned to financial assets. Further no investors ranked real estate and gold and silver as 1. Similarly 12, 7, 9, and 2 investors assigned rank 2 for real estate, gold and silver, account with bank, and financial assets respectively. Moreover, another way of interpreting above two way table is also possible. For e.g. for the option real estate none of the investors assigned rank 1, 12 assigned 2, 11 assigned 3,and 7 assigned rank 4.

Further to have the knowledge of average rank of investors, the mean rank of each alternative has been calculated with number of investors assigning respective ranks as frequency.

Table 4.35: Mean Rank of Investment options

Mean Rank	Investment Options
1.07	Financial Assets
2.83	Real Estate
3.03	Gold and Silver
3.07	Deposit account

As shown in above table the rank of financial assets is 1.07, of real estate is 2.83, gold and silver 3.03, and deposit account with banks 3.07. Hence, it can be said that financial assets stand in 1st preference to investors and similarly real estate, gold and silver, and deposit account with banks stand 2nd, 3rd, and 4th in preference respectively.

For question no.3 (What type of financial assets do you have?), all investors responded with option (a) i.e. shares. This means all the investors have investment in shares rather than in bonds and debentures. This shows some evidence that investors prefer shares to bonds and debentures.

Investors trading habit was tried to be known in question no.4; i.e. whether they are active investors or passive investor. 2/3 or 66.67% of the investors reported as active traders and the remaining 1/3 or 33.31% as non active traders.

Two options are provided to the investors for question no.5 (what is your reason behind common stock investment?) – Regular dividends and capital gains. The reason behind such a question is to know whether investors are aware enough about their action to mitigate against inflation. Dividend yield is insignificantly low in their contribution to total returns. This is true even for no.1 ranked bank SCB(our findings in previous section), which stands as low as 0.02% for the year 2006/07, and high of just 5.04%, while inflation is as high as 8% in 2005/06. In the same year dividend yield is 0.14%. Clearly if stock returns be hedge against inflation, then it certainly comes from capital gains. The response for the question is that, 12 investors out of 30, i.e. 40% of investors

reported for cash dividends and 18/30=60% for capital gains. This means as high as 40% Nepalese investors might be unaware of prevailing negative impact of inflation in their wealth.

Question no.6 is related with asking investors to tick the group of companies traded in NEPSE of which they presently have investment. Among the 8 groups of corporations for trading in NEPSE investors' response for the question can be summarized as follows:

Table 4.36: Investors' Holding of NEPSE Group

Group	No. of Responses
Commercial Banks	25
Development Banks	15
Finance Companies	10
Insurance Companies	2
Manufacturing & Processing Companies	1
Hotels	0
Trading Companies	0
Others	2

The table clearly shows the investors preference over commercial banks, i.e. 25 out of 30 reported having shares of commercial banks and the researcher's attempt of studying stock returns of commercial banks is somehow justified. And this is also consistent with volume-wise and transaction-wise dominance of commercial banks in NEPSE.

To have clearer idea about this striking fact, question no.7 is accompanied with requesting for explicit answer of yes or no to the question whether they prefer commercial banks group to other groups. The response is consistent, 25 respondents ticked yes and 5 ticked no. This means the 25/30= 83.33% of the investors prefer commercial banks to other groups of NEPSE.

Further, to see whether there is significance difference among investors who regularly trade securities or not to their preference over commercial banks, Fishers Exact Test has been carried. In other words, testing of independence of two attributes; regularly trading securities and preference to commercial banks have been carried.

Table 4.37: The Fisher's Exact Test for 2*2 Tables

		Trading Habit		Total
		Regular	Irregular	
Preference to Commercial Banks	Yes	18	7	25
	No	2	3	5
	Total	20	10	30

Null Hypothesis, H_0: $p_1 = p_2$, there is no difference among investors who trade securities regularly or not with respect to their preference to commercial banks.
Alternative Hypothesis, H1: $p_1 \neq p_2$, i.e. there is significant difference among investors who trade securities regularly or not with respect to their preference to commercial banks.
Where, p_1 = probability that the randomly selected subject from group1 (who trade regularly) will prefer commercial banks
p_2 = probability that the randomly selected subject from group2 (who do not trade regularly) will prefer commercial banks.

The several possible outcomes of above 2*2 table that make same marginal totals of 25,5,20,10; and the sum total of 30 have been presented in the appendix.

Since, the alternative hypothesis is two tailed test, there are 3 outcomes which are more extreme than outcome I (see appendix). They are outcomes IV, V, and VI with P_1-P_2 greater than 0.16 (P_1-P_2 of Outcome I) irrespective of positive or negative signs because of two tailed test. Therefore, the probability of an outcome as extreme or more extreme in either direction is P(I) + P(IV) + P(V) + P(VI) = 0.16+0.11+0.03+0.002 = 0.302

Level of significance: 5%

Decision: At 5% level of significance i.e. α = 0.05, accept H0 since the observed probability is greater than the level of significance (α) i.e. 0.302>0.05. This means there is no difference among investors who trade securities regularly or not with respect to their preference to commercial banks.
The result of the test shows that irrespective of those who trade regularly or not, their preference over commercial bank is not affected. This means the figure 83.33% stands as the proportion of investors who prefer commercial banks which include both active traders and non active traders.

Question no.8 is related to knowing the opinion of investors regarding the stock returns provided by commercial banks. The options ranged from very good to worse.

Table 4.38: Returns Provided by Commercial Banks

Options	No. of Responses
Very Good	1
Good	17
Normal	12

Bad	0
Worse	0
Total	30

This means none of the respondents reported on the negative aspect of the options i.e. bad and worse, while those reporting very good and normal are 1, 17, and 12 respectively. This too is consistent with previous results of Nepalese investors' preference over commercial banks.

Though is quite clear that investors prefer commercial banks to other groups, the next issue is associated with which commercial bank they prefer the most and which the least. Eight sample commercial banks were allowed to be ranked from 1 to 8 according to their most preference to least preference.

The mean ranks of each commercial bank have been presented as follows (the calculation of which have been shown in the appendix):

Table 4.39: Mean Ranks assigned to Commercial Banks by Investors

Banks	Mean Ranks
SBI	7
NIC	7.13
BOK	4.43
EBL	5.07
HBL	4.83
NIB	3.6
NABIL	2.4
SCB	1.53

The mean ranks provided by the investors should be compared with some theoretical values to determine whether their ranks statistically doffer with theoretical distribution or not. For this ranks computed from secondary data analysis more specifically technical variables or market based data rather than ROE data has been used as theoretical distribution. This is because investors ranks reported in questionnaire is the result of reflection of market price data and further over primary concern by market prices adjusted for cash and stock dividends.

So, to know the whether ranks assigned by investors follow some theoretical distribution or not, Kolmogorov–Smirnov, one sample test has been carried out which is as follows:

Table 4.40: Kolmogorov- Smirnov Test for Goodness of Fit

Banks	O	E	Cumulative O	Cumulative E	Cumulative Relative Frequency		$\left\|F_0(X) - S_N(X)\right\|$
					O	E	
SBI	7	7	7	7	0.194	0.194	0
NIC	7.13	6	14.13	13	0.3925	0.361	0.0314
BOK	4.43	8	18.56	21	0.516	0.583	0.0678
EBL	5.07	4	23.63	25	0.656	0.694	0.0381
HBL	4.83	3	28.46	28	0.791	0.778	0.0128
NIB	3.6	5	32.06	33	0.891	0.917	0.026
NABIL	2.4	2	34.46	35	0.957	0.972	0.015
SCB	1.53	1	35.99	36	1	1	0
	35.99	36					

Null Hypothesis, H_0: The assignment of ranks by investors follows the expected ranks as calculated from the returns of market price data (shareholders' wealth). That is, the difference between observed and expected ranking of commercial banks does not exceed the differences which would be expected to occur by chance.
Alternative Hypothesis, H_1: The observed rankings do not coincide with those predicted.

Critical Value: At 5% level of significance for N = 36, the value of d is

$$\frac{1.36}{\sqrt{n}} = \frac{1.36}{\sqrt{36}} = 0.227 \text{ [For n > 35]}$$

Decision: Since the calculated value of D, i.e. the maximum difference between the cumulative frequencies is $\left|F_0(X) - S_N(X)\right| = \left|18.56/36 - 21/36\right| = 0.068$. Since, the observed value of D (0.068) is less than the critical value of D (0.227), we can not reject H_0. This means there is no significant difference in observed rankings and expected rankings of commercial banks.

Till question no.9 no introduction of inflation is made to the investors. So, question no.10 is concerned with investors' opinion regarding the present situation of Inflation in Nepal. The options are very good, good, normal, bad and worse. Investors' response to the question is presented below:

Table 4.41: Investors' Response to Present Inflation Situation

Options	Numbers
Very Good	0
Good	3
Normal	8
Bad	15
Worse	4
Total	30

Among 30 investors as presented in the above table 0 responded with very good answer and similarly 3, 8, 15 and 4 responded as good, normal, bad, and worse respectively.
The response of very good situation of inflation in Nepal is essentially about low level of inflation that has minimal negative impact on shareholders wealth. And the response worse is existence of very high degree of inflation.

In this stage the degree of association among investors responding to their opinion towards stock returns of commercial banks and present situation of inflation in Nepal is deemed necessary (the major research question). So, coefficient of correlation between these two variables is calculated as follows:

Table 4.42: Correlation between Investors' Perception towards Stock Returns and Inflation

Situation	Stock Returns	Inflation
High	1	4
	17	15
	12	8
	0	3
Low	0	0
	30	30

Karl Pearson's Correlation Coefficient, r = 0.95

Since calculated correlation coefficient is 0.95 which signifies the existence of very high degree of positive towards stock returns and inflation. Further to see whether this correlation coefficient is significant enough PE is calculated as follows:

$$PE = 0.6745 \times \frac{1-r^2}{\sqrt{n}}$$

$$= 0.6745 \times \frac{1-(0.95)^2}{\sqrt{5}}$$

$$= 0.03$$

$6PE = 0.03*6 = 0.18$

Since r > 6PE the correlation coefficient is significant.
This means the presence of high degree of positive correlation between banking stock returns and inflation as indicated by investors' response is valid.

Though above results provide evidence of association between research variables question no.11 is dedicated to know the explicit response of investors which regard to

whether stock returns is affected by inflation and stock of the economy out of 30, 17 responded with yes and 13 with no; this means 17/30 = 56.67% i.e. more than 50% believed that there is somewhat association with stock returns, inflation and GDP growth. This is again consistent with previous findings.

A hypothesis is tested to know whether the investors' reason for investment and their belief of stock returns being affected by inflation and state of economy are independent attributes.

Table 4.43: Test of Independency of Attributes

Reasons behind stock investment	Stock Returns affected by Inflation and States of Economy		Total
	Yes	No	
Cash dividends	7	5	12
Capital gains	10	8	18
Total	17	13	30

To test this independency of attributes chi – square test has been applied as none of the test contains value less than 5 and N which is 30 is not less than 20, for which Fisher's Exact 2x2 Table should have been used as previously did.

Null Hypothesis, H_0: There is no significant difference between the investors who invest for cash dividend or capital gain in the proportion who thinks stock returns(R) is affected by Inflation (q) and State of economy (g).

Alternative Hypothesis, H_1: There is a significant difference between the investors who invest for cash dividend or capital gain in the proportion who thinks stock returns(R) is affected by Inflation (q) and State of economy (g).

Test Statistic under H_0 is

$$\chi^2 = \sum [\frac{(O-E)^2}{E}]$$

$$= \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$$

$$= \frac{30(7\times8-10\times5)^2}{12\times18\times17\times13}$$

$$= 0.023$$

Degree of Freedom = (r-1) (c-1) = (2-1)(2-1) = 1
Critical Value: Tabulated value of χ^2 at 5% level of significance for 1 degree of freedom is 3.84.

Decision: Since calculated $\chi^2 <$ tabulated value i.e. 0.023<3.84, H0 is accepted. This means investors preferring cash dividend and capital gain, and their response to stock returns(R) being affected by inflation (q) and GDP (g) are independent attributes.

This independency of attributes between investors' response for their reason behind investment and stock returns being affected by inflation and state of economy shows evidence of somewhat myopic investment analysis in Nepalese investors. Rather than their investments decisions guided by sound analysis of fundamental company related factors and macroeconomic variables like inflation and state of economy the decisions are influenced with rumors in the market.

A final question is accompanied with what they would like to do to reduce the effect of inflation. The response to the question is tabulated as follows:

Table 4.44: Investors' Response to reduce the effects of Inflation

Options	Numbers
Buying Shares	18
Buying Bonds	4
Depositing money in Banks & FIs	4
Buying Land & Building	4
Total	30

The table shows that 18/30, 60% of the investors prefer buying shares and 4/30, 13.33% each prefer buying bonds depositing money in banks and FIs, and buying land and building.

This response however shows sound and consistent preferences of investors as calculated previously. This is because share investments bring variable income and share investors falls under the debtor group of debtor–creditor hypothesis of the inflationary world. Further investment in share ranked 1st position among all other investment options.

4.4.2 Excerpt of Interviews with Regulatory Authorities, Bankers and Securities Businesspersons

Semi-structured interviews have been conducted with regulatory authorities, bankers and securities businesspersons to know the present situation of the Nepalese investors in the context of Nepalese investment environment. The list of questions has been presented in the appendix. The summary of the interviews are as follows:

The prospect or future of sound Nepalese investors are good and of those who base their investment decisions on rumors may not be good. Those who trade securities with long run benefits ultimately will receive their goal. But abnormal high returns as experienced in past few years or months is not possible. So, investors making decision taking into fundamental factors in their analysis like book income, quality of management etc. will be benefited.

Further, they indicated that there are no other better investment options than financial investment. However, in comparison with real estate investment the return from such may be higher than stock returns but this perspective is only in Kathmandu valley and one should also keep in mind that these investments are relatively illiquid and does not have organized market for trading as financial assets do.

Those investors who take into account the company's performance along with national and global macroeconomic factors and political development into their investment decisions are likely to outperform those who do not. They also indicated that global financial crisis which started from USA may also enter Nepal if no proactive measures are taken.

Moreover, market would also automatically correct arbitrage or abnormal returns and it was with the case of shares of Nepal Telecom.

The returns provided by banking sector certainly outperformed other sectors and NEPSE is essentially about commercial banks as it constitutes about 60 to 70 % of NEPSE index volume–wise and also same proportion transaction–wise. And these banking returns which stand at around 20-25% is certainly enough to compensate against inflation prevailing. However, this return of being hedge against inflation was not planned but is simply resultant effect; as the present bitter situation in Nepal is lack of coordination among governing bodies (regulatory authorities).

And finally to overcome imperfect market situation of making the market unaffected by single investor, proper coordination among NRB, SEBON, ICAN, Company Registrars Office, Insurance Board is prerequisite to make investor friendly environment in Nepal that would adequately compensate informed investors.

Chapter 5: SUMMARY, MAJOR FINDINGS, CONCLUSION & RECOMMENDATION

5.1 Summary

The new world order has focused international business. To materialize this fact several global and regional economic cooperation like WTO, EU, NATO, ASEAN, BIMSTEC, SAFTA etc. has emerged to share the common economic benefits. As a result of this world economy has witnessed the growth of 4.9% in 2007. But this growth fall at 3.0% in 2008 and continue to fall in same pace 1.0% in 2009. is expected to reach about 3% in 2010. The basic reason of such is global financial crisis which started in USA. Further USA is believed to face stagflation, the situation of higher inflation but lower economic growth. Global inflation in advanced economies is for 3.4 % in 2008 which was 2.6% in 2007 and it is expected to be 0.1% & 1.1% in 2009 and 2010 respectively; and the same for developing economies is 6.4% in 2007,9.3% in 2008 & 5.5% 2009 and it is estimated to be 4.9% in 2010

Similar is the stock of Nepal. Inflation for 2008 is 7.7% and is 13.24% during the fiscal Year 2065/66. However the economic growth for 2065/66 targeted at7% was not achieved. It is expected to be down to 5.5 % for 2009/10.

Simply inflation is persistent and appreciable rise in the general level of prices which results in lower purchasing power of money. Inflation may have its roots in demand related, cost related, mixed demand-cost or structural factors. Generally inflation is good for flexible income groups and bad for fixed income groups. And the most widely used measure of inflation is CPI.

The most widely used tool to cure this economic disease is monetary policy. In Nepal, the task of formulating monetary policy has been entrusted to NRB. And for the year 2065/66 NRB has published its cautions and hard monetary policy to fight against inflation and to achieve the projected economic growth of 7% for the same period.

It is the general public who feel the pain of inflation. And the most effective tool for them to compensate against inflation is investment. Though investment may be termed as sacrifice of current money for further money, it is undertaken with the hope of making future value of money greater than current money. But only nominal difference is not sufficient, as it might simply be the outcome of time value of money; in future money must be greater than current money in real terms, which then compensate for inflation or lost purchasing power of money over time.

Nepalese shareholders have been trading their shares in the capital market like NEPSE, which is the only organized secondary market for trading securities. However, among 8 groups' securities traded in NEPSE, commercial banks group compose of the major

chunk. This means Nepalese shareholders have higher preference to commercial banks. But an interesting question might be that whether this highly preferred stocks provide adequate returns that are high enough in real terms and compensate against the risk they undertake especially purchasing power risk.

The review of related studies in the field showed somewhat inconclusive results. The study of Zvi Bodie, Jeffery Jaffe, Gershon Mandelker, Charles Nelson, G. William Schwert, Eugune F. Fama, Hai Hong, Summers, Fisher Black, Tobin, Bernanke and Blinder, Fuhrer and Moore, Lintner all showed the presence of inverse relationship between stock returns and inflation.

In contrary, along with classical macroeconomists like Williams (1938) and Metzler (1951); the study of Robert S. Pindyck, Michael Firth, Jacob Boudoukh, Matthew Richardson and Robert F. Whitelaw all show the existence of positive relationship between inflation and stock returns.

But some of the studies have mixed results. The study of Reilly, Johnson and Smith, Cagan, Martin Feldstein, Van Horne, and Peter Blair Henry show that stock prices tend to go positively with expected inflation while they tend to react negatively with unexpected inflation.

The research design has been the mixed i.e. descriptive, exploratory and analytical as per the demand of the situation. Both secondary and primary data have been collected. The major sources of secondary data are libraries, various annual reports, e.g. annual report of SEBO, Economic Surveys, Statistical year Book, Annual reports of respective banks, NRB Bulletins etc. And the sources of primary data are investors, brokers' offices, regulatory authorities, bankers etc.

All commercial banks listed in the NEPSE provide population for the study. However numbers of samples have been determined to be 8; and sample banks have been selected using non random sampling i.e. judgmental sampling so as to match the data with time period considered for the study which is from 2002/03 to 2008/09.
Data collection methods for primary data have been investors' response collected through questionnaire in various broker offices. Further interview have also been conducted with the authorities of NRB, SEBO, Bankers, Security Businesspersons etc. For secondary data various annual report have been collected from SEBO, respective commercial banks, Economic Survey, Statistical Year Book of Nepal, Monetary policy, NRB Bulletins, and various newspapers and magazines.

Data have been presented in charts and diagrams and analyzed with several descriptive and inferential statistics.

1st preliminary variables like Market capitalization, No. of listed companies NEPSE index, inflation, GDP of the country and MPS, EPS, P/E NI, TD ,and TL of respective sample banks have been presented and analyzed.

Next the fundamental variable i.e. ROE of each sample banks and then portfolio ROE of these banks have been studied. Correlation and regression between stock returns (ROE) and inflation have been carried, and various related hypothesis have been tested.

Then, the technical variable i.e. returns as the result of market prices or wealth has been studied using the same techniques used for technical analysis.

And finally analysis of primary data has been carried out. Twelve close-ended questions collected through questionnaire have been studied to know the option of investors regarding available investment options, the type of financial assets they posses, their trading habit, their possession of investment with regard to groups categorized by NEPSE, preference towards commercial banks, their perception towards returns of commercial banks, then ranking commercial bank in terms of stock returns, their perception towards inflation, their belief that whether stock returns is affected by inflation and state of the economy and their preferences in doing to reduce the effects of inflation.

Finally the primarily analysis section ends with excerpts of interview with regulatory authorities, bankers, securities businesspersons, and investors.

5.2 Major Findings

No doubt that inflation lowers the purchasing power of money. However, it should not be thought that disinflation or deflation is good for the economy. A normal projected inflation is always good for the economy. So the study entitled "Inflation and Banking Returns" has been undertaken whether the same is the impact of inflation of past 7 year's inflation on the wealth of commercial banks' shareholders. The major findings of the study are as follows:

5.2.1 Findings of Fundamental Analysis

➢ Calculation of coefficient of variance of each sample commercial banks ROE based return shows that NABIL, SCB, NIB, HBL, EBL, BOK, NIC, and SBI stands 1st, 2nd,3rd, 4th, 5th, 6th, 7th and 8th position respectively which is same for nominal data. But with regard to real data, HBL, NABIL, SCB, EBL, NIB, BOK, NIC, and SBI stands 1st, 2nd,3rd, 4th, 5th, 6th, 7th and 8th position respectively.

- The correlation coefficient of -0.66 between ROE based stock real returns and inflation is tested with testing of hypothesis of an observed sample correlation coefficient also showed absence significant correlation in the population data.
- The regression equation of portfolio real returns on inflation is $Y_e = 18.60 - 0.44X$ and testing of hypothesis, whether the calculated regression coefficient of -0.44 is significant enough or not, using F-statistic showed the regression coefficient being insignificant.
- Then test of autocorrelation using Durbin–Watson test, d has been used which yielded the result of absence of positive autocorrelation.
- Inflation then has been taken as dependent variable and portfolio real stock return as independent. The regression equation of such is $X_e = 9.6 - 0.29 \times Y$. The test of regression coefficient showed the presence of insignificant regression coefficient.
- The hypothesis whether average portfolio real returns(ROE) are greater than average inflation has been tested using t-statistics, which showed that average portfolio real returns is significantly greater than average inflation.
- Another variable representing state of the economy, GDP growth has been introduced; and the multiple correlation of portfolio real returns on inflation and GDP growth is 0.83, which showed presence of significant positive multiple correlation in population data.
- The multiple regression equation of portfolio real returns on inflation and GDP growth is $X_{1e} = 13.74 - 0.55X_2 + 0.57X_3$, and testing of regression coefficient of multiple correlation showed significant regression coefficients.
- The final fundamental analysis of test of autocorrelation of the multiple regression models has been carried out that showed absence of positive autocorrelation but inconclusive findings with regard to negative autocorrelation.

5.2.2 Findings of Technical Analysis

- Calculation of coefficient of variance of each sample commercial banks market price based return shows that EBL, SCB, HBL, NABIL, BOK, NIC, NIB, and SBI stands 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th position respectively which is same for both nominal data and real data.
- The correlation coefficient of -0.17 between market price based stock real returns and inflation showed significant positive correlation in the population data.
- The regression equation of portfolio real returns on inflation is $Y_e = 91.56 - 2.73 X$ and testing of hypothesis, whether the calculated regression coefficient of 25.81 is significant enough or not, using F-statistic showed the regression coefficient being significant.
- Then test of autocorrelation using Durbin–Watson test, d has been used which yielded the result of absence of positive autocorrelation.

- Inflation then has been taken as depended variable and portfolio real stock return as independent. The regression equation of such is $X_e = 3.31 + 0.02Y$ The test of regression coefficient showed the presence of insignificant regression coefficient.
- The hypothesis whether average portfolio real returns are greater than average inflation has been tested using t-statistics, which showed that average portfolio real returns is significantly greater than average inflation.
- Another variable representing state of the economy, GDP growth has been introduced; and the multiple correlation of portfolio real returns on inflation and GDP growth is 0.85, which is significant enough as it showed presence of significant positive multiple correlation in population data.
- The multiple regression equation of portfolio real returns on inflation and GDP growth is $X_{1e} = 27.02-15.12X_2 +13.53X_3$, and testing of regression coefficient of multiple correlation showed significant regression coefficients.
- The final technical analysis of test of autocorrelation of the multiple regression models has been carried out that showed absence of positive autocorrelation but inconclusive findings with regard to negative autocorrelation.

5.2.3 Findings of Primary Data Analysis

- It is found that all persons supplied with questionnaire are investors, have investment in shares rather than on bonds and debentures.
- The mean rank of financial assets, real estate, gold and silver and depositing money in banks and FIs stand to be 1.07, 2.83, 3.03, and 3.07 respectively.
- Most of the investors have their investment in commercial banks group followed by development banks, finance companies, insurance companies, others and manufacturing and processing companies.
- Testing of independence of attributes using Fishers Exact Test for 2*2 table showed statistical independence between investors' preference over commercial banks and their trading habit.
- The investors' ranks to the sample commercial banks showed consistency with regard to the theoretical distribution of ranks. Kolmogorov–Smirnov test of one sample has been employed for this purpose.
- The association between investors' perception towards stock returns of commercial banks and present inflation situation as being high and low; showed existence of positive correlation of 0.95; and such degree of association has been found to be statistically significant.
- Chi-square test statistic has been used to test the independency of attributes between investors reason behind stock investment and their perception towards whether stock returns is affected by inflation and state of economy, which showed statistical independency between them.
- Further to reduce the effects of inflation most of the investors, 60% prefer buying shares.

102

➢ Finally, interviews conducted with the officials of NRB, SEBO, Banks, Security Business persons etc. provide some evidence that investors, who have been making their investment decisions with sound technical and fundamental analysis instead of rumors, are enjoying enough real returns that can compensate against inflation at present and such investors also have prosperous future.

5.3 Conclusion

The macroeconomic picture of Nepal may not be sound, but the situation for Nepalese investors is not that bad. Especially those who have financial assets investments and further if they have stock of commercial banks they are having adequate return in real terms. This means, inflation has not been able to affect shareholders wealth negatively.

This however might only be the result of chance factor because the study shows that some Nepalese investors are not aware of several macroeconomic variables like inflation and GDP growth that may potentially affect their return and thereby their wealth. But one should also take into account that the past 7 years were the period in which commercial banks declared huge amount of stock dividends and right shares to meet their capital requirement of Rs.200 crores within 2010A.D.as directed by NRB. These stock dividends constitute the major portion of stock returns. So, whether these commercial banks will keep on declaring such things and shareholders will be able to enjoy higher returns that provide hedge against inflation upcoming future is a difficult task to predict.

But one should keep in mind that there is no alternative of habit of taking sound investment decision considering the fundamental, technical, and macroeconomic variables affecting stock returns for maximizing wealth.

5.4 Recommendation

The situations of inflation and stock returns of commercial banks have been presented in the previous sections. And it is quite clear that commercial banks' stock returns provide some hedge against inflation. But it seems that the situation is only resultant effect as no systematic efforts have been directed towards the goal of maximizing stockholders wealth in real terms. Hence some of the suggestions and recommendation of the researcher to investors, security businesspersons, bankers, regulatory authorities of NRB and SEBON and all those interested in this part of investment environment are as follows:
✓ First, no investors should be guided by rumors. Rather their every investment decision must be determined by corporations' visible performance: company's management capability, its fundamental and technical factors, national and global macroeconomic and political variables etc. As the mix of all these variables affect investors' wealth.

- ✓ Second, investors must not put all their eggs in one basket. This means it is better for investors to hold the portfolio of diversified investment options.
- ✓ Third, in this age of information, those who have access over information obviously have edge over others who do not. So, investors must stay alert to the reliable information about the market. In this aspect the regulating authorities must also bring regulations that facilities efficient flow of true information to investors.
- ✓ Fourth, it is true that Nepalese investors lack knowledge of processing and analyzing information and data. For this governing body should provide a platform of training facilities to current and potential investors. Further on investors' part, they should keep the habit of learning new things because in this dynamic world things quickly become outdated.
- ✓ Fifth, corporations and its CEOs and BOD must be guided by the philosophy that shareholders are the prime constituent of the company and they themselves are simply agents. With this philosophy every effort of the company must be directed towards maximizing shareholders wealth.
- ✓ Sixth, regulatory authority like SEBON must keep its constant eyes on those factors which brings market imperfection. New effective laws, regulations and actions are the need in Nepal to avoid the influence of single investor in whole market.
- ✓ Seventh, NRB must also take normal expected level of inflation as granted which is conducive for the investment environment and overall country's economic environment. This is because NRB's act of unnecessary control in liquidity may bring negative impact on stockholders wealth, because of limited investment options lower economic growth as a result of low liquidity in the economy.
- ✓ Finally, coordination among investors, their agents (management of corporations), security businesspersons, regulatory authorities is the most. Because if any of the group perceives another group as enemy or rival, the sound investment environment would be a utopian dream.

5.5 Avenues for Future Research

As the research is a process of studying again and again, this study entitled "Inflation and Banking Returns" leaves some area for future research. Further, due to the limitations previously stated, all potential areas have not been covered. This leaves some avenues for future research in this field. One of this might be to take into account all the listed companies in NEPSE. Other might be to take longer timer horizon for the study so that horizon specific results could be avoided as implied by Boudoukh et al., 1994. Further, decomposition of expected and unexpected inflation might be another. Also one could take into account the investors risk aversion component into study because inflation essentially is purchasing power risk and the return is dependent on the level of risk undertaken. Yet another variable to consider might be the country's taxation policy because the impact of inflation on NI is dependent upon whether taxes are paid taking into account historical cost depreciation method or the method that considers changes in the price level.

BIBLIOGRAPHY

Books:

Bajracharya, B.C. (2059). *Business Statistics and Mathematics. (2nd Edition).* Kathmandu: M.K. Publishers and Distributors.

Bhandari, D.R. (2003). *Banking and Insurance: Principle and Practice. (1st Edition).* Kathmandu: Aayush Publication.

Bodie, Z., Kane, A., Marcus, Alan J., & Mohanty, P. (2006). *Investments. (6th Edition).* New Delhi: Tata McGraw-Hill Publishing Co. Ltd.

Francis, J.C. (2003). *Investments: Analysis and Management. (11th Edition).* New York: McGraw Hill Book Company.

Gordon, F. & Natarajan, K. (2001). *Banking: Theory, Law and Practice. (15th Edition).* New Delhi: Himalaya Publishing House.

Jhingan, M.L. (2005). *Macroeconomic Theory. (11th Edition).* New Delhi: Vrinda Publications (P) Ltd.

Joshi, S. (2060). *Economic Policy Analysis. (2nd Edition).* Kathmandu: Taleju Prakashan.

Liaw, K.T. (2004). *Capital Markets. (2nd Edition).* Ohio: Thomson South-Western, Mason.

Shapiro, E. (1995). *Macroeconomic Analysis. (5th Edition).* New York: Harcourt Brace Jovanovich Inc.

Sharpe, W.F., Alexander, G.J., & Bailey, J.V. (2006). *Investments. (6th Edition).* New Delhi: Prentice Hall of India Pvt. Ltd.

Siegel, S., & Castellan, N.J. (1998). *Nonparametric Statistics for the Behavioral Sciences. (2nd Edition).* Singapore: McGraw Hill Book Company.

Sthapit, A.B., Gautum, H., Joshi, P.R., & Dangol, P.M. (2005). *Statistical Methods. (3rd Edition).* Kathmandu: Buddha Academic Publishers and distributors Pvt. Ltd.

Van Horne, J.C. (2004). *Financial Management and Policy. (12th Edition).* New Delhi: Pearson Education.

Weston, J.F. & Brigham, E.F. (1996). *Essentials of Managerial Finance. (11th Edition).* New York: The Dryden Press.

Weston, J.F. & Copeland, T.E. (1992). *Managerial Finance. (9th Edition).* New York: The Dryden Press.

Wolff, H.K. & Pant, P.R. (2005). *Social Science Research and Thesis Writing. (4th Edition).* Kathmandu: Buddha Academic Publishers and Distributors Pvt. Ltd.

Journals

Adhikari, N. (2004). Securities Markets in Nepal, *SEBO Journal*, Vol.1(5): 75-79.

Bhattarai, P. (2004). Eligibility of Trading Securities and Challenges, *SEBO Journal*, Vol.1 (6): 38-43.

Boudoukh, J., Richardson, M., & Whitelaw, R.F. (1994). Industry Returns and the Fisher Effect, *The Journal of Finance*, Vol.49 (5): 1595-1616.

Boyd, J.H., Hu Jian, & Jagannathan, R. (2005). The Market Reactions to Unemployment News: Why Bad News is Usually Good for Stocks, *The Journal of Finance*, Vol.60 (2): 649-671.

Fama, E.F. (1981). Stock Returns, Real Activity, Inflation, and Money, *The American Economic Review*, Vol 71(4): 545-563.

Feldstein, M. (1980). Inflation and the stock Market, *The American Economic Review*, 70(5): 839-847.

Firth, M. (1979). The Relationship Between Stock Returns and Rates of Inflation, *The Journal of Finance*, Vol 34 (3) 743-749.

Greenbaum, S.I., Ali, M.M., & Merris, R.C. (1976). *The Journal of Finance*, Vol 31. (1):89-101.

Henry, P.B. (2002). Is Disinflation Good for the Stock Market?, *The Journal of Finance*, Vol 57 (4): 1617-1648.

Hong, H. (1977). Inflation and the Market Value of the Firm: Theory and Tests, *The Journal of Finance*, Vol 32 (4): 1031-1048.

Manandhar, KD, & Dahal, K.B. (2000). Monetary Policy and Banking Profits in Nepal, *Management Dynamics*, Vol 10 (1): 2-16.

Nepal Rastra Bank (2066). *Monetary Policy of Fiscal Year 2065/66*, NRB, Kathmandu.

Nepal Rastra Bank (Jestha 2066) *Current Macroeconomic Situation 2008/09*, Research Department, NRB, Kathmandu.

Nepal Rastra Bank (July-September 2008). *NRB News*. Kathmandu. Vol. 11/12.

Nepal Rastra Bank (March 2008) *A Handbook of Government Finance Statistics*, Vol.1, Research Department, Kathmandu.

Nepal, B. (April. May. June. 2008). Inflationary Pressures, *NRB News*, Kathmandu Vol.11 (2):5.

Pindyck, Robert S. (1984) Risk, Inflation and the stock Market, *The American Economic Review*, Vol 74 (3): 335-351.

Pradhan, R.S., & Balampaki, S.B. (2004). Fundamental of Stock Returns in Nepal, *SEBO Journal*, Vol. 1 (2): 8-24.

Schwert, G.W. (1981). The Adjustment of Stock Prices to Information about Inflation, *The Journal of Finance*, Vol 34. (1): 15-29.

Shrestha, MK. (2007). NRB monetary Policy and Stock Market Impacts, *SEBO Journal*, Vol. 3 (4): 9-16.

Thapa, K. (2007). Nepalese Securities Markets: Regulation and Development, *SEBO Journal*, Vol 3 (7): 21-29.

Dissertations

Acharya, M. (1977). *NRB and Monetary Policy*. An Unpublished Master Degree Thesis submitted to Central Department of Economics, Tribhuvan University.

Adhikari, P.R. (2003). *Performance of Listed Companies and Returns to Investors.* An Unpublished Master Degree Thesis submitted to Central Department of Management, Tribhuvan University.

Khakurel, B.P. (2005). *A Study of Money Supply and Inflation in Nepal.* An Unpublished Master Degree Thesis submitted to Central Department of Economics, Tribhuvan University.

Official Reports, Magazines and Newspapers

Bank of Kathmandu Limited (2008/09) *Annual Reports.* Kathmandu.

Central Bureau of Statistics. (2008). *Statistical Year Book of Nepal*, Kathmandu.

Everest Bank Limited (2008/09) *Annual Reports.* Kathmandu.

Himalayan Bank Limited (2008/09) *Annual Reports.* Kathmandu.

Ministry of Finance. (2007/08). *Economic Survey*, Nepal.

Nabil Bank Limited (2008/09). *Annual Reports.* Kathmandu.

Nepal Industrial and Commercial Bank Limited (2008/09) *Annual Reports.* Kathmandu.

Nepal Investment Bank (2008/09) *Annual Reports.* Kathmandu.

Nepal Rastra Bank. (Sep.-Oct. 2008). *NRB News*, Year 33, Vol.1. NRB, Kathmandu.

Nepal Stock Exchange. (2008/09). *Trading Report*. Singhadurbar Plaza, Kathmandu.

SBI Bank Limited (2008/09) *Annual Reports.* Kathmandu.

Securities Board Nepal, (2008/09). *Annual Report*. Kathmandu.

Securities Board of Nepal. (May-June 2008), *SEBON Newsletter*, Vol.2, Kathmandu.

Standard Chartered Bank (2008/09) *Annual Reports.* Kathmandu.

The Kathmandu Post (various issues).

The Rising Nepal (various issues).

APPENDICES

Appendix A: Preliminary Variables

NABIL							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	740	1000	1505	2240	5050	5275	4899
EPS (Rs.)	84.66	92.61	105.49	129.21	137.08	108.31	106.76
P/E (times)	8.75	10.8	14.27	17.34	36.84	48.7	45.89
No. of Shares	4916544	4916544	4916544	4916544	4916544	6892160	9657470
Net Income (Rs.)	418346183	516864238	520114085	635262349	673959698	746468394	1031053098
Share Capital (Rs.)	491654400	491654400	491654400	491654400	491654400	689216000	965747000
Reserves & Funds (Rs.)	822533056	990027903	1165983908	1383340017	1565395315	1747982989	2164493637
Total Loans (Rs.in 000)	7755952	8189993	10586170	12922543	15545779	21365053318	27589933041
Total Deposits (Rs.in 000)	13447661	14119032	14586609	19347399	23342285	31915047467	37348255840

NIB							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	795	940	800	1260	1729	2450	1388
EPS (Rs.)	39.56	51.7	39.5	54.35	62.57	57.87	37.42
P/E (times)	20.1	18.18	20.25	21.33	27.63	42.33	37.10
No. of Shares	2952930	2952930	5877385	5905860	8013526	12039154	24070689
Net Income (Rs.)	140465820	181074485	232147098	350536413	501398853	696731516	900619072
Share Capital (Rs.)	295293000	295293000	587738500	590586000	801352600	1203915400	2407068900
Reserves & Funds (Rs.)	343249707	433754717	592434502	824853715	1076770938	1482870648	1500770808
Total Loans (Rs.in 000)	5772140	7130126	10126050	12776208	17286427	26996652	36241207
Total Deposits (Rs.in 000)	7922766	11524680	14254574	18927306	24488856	34451726	46698100

SCB							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	1640	1745	2345	3775	5900	6830	6010
EPS (Rs.)	149.3	143.55	143.14	175.84	167.37	131.92	109.99
P/E (times)	10.98	12.16	16.38	21.47	35.25	51.77	54.64
No. of Shares	3395488	3746404	3746404	3746404	4132458	6207840	9319664
Net Income (Rs.)	506932087	537800124	536244885	658755881	691668004	818921008	1025114536
Share Capital (Rs.)	339548800	374640400	374640400	374640400	413245800	620784000	931966400
Reserves & Funds (Rs.)	1029357807	1121098611	1207775016	1379498377	1703098501	181763996	2120503331
Total Loans (Rs.in 000)	5695824	6410242	8143208	8935418	10502637	13718597	13679757
Total Deposits (Rs.in 000)	18755635	21161442	19363470	23061032	24647021	29743999	35871721

NIC							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	220	218	366	496	950	1284	1126
EPS (Rs.)	5.19	13.65	22.75	16.1	24.01	25.75	27.83
P/E (times)	42.43	15.97	16.09	30.81	39.56	49.86	40.46
No. of Shares	4999545	4999545	5000000	6000000	6600000	9438771	11404800
Net Income (Rs.)	25942128	68260867	113755734	96587674	158475051	243058040	317434138
Share Capital (Rs.)	499954500	499954500	500000000	600000000	660000000	943877100	1140480000
Reserves & Funds (Rs.)	52146444	120438224	184193958	166462479	257990162	359549800	519773729
Total Loans (Rs.in 000)	2419523	3561139	4711712	6655964	8941398	11264678	13679394
Total Deposits (Rs.in 000)	3144321	5146483	6241378	8765951	10068231	13084689	15579931

HBL							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	836	840	920	1100	1740	1980	1760
EPS (Rs.)	49.45	49.05	47.91	59.24	60.66	62.74	61.90
P/E (times)	16.91	17.12	19.2	18.57	28.69	31.56	28.43
No. of Shares	4290000	5362500	6435000	7722000	8108100	10135125	12162150
Net Income (Rs.)	212129000	263053495	308275171	457457696	491822905	635868519	752834735
Share Capital (Rs.)	429000000	536250000	643500000	772200000	810810000	1013512500	1216215000
Reserves & Funds (Rs.)	634132203	787916357	898246461	993975616	1335689655	1499479102	1903665537
Total Loans (Rs.in 000)	10844599	12929631	12424521	14642560	16997997	19497520	24793155
Total Deposits (Rs.in 000)	21007379	22010333	24814017	26490852	30048418	31842789	34681345

SBI							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	255	307	335	612	1176	1511	1900
EPS (Rs.)	11.47	14.26	13.29	18.27	39.35	28.33	36.18
P/E (times)	22.74	21.54	25.21	33.49	29.89	53.34	52.52
No. of Shares	4251573	4268759	4318656	6402361	6477984	8745278	8745278
Net Income (Rs.)	48748221	60851673	57386634	117001973	254908844	247770758	316373495
Share Capital (Rs.)	425157300	426875900	431865600	640236100	647798400	874527840	874527840
Reserves & Funds (Rs.)	144694881	199760826	257147460	342137628	515492451	540116972	838079355
Total Loans (Rs.in 000)	4468720	5143662	6213879	7626736	9460451	12113698	15131748
Total Deposits (Rs.in 000)	6522817	7198327	8654774	11002041	11445286	13715395	27957221

BOK							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	198	295	430	850	1375	2350	1825
EPS (Rs.)	17.72	27.5	30.1	43.67	43.5	59.94	54.68
P/E (times)	11.18	7.2	14.29	19.46	31.61	39.21	33.37
No. of Shares	4635809	4635809	4635809	4635809	6031413	6031413	8443979
Net Income (Rs.)	82127662	127473189	139529721	202440627	262386980	361496879	461734911
Share Capital (Rs.)	463580900	463580900	463580900	463580900	603141300	603141300	844397900
Reserves & Funds (Rs.)	115552336	187164330	257156916	376152989	378837432	738932488	897192263
Total Loans (Rs.in 000)	4542700	5646698	5912579	7259083	9399328	12462638	14647297
Total Deposits (Rs.in 000)	6170712	7741645	8975781	10485359	12388927	15833739	18083980

EBL							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
MPPS (Rs.)	445	680	870	1379	2430	3132	2455
EPS (Rs.)	29.9	45.58	54.22	62.78	78.42	91.82	99.99
P/E (times)	14.88	14.93	16.04	21.97	30.99	34.11	24.55
No. of Shares	3150000	3150000	3780000	3780000	3780000	4914000	6388210
Net Income (Rs.)	94180428	143566683	168214611	237290936	296409281	451218613	638732757
Share Capital (Rs.)	455000000	455000000	518000000	518000000	518000000	831400000	838821000
Reserves & Funds (Rs.)	157824701	225318543	314617365	4448083201	683515266	1089837580	1364804055
Total Loans (Rs.in 000)	4908461	5884123	7618671	9801308	13664082	18339086	23884674
Total Deposits (Rs.in 000)	6694963	8063902	10097691	13802445	18186254	23976299	33322946

Appendix B: Fundamental Variable (ROE)

NABIL	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	491654400	491654400	491654400	491654400	491654400	689216000	965747000
Reserves & Funds (Rs.)	822533056	990027903	1165983908	1383340017	1565395315	1747982989	2164493637
Total Equity (Rs.)	1314187456	1481682303	1657638308	1874994417	2057049715	2437198989	3130240637
Net Income (Rs.)	418346183	516864238	520114085	635262349	673959698	746468394	1031053098
ROE(Nominal)	0.31833068	0.34883607	0.31376814	0.338807595	0.32763413	0.30628127	0.32938461
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.25794912	0.29695776	0.25719439	0.239636662	0.24777644	0.21288883	0.17395321

NIB							
	2002/03	*2003/04*	*2004/05*	*2005/06*	*2006/07*	*2007/08*	*2008/09*
Share Capital (Rs.)	*295293000*	*295293000*	*587738500*	*590586000*	*801352600*	*1203915400*	*2407068900*
Reserves & Funds (Rs.)	*343249707*	*433754717*	*592434502*	*824853715*	*1076770938*	*1482870648*	*1500770808*
Total Equity (Rs.)	*638542707*	*729047717*	*1180173002*	*1415439715*	*1878123538*	*2686786048*	*3907839708*
Net Income (Rs.)	*140465820*	*181074485*	*232147098*	*350536413*	*501398853*	*696731516*	*900619072*
ROE(Nominal)	*0.21997874*	*0.24837124*	*0.19670599*	*0.247651955*	*0.26696798*	*0.25931783*	*0.23046469*
Inflation (q)	*0.048*	*0.04*	*0.045*	*0.08*	*0.064*	*.077*	*0.1324*
Real ROE	*0.16410185*	*0.20035696*	*0.1451732*	*0.155233292*	*0.19075938*	*0.16928303*	*0.086599*

HBL							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	429000000	536250000	643500000	772200000	810810000	1013512500	1216215000
Reserves & Funds (Rs.)	634132203	787916357	898246461	993975616	1335689655	1499479102	1903665537
Total Equity (Rs.)	1063132203	1324166357	1541746461	1766175616	2146499655	2512991602	3119880537
Net Income (Rs.)	212129000	263053495	308275171	457457696	491822905	635868519	752834735
ROE(Nominal)	0.1995321	0.19865593	0.19995192	0.259010311	0.22912788	0.25303249	0.24130242
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.1445917	0.15255378	0.14827935	0.165750288	0.15519537	0.16344707	0.09616957

SCB							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	339548800	374640400	374640400	374640400	413245800	620784000	931966400
Reserves & Funds (Rs.)	1029357807	1121098611	1207775016	1379498377	1703098501	181763996	2120503331
Total Equity (Rs.)	1368906607	1495739011	1582415416	1754138777	2116344301	802547996	3052469731
Net Income (Rs.)	506932087	537800124	536244885	658755881	691668004	818921008	1025114536
ROE(Nominal)	0.37031897	0.35955479	0.33887744	0.375543765	0.32682206	0.32854773	0.33583119
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.30755627	0.30726422	0.28122243	0.273651634	0.24701321	0.23359089	0.17964605

SBI							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	425157300	426875900	431865600	640236100	647798400	874527840	874527840
Reserves & Funds (Rs.)	144694881	199760826	257147460	342137628	515492451	540116972	838079355
Total Equity (Rs.)	569852181	626636726	689013060	982373728	1163290851	1414644812	1712607195
Net Income (Rs.)	48748221	60851673	57386634	117001973	254908844	247770758	316373495
ROE(Nominal)	0.08554538	0.09710837	0.08328817	0.119101285	0.21912735	0.17514697	0.18473208
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.03582574	0.0549119	0.03663939	0.036204893	0.14579638	0.09112997	0.04618594

NIC							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	499954500	499954500	500000000	600000000	660000000	943877100	1140480000
Reserves & Funds (Rs.)	52146444	120438224	184193958	166462479	257990162	359549800	519773729
Total Equity (Rs.)	552100944	620392724	684193958	766462479	917990162	1303426900	1660253729
Net Income (Rs.)	25942128	68260867	113755734	96587674	158475051	243058040	317434138
ROE(Nominal)	0.04698802	0.110028478	0.16626241	0.12601749	0.17263262	0.18647616	0.19119616
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	-0.0009656	0.067335075	0.11604058	0.04260878	0.10209833	0.10164917	0.05191272

EBL							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	455000000	455000000	518000000	518000000	518000000	831400000	838821000
Reserves & Funds (Rs.)	157824701	225318543	314617365	444808301	683515266	1089837580	1364804055
Total Equity (Rs.)	612824701	680318543	832617365	962808301	1201515266	1921237580	2203625055
Net Income (Rs.)	94180428	143566683	168214611	237290936	296409281	451218613	638732757
ROE(Nominal)	0.15368249	0.21102862	0.20203111	0.24645709	0.24669623	.23485831	0.28985546
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.10084207	0.164450596	0.15026901	0.15412694	0.17170698	0.14657225	0.19763738

BOK							
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Share Capital (Rs.)	463580900	463580900	463580900	463580900	603141300	603141300	844397900
Reserves & Funds (Rs.)	115552336	187164330	257156916	376152981	378837432	738932488	897192263
Total Equity (Rs.)	579133236	650745230	720737816	839733881	981978732	1342073788	1741590163
Net Income (Rs.)	82127662	127473189	139529721	202440627	262386980	361496879	461734911
ROE(Nominal)	0.14181134	0.195888011	0.1935929	0.24107712	0.2672023	0.26935693	0.26512260
Inflation (q)	0.048	0.04	0.045	0.08	0.064	.077	0.1324
Real ROE	0.08951464	0.149892319	0.14219416	0.14914548	0.19097961	0.1786044	0.1172047

Calculation of Values

Inflation and Portfolio Real Return (ROE)

Inflation(X)	Stock Returns(Y)							
2.4	20.84	Mean (X)=	4.714286		r_{XY} =	-0.35776		
2.9	15.15	Mean(Y)=	16.63286					
4.8	13.74	SD (X)=	1.806677		a_{yx} =	18.60	a_{xy} =	22.08
4	17.42	SD(Y)=	2.191038		b_{yx} =	-0.43	b_{xy} =	-0.98
4.5	15.96				F (b_{yx})=	0.72	F (b_{xy}) =	0.72
8	15.2							
6.4	18.12							

Stock Returns (ROE), Inflation, and GDP Growth

Stock Returns (X1)	Inflation (X2)	GDP growth(X3)		
20.84	2.4	15.11	$R_{1.23}$ =	0.85
15.15	2.9	4.06		
13.74	4.8	7.14	b_1 =	13.74
17.42	4	9.04	b_2 =	-0.55
15.96	4.5	9.81	b_3 =	0.57
15.2	8	10.97		
18.14	6.4	11.17		

Appendix C: Technical Variable

Calculation of NABIL has been showed in Data Presentation and Analysis section.

NIB

	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	1401		1401				
2000/01	1150		1150	-17.92			-17.92
2001/02	760	30	988	-14.09			-14.09
2002/03	795	20	1240.2	25.53	20	2.02	27.55
2003/04	940	15	1686.36	35.97	15	1.21	37.18
2004/05	800	12.5	1614.6	-4.26	12.5	0.74	-3.52
2005/06	1260	55.46	3953.34	144.85	20	1.24	146.09
2006/07	1729	30	7052.32	78.39	5	0.13	78.52
2007/08	2450	40.83	14073.37	99.56	7.5	0.11	99.67
2008/09	1388	20.00	9567.60	-32.02	20	0.14	-31.88

Where, SD = stock dividends, CD = cash dividends, g = capital gains & DY = dividend yields.

SCB

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	1985		1985				
2000/01	2144	100	4288	100	116.02	5.04	121.06
2001/02	1575	100	6300	100	46.92	2.33	49.25
2002/03	1640	120	14432	110	129.08	1.75	130.83
2003/04	1745	110	32247.6	110	123.45	0.76	124.21
2004/05	2345	120	95338.32	120	195.64	0.37	196.01
2005/06	3775	140	368343.36	130	286.35	0.14	286.49
2006/07	5900	130	1324084.61	80	259.47	0.02	259.49
2007/08	6830	130	3525431.37	166.25	80	0.01	166.26
2008/09	6010	100	6204346.28	75.99	50	0.001	75.99

HBL

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	1700		1700				
2000/01	1500	57.5	2362.5	38.97	27.5	1.62	40.59
2001/02	1000	35	2126.25	-10	25	1.06	-8.94
2002/03	836	25	2221.93	4.5	1.32	0.06	4.56
2003/04	840	20	2679.08	20.57	0		20.57
2004/05	920	31.85	3860.85	44.11	11.58	0.43	44.54
2005/06	1100	35	6231.92	61.41	30	0.78	62.19
2006/07	1740	40	13800.87	121.45	15	0.24	121.69
2007/08	1980	45	22818.17	65.34	25	0.181	65.52
2008/09	1760	43.56	29118.01	27.61	12	12	27.66

NIC

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	550		550				
2000/01	399	10	438.9	-20.2	10	1.82	-18.38
2001/02	245		269.5	-38.6			-38.6
2002/03	220		242	-10.2			-10.2
2003/04	218		239.8	-0.9			-0.9
2004/05	366	30	523.38	118.26	10	4.17	122.43
2005/06	496	10.53	783.97	49.79	0.053	0.10	49.89
2006/07	950	21.03	1817.63	131.85	1.05	0.13	131.98
2007/08	1284	21.05	2973.79	63.61	1.05	0.06	63.67
2008/09	1126	15.19	3004	1.02	0.79	0.03	1.05

SBI

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	1165		1165				
2000/01	1500	20	1800	54.51			54.51
2001/02	401		481.2	-73.27			-73.27
2002/03	255	8	330.48	-31.32	8	1.66	-29.66
2003/04	307		397.87	20.39			20.39
2004/05	335		434.16	9.12			9.12
2005/06	612	5	832.81	91.82	5	1.15	92.97
2006/07	1176	47.59	2361.88	183.6	12.59	1.51	185.11
2007/08	1511		3034.70	28.49			28.49
2008/09	1900	42.11	5422.87	78.70	2.11	0.07	78.77

EBL

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	980		980				
2000/01	650		650	-33.67			-33.67
2001/02	405	20	486	-25.23			-25.23
2002/03	445		534	9.88	20	4.12	14
2003/04	680		816	52.81	20	3.75	56.56
2004/05	870	20	1252.6	53.5			53.5
2005/06	1379		1985.76	58.53	25	2.0	60.53
2006/07	2430	30	4548.96	129.08	10	0.50	129.58
2007/08	3132	30	7622.04	67.56	20	0.44	68
2008/09	2455	30	7766.83	1.90	30	0.39	2.29

BOK

Year	MPS(Rs.)	SD%	Wealth(Rs.)	g%	CD%	DY%	Total Return%
1999/00	998		998				
2000/01	850		850	-14.83			-14.83
2001/02	254	10	279.4	-67.13			-67.13
2002/03	198		217.8	-22.05	10	3.58	-18.47
2003/04	295		324.5	48.99	10	4.59	53.58
2004/05	430		473	45.76	10	3.08	48.84
2005/06	850	30	1215.5	156.98	10	2.11	159.09
2006/07	1375		1966.25	61.76	10	0.82	62.58
2007/08	2350	42.11	5730.73	191.45	2.11	0.1073	191.56
2008/09	1825	47.37	6558.64	14.45	7.37	0.1286	14.57

Calculation of Values

Inflation and Portfolio Real Return

Inflation(X)	Stock Returns(Y)						
4.8	13.74	Mean (X) =	4.714286	r_{XY} =	-0.66		
4	17.42	Mean (Y) =	57.48286				
4.5	15.96	SD (X) =	1.806677	a_{yx} =	-64.2	a_{xy} =	3.31
8	15.2	SD (Y) =	58.66156	b_{yx} =	25.81	b_{xy} =	0.02
6.4	18.14			$F(b_{yx})$ =	8.57	$F(b_{xy})$ =	3.65
7.7	16.21						
13.24	11.87						

Stock Returns , Inflation, and GDP Growth

Stock Returns (X1)	Inflation (X2)	GDP growth(X3)		
16.96	4.8	7.14	$R_{1.23}$ =	0.88
48.72	4	9.04		
70.83	4.5	9.81	b_1 =	-126.94
112.18	8	10.97	b_2 =	24.36
159.96	6.4	11.17	b_3 =	7.24
84.76	7.7	12.89		
14.90	13.24	16.89		

Appendix D: Primary Analysis

a) Format of Questionnaire

Note: The information collected herewith would be used for the thesis purpose only.

Name: ………………………………………………. (optional)

Place: ………………………………………….

Number:……………………………………....

1. Are you an investor? a. Yes ☐ b. No ☐

2. Which investment do you prefer? Please assign ranks from 1 to 4:
   - a. Real Estate (land and building) ☐
   - b. Gold and Silver ☐
   - c. Depositing money in Banks and Financial Institutions ☐
   - d. Investment in Financial Assets (Shares and Debentures) ☐

3. What type of financial assets do you have? a. Shares ☐ b. Bonds and Debentures ☐

4. Do you regularly trade securities in stock market? a. Yes ☐ b. No ☐

5. What is your reason behind investment in common stocks?
   - a. Regular Dividends ☐
   - b. Capital gains ☐

6. Presently you have investments in the financial assets of:
   - a. Commercial Banks ☐
   - b. Development Banks ☐
   - c. Finance Companies ☐
   - d. Insurance Companies ☐
   - e. Manufacturing & Processing Companies ☐
   - f. Hotels ☐
   - g. Trading Companies ☐
   - h. Others (hydropower, film development etc.) ☐

7. Do you prefer commercial banks group to other groups? a. Yes ☐ b. No ☐

8. What do think about the returns provided by shares of commercial banks?
   a. Very good ☐   b. Good ☐   c. Normal ☐   d. Bad ☐   e. Worse ☐

9. In terms of returns provided to shareholders, rank the following commercial banks from 1 to 8:
   - a. Nepal SBI Bank Ltd. ☐
   - b. Nepal Industrial & Commercial Bank Ltd. ☐
   - c. Bank of Kathmandu Ltd. ☐
   - d. Everest Bank Ltd. ☐
   - e. Himalayan Bank Ltd. ☐
   - f. Nepal Investment Bank Ltd ☐
   - g. NABIL Bank Ltd. ☐
   - h. Standard Chartered Bank Nepal Ltd. ☐

10. What do you think about the present situation of inflation in Nepal?
    a. Very good ☐   b. Good ☐   c. Normal ☐   d. Bad ☐   e. Worse ☐

11. Is stock return affected by inflation and state of the economy? a. Yes ☐ b. No ☐

12. In which would you prefer to invest to reduce the effects of inflation?
    - a. Buying shares ☐
    - b. Buying debentures & Bonds ☐
    - c. Depositing money in Banks and Financial Institutions ☐
    - d. Buying land and Building ☐

Thank you for your kind co-operation.
b) Response to the Questionnaire

Figures in the parentheses indicate the number of responses to the respective questions.

1 Are you an investor?   Yes(**30**)   No(**0**)

2 Which investment do you prefer?   Mean Ranks
   a. Real Estate (land and building)   **2.83**
   b. Gold and Silver   **3.03**
   c. Depositing money in Banks and Financial Institutions   **3.07**
   d. Investment in Financial Assets (Shares and Debentures)   **1.07**

3 What type of financial assets do you have?   Shares (**30**)   Bonds and Debentures(**0**)

4 Do you regularly trade securities in stock market? Yes(**20**) No(**10**)

5 What is your reason behind investment in common stocks?   Regular Dividends(**12**)   Capital Gains(**18**)

6 Presently you have investments in the financial assets of
   a. Commercial Banks (**25**)
   b. Development Banks (**15**)
   c. Finance Companies (**10**)
   d. Insurance Companies (**2**)
   e. Manufacturing & Processing Companies (**1**)
   f. Hotels (**0**)
   g. Trading Companies (**0**)
   h. Others (**2**)

7 Do you prefer commercial banks group to other groups?   Yes (**25**)   No(**5**)

8 What do think about the returns provided by shares of commercial banks?
   a. Very good (**1**)   b. Good (**17**)   c. Normal (**12**)   d. Bad (**0**)   e. Worse (**0**)

9 In terms of returns provided to shareholders, rank the following commercial banks from 1 to 8:

Banks	Mean Ranks
SBI	**7**
NIC	**7.13**
BOK	**4.43**
EBL	**5.07**
HBL	**4.83**
NIB	**3.6**
NABIL	**2.4**
SCB	**1.53**

10 What do you think about the present situation of inflation in Nepal?
   a. Very good(**0**) b. Good(**3**)   c. Normal(**8**) d. Bad(**15**)   e. Worse(**4**)

11 Is stock return affected by inflation and state of the economy?   Yes(**17**)   No(**13**)

12 In which would you prefer to invest to reduce the effects of inflation?

    a. Buying shares(**18**)

    b. Buying debentures & Bonds(**4**)

    c. Depositing money in Banks and Financial Institutions(**4**)

    d. Buying land and Building(**4**)

c) Interview Questions

1. Sir, what do you see the future of the Nepalese investors?
2. Are Nepalese investors adequately compensated for their investment?
3. How can you relate Nepalese economy, prevailing Inflation, and Stock Market Index?
4. What do you think about the impact of inflation on shareholders' wealth?
5. Which financial assets provide hedge against inflation?
6. What do you say about returns provided by commercial banks?
7. Can these returns be hedge against inflation?
8. Sir, can returns from financial and real assets be compared? How?
9. What do you think NRB and SEBON can do to reduce the effects of inflation on stockholders wealth?
10. And finally, what do you think an investor can do to reduce the harmful effects of inflation?

The Fisher's Exact Test for 2*2 Tables

		Trading Habit		Total
		Regular	Irregular	
Preference to Commercial Banks	Yes	18	7	25
	No	2	3	5
	Total	20	10	30

The several possible outcomes of above 2*2 table that make same marginal totals of 25, 5, 20, 10; and the sum total of 30:

Outcome I

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		0.9	0.7	0.2	0.16
Preference to Commercial Banks	Yes	18	7	25				
	No	2	3	5				
		20	10	30				

Outcome II

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		0.9	0.8	0.05	0.36
Preference to Commercial Banks	Yes	17	8	25				
	No	3	2	5				
		20	10	30				

Outcome III

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		0.8	0.9	-0.1	0.34
Preference to Commercial Banks	Yes	16	9	25				
	No	4	1	5				
		20	10	30				

Outcome IV

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		0.8	1	-0.25	0.11
Preference to Commercial Banks	Yes	15	10	25				
	No	5	0	5				
		20	10	30				

Outcome V

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		1	0.6	0.35	0.03
Preference to Commercial Banks	Yes	19	6	25				
	No	1	4	5				
		20	10	30				

Outcome VI

		Trading habit			P_1	P_2	P_1-P_2	P(cal)
		Regular	Irregular		1	0.5	0.5	0.002
Preference to Commercial Banks	Yes	20	5	25				
	No	0	5	5				
		20	10	30				