

**STUDY ON EFFICIENT MARKET HYPOTHESIS IN
CONTEXT OF NEPAL**

A THESIS

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RECOMMENDATION

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DECLARATION

I hereby declare that the work reported in this thesis entitled “**STUDY ON EFFICIENT MARKET HYPOTHESIS IN CONTEXT OF NEPAL**” submitted to the Nepal Commerce Campus, Minbhawan is my original work done for the Master’s Degree in Business Studies under the supervision of Mr. Madan Kandel and Dr. Sushil Bhakta Mathema, Faculty , Nepal Commerce Campus, Minbhawan, Kathmandu.

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ACRONYMS

AAR	Average Abnormal Return
ACF	Auto-correlation Function
AGM	Annual General Meeting
AMEX	American Stock Exchange
AR	Auto-regressive
ARIMA	Auto Regressive Integrated Moving Average
BJ	Box Jenkins
BOD	Board of Directors
CAAR	Cumulative Average Abnormal Return
CDS	Central Depository System
CSE	Colombo Stock Exchange
EMH	Efficient Market Hypothesis
et. al	and others
GARCH	Generalized Autoregressive conditional Hetero-skaedasticity
LB	Ljung-Box
Ltd.	Limited
MA	Moving Average
NEPSE	Nepal Stock Exchange
NRN	Non Resident Nepalese
NYSE	New York Stock Exchange
S. No.	Serial number
SEBO/N	Securities Board of Nepal
ZSE	Zimbabwean stock Exchange

Chapter: I

INTRODUCTION

1.1 General Background

The concept of efficient market hypothesis (EMH) has been one of the most dominant themes in financial research for explaining the share price behavior. The increasing globalization of the financial markets has heightened this concept in emerging markets as well. Several studies have focused on predictability of returns in the less matured and developing stock markets (Abraham et al., 2002). In the context of stock markets, the term "efficiency" has been used in a rather restricted sense to reflect only the informational efficiency of such markets. Security market efficiency basically explains the relationship between information and share prices (Paxson and Wood, 1997). However, a precondition for this strong version of hypothesis is that information and trading costs, the costs of getting prices to reflect information, are always zero (Grossman and Stiglitz, 1980).

In market efficiency hypothesis security prices fully reflect all available information (Fama, 1965, 1991). The degree of efficiency shown by a market is measured by the speed with which the market incorporates the new information into its price structures. The efficient market theorists postulate that in an efficient market the speed of adjustment of prices to new information is very rapid.

In efficient security market, the prices of securities rationally reflect all available information that is relevant to the valuation of securities (Ogden, 2003). There are three versions of the EMH: the weak, semi-strong, and the

strong forms of the hypothesis. They tend to describe different degrees of market efficiency according to the type of information being reflected in prices. The weak form hypothesis asserts that historical price and volume data should already be reflected in current prices and should be of no value in predicting future price changes. Thus, weak form market efficiency suggests that prices traded in securities market that is weak form efficient cannot be predicted by using historical price information (Belaire-Franch and Opong, 2005). The semi strong form hypothesis states that all publicly available information regarding the prospects of the firm must be reflected already in the stock price. In the strong form, stock prices reflect all information relevant to the firm, public or private.

The stock market plays an important role in the financial system of any country. The activities of buying and selling of shares on the securities market are extremely important for the efficient allocation of capital through proper pricing of capital and risk (Islam and Khaled, 2005). So the need for efficient stock market has become greater in recent years to mobilize the capital from unproductive to productive sectors of economy. The EMH ensures the allocation of resources in an efficient manner and signals to attract capital, domestic as well as foreign, to fulfill the growing demand of funds in the development of the country.

The need for efficient stock market has, thus, become greater in recent years to mobilize the capital from unproductive to productive sectors of economy. The EMH ensures the allocation of resources in an efficient manner and signals to attract capital, domestic as well as foreign, to fulfill the growing demand of funds in the development of the country. Success of an increasing privatization of the economy will depend on the presence of an active and

efficient share market. The concept of efficient market hypothesis (EMH) has been one of the burning issues for explaining the share price behavior. If the market is efficient, it uses all information including historical, public and private information available to it, in setting a price (Van Horne, 2000). In an economy like Nepal, efficient allocation of scarce resources and encouragement of foreign private investment are both of vital importance. Success of an increasing privatization of the economy will depend on the presence of an active and efficient share market. Several studies have focused on predictability of returns in the less matured and developing stock markets (Abraham et al., 2002). Compared to the stock markets in developed economy, the emerging stock markets like Nepal, are believed inefficient; characterized by a lower volume and frequency of trading, ease of manipulation by a few large traders, weaker disclosure and accounting requirements, settlement delays, and generally less than smooth transmission of financial information. If so, such characteristics of stock market will discourage the capital accumulation activities and private investment. In such situation, governmental efforts are required for proper facilitation and control of securities market, which need better understanding of existing level of market efficiency (Islam and Khaled, 2005). Since no extensive research can be found in this issue in Nepalese perspective, this study is an effort to examine the level of efficiency of Nepalese capital market.

1.2 Statement of the Problem

Study of the stock market efficiency has long been dominated by the notion that market adjusts available information in a rapid and quick manner (Fama, 1991). The adjustment of available information, public as well as private, would imply that even investors with precise inside information will

be unable to beat the market. Accordingly, three types of efficiency came into existence namely: weak, semi-strong and strong. Weak form efficiency takes place when all information embodied in the past prices is reflected in current prices. Semi-strong form efficiency ensures that market exploits all publicly available information and strong-form efficiency implies that investors would not be permitted to earn abnormal profits on the basis of inside information. Based on these approaches of efficiencies, this study attempts to deal with semi-strong form and weak form efficiencies in the context of Nepalese stock market, but does not deal with strong form EMH.

The efficient market hypothesis implies that no one should be able to consistently find miss-priced securities and hence are not able to make abnormal profits. If the markets were sufficiently efficient to provide no profitable opportunities to information traders, then it should be expected that active money managers would not exist.

Random walk properties of stock prices have long been a prominent topic in the study of stock market efficiency in its weak form. The information contained in the past prices is fully and instantaneously incorporated in weak form of EMH and hence stock returns will display unpredictable behavior. In stock prices not characterized by a random walk, the return generating process is dominated by a temporary component and therefore future returns can be predicted by the historical sequence of returns.

The semi-strong form hypothesis has been tested extensively in terms of the reaction of securities prices to various types of information. Many studies on semi-strong form efficiency of stock market are focused on the information content of the annual earnings and dividend announcements. The purpose of these public disclosure announcements is to provide information that meet

investors' needs for decision making.

The efficiency or inefficiency of the stock market depends upon the development of regulatory institutions, awareness of investors, effective enforcement of rules and regulations, market discipline, corporate good governance, instantaneous flow of information and the likes. These qualitative issues need to be addressed while making overall evaluation of market efficiency. There are few studies conducted to understand the behavior of investors. For example, Lewellen et al. (1977), Baker et al. (1977) and Shiller (1990) conducted studies on investment goals, behavior and beliefs of investors as well as their opinion on predictability of returns. Though there are these studies and findings in the context of developed and big markets, their applicability is yet to be seen in the context of smaller and under developed stock markets like that of Nepal.

The EMH has been widely accepted as valid, but evidences against market efficiency are growing. Through out the years, existence of market efficiency has been strongly supported by empirical evidences from developed countries. However research findings on the emerging markets are much controversial. It is generally believed that the emerging markets are less efficient than the developed markets. Some of the studies have shown the evidence of market efficiency also in emerging markets (e.g. Ojah and Karemera, 1999; Chiwara, 2000; Cooray and Wickrema Singhe, 2005; Asiri, 2008; etc). Beside these, there are also some studies of showing the evidence for the lack of efficiency in emerging markets (e.g. - Gandhi, 1980; Balaban, Candemir and Kunter, 1996; Olowe, 1998; Abeysekera, 2001; Mlmabo, Biekpe and Smith, 2003; etc). Many controversial evidences exist in case of emerging markets regarding efficiency.

Empirical test of market efficiency in an emerging market like Nepalese capital market helps to reach an ultimate conclusion about the level of efficiency in developing and less developed emerging market in general. Knowledge regarding the level of efficiency of the market is essential for investors, market players, regulatory authorities etc. In this regard, test of market efficiency of Nepal Stock Exchange Ltd (the single stock exchange of the country) deserves its own importance. This study is an effort to address the following issues:

- Is the share price behaviour in NEPSE shows the random walk behaviour?
- Is historical price trend is sufficient to predict the future share price in NEPSE?
- Do the financial statements of the company helps to predict the future prices?
- To what extent the stock price of Nepalese companies reflect the information?
- What do the peoples (well known with Nepalese capital market)believe about the level of efficiency of Nepalese stock market?
- What are the major issues regarding efficiency of Nepalese capital market?

1.3 Objectives of the Study

The main objective of the study is to test the level of efficiency in context of Nepalese capital market. Furthermore, it aims to test whether the Nepalese capital market is in semi-strong form of efficiency or weak form of

efficiency. Following are the major objectives of the study:

- To examine whether the historical information or historical price movement is dependent or independent to the future price movement for Nepalese companies.
- To observe whether the share price responses in Nepalese capital market are dependent or independent to the publicly available information.
- To determine the relevance and validity of EMH in context of Nepalese capital market.
- To examine the effect of cash dividend announcement on share price movement in NEPSE.

1.4 Limitation of the Study

The limitations of the study are as follows:

- ◆ This study is only confined to the test of semi-strong form and weak form of EMH. Thus, strong form of EMH has not been dealt in this study. Testing strong form of efficiency needs insiders' information and mutual funds data. Due to lack of the relevant database on these individuals and institutions, this study does not cover strong form of efficiency test in contest of Nepalese stock market.
- ◆ On testing semi-strong form hypothesis of EMH, this study is limited to use only one event i.e. cash dividend announcement. This study has excluded other events like stock dividend announcements, rights announcements, earning announcements, new public issue announcement, further public issue announcement etc.

- ◆ Testing semi-strong form hypothesis of EMH, study has used the event of cash dividend announcement. The information relating to cash dividend announcement flows in the market immediately after BODs decisions regarding cash dividend which is approved by AGM cash dividend announcement flows in the market immediately after BODs decisions regarding cash dividend which is approved by AGM after the gap of some days. Under this study, event day is assumed to be the date of AGM.
- ◆ Under this study, only attempt has been made to investigate the price behavior of common stocks. It ignores the study of price behavior of other securities like preference share, corporate bonds, and government securities and like.
- ◆ Though this study aims at testing the stock market efficiency, all dimensions of efficiency have not been tested in context of Nepal.
- ◆ The study period includes the share price data from 1st December, 2008 to 1st December, 2011. NEPSE opened its trading floor on 13th January, 1994. The data before 1st December 2008 have not been considered. Data was collected on August of 2011. So the latest data that has been collected till last month.
- ◆ Under the study, stock price data of only 15 companies among **159** companies that are listed in NEPSE are considered for testing the weak form of EMH. For testing the semi-strong form of EMH, event of cash dividend announcements for only eight companies have been observe where there were 13 companies that are announced only cash dividend. The cash dividend announcement in 2067/068 is only considered for testing semi-strong form of efficiency.

- ◆ The opinion survey of respondents has been conducted only from the limited offices. Ones who are assumed to be well known about the Nepalese capital market were the target group of the study.

1.5 Organization of the Study

This study is organized into five chapters. Each chapter devoted to specific aspects of the study. First chapter deals with the major issues to be investigated along with the background of the study, statement of the problem and objectives. Second chapter presents the conceptual review and review of the major studies in the area. The research Methodology used in the study has been presented and described in chapter three. This chapter contains the research design, nature and sources of data and sampling procedures. Furthermore, the tools used in analysis and limitation of the study are also included under this chapter. Chapter four dealt with the presentation and analysis of both primary and secondary data. And finally the last chapter i.e. chapter five reveal the major findings of the study. These findings are summarized and overall conclusion has been drawn at the end of the study.

Chapter-II

REVIEW OF LITERATURE

The review of literature has been described in four sections. First section presents a brief discussion on the theoretical framework. In second section review of empirical works on stock market efficiency have been discussed. Review of the studies in context of Nepal has been presented in third section and finally the last section has devoted for concluding remarks.

2.1. Conceptual Framework

Concept of Market Efficiency

With a better understanding of price formation in competitive markets, the random walk model came to be seen as a set of observations that can be consistent with the efficient markets hypothesis. The switch of emphasis began with observations such as that of Samuelson (1965), whose proof that properly anticipated prices fluctuate randomly began with the observation that ‘in competitive markets there is a buyer for every seller. If one could be sure that a price would rise, it would have already risen’. Samuelson asserted that ‘arguments like this are used to deduce that competitive prices must display price changes... that perform a random walk with no predictable bias.’

Samuelson explains that ‘we would expect people in the market place, in pursuit of avid and intelligent self-interest, to take account of those elements of future events that in a probability sense may be discerned to be casting their shadows before them’. By presenting his proof in a general form, Samuelson added rigour to our notion of a well-functioning market. It is not

clear to us whether these results ought to be seen as obvious or surprising, nor was it clear to Samuelson who wrote that ‘the theorem is so general that I must confess to having oscillated over the years in my own mind between regarding it as trivially obvious and regarding it as remarkably sweeping. Such perhaps is characteristic of basic results’.

Building on Samuelson’s microeconomic approach, together with a taxonomy suggested by Harry Roberts (1967), Fama (1970) assembled a comprehensive review of the theory and evidence of market efficiency. Though Samuelson’s findings proceeds from theory to empirical work, he notes that most of the empirical work preceded development of the theory.

The theory involves defining an efficient market as one in which trading on available information fails to provide an abnormal profit. A market can be deemed to be efficient, therefore, only if we posit a model for returns. From this point on, tests of market efficiency become joint tests of market behaviour and models of asset pricing.

The weak form of the efficient market hypothesis claims that prices fully reflect the information implicit in the sequence of past prices. The semi-strong form of the hypothesis asserts that process reflect all relevant information that is publicly available, while the strong form of market efficiency asserts information that is known to any participant is reflected in market prices. The literature begins, therefore, with studies of weak form market efficiency.

Fama (1970) summarized the early random walk literature, his own contributions and other studies of the information contained in the historical

sequence of prices, and concludes that ‘the results are strongly in support’ of the weak form of market efficiency. He then reviews number of semi-strong and strong form tests and concludes that ‘in short, the evidence in support of the efficient markets model is extensive, and contradictory evidence is sparse’. He concedes, however, that ‘much remains to be done’, and indeed, Fama (1991) subsequently returned to the fray with a reinterpretation of the efficient markets hypothesis in the light of subsequent research.

History of Market Efficiency

The concept of market efficiency had been anticipated at the beginning of the century on the dissertation submitted by Bachelier (1900) to the Sorbonne for his Ph D in mathematics. Bachelier recognizes that ‘past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes. This recognition of the informational efficiency of the market leads Bachelier to continue that ‘if the market, in effect, does not predict its fluctuations, it does assess them as being more or less likely, and this likelihood can be evaluated mathematically’. But, Bachelier’s contribution was overlooked until it was circulated to economists by Paul Samuelson in the late 1950s (Bernstein, 1992) and subsequently published in England by Cootner (1964).

Although there could have been an emerging theory of speculative markets during the first half of the twentieth century, this was not to be. Instead, the early literature followed the path of accumulating a variety of empirical observations that did not sit early alongside the paradigms of economics or the beliefs of practitioners. Bachelier (1900) had concluded that commodity prices fluctuate randomly, and later studies by Working (1934) and Cowles and Jones (1937) were to show that US stock prices and other economic

series also share these characteristics. These studies were largely overlooked by researchers until the late 1950s.

There was, in addition, distributing evidence about the difficulty of beating the equity market. Alfred Cowles III, founder of Cowles Commission and benefactor of Econometric Society, published in the launch issue of *Econometrica* a painstaking analysis of many thousands of stock selections made by investment professionals. Cowles (1933) found that there was no discernable evidence of any ability to outguess the market. Subsequently, Cowles (1944) provided corroborative results for a large number of forecasts over a much longer sample period. By the 1940s, there was therefore scattered evidence in favor of the weak and strong form of efficiency of the market, though these terms were not yet in use.

In finance, this analogy has been applied to series whose successive returns are serially independent. In the early 1950s, electronic computers were used to study the behaviour of lengthy price series. The assumption of economists was that one could 'analyze an economic time series by extracting from it a long-term movement, or trend, for separate study and then scrutinizing the residual portion for short-term oscillatory movements and random fluctuations'. (Kendall, 1953)

When Kendall examined 22 UK stock and commodity price series, however, the results surprised him, he concluded that 'in series of prices which are observed at fairly close intervals the random changes from one term to the next are so large as to swamp any systematic effect which may be present. The data behave almost like wandering series'. The near-zero serial correlation of price changes was an observation that appeared in consistent

with the views of economists. Nevertheless, these empirical observations came to be labeled the 'random walk model' or even the 'random walk theory'.

If prices wander randomly, then this poses a major challenge to market analysts who try to predict the future path of security prices. Drawing on Kendall's work and earlier research by Working (1934), Roberts (1959) demonstrated that a time series generated from a sequence of random numbers was indistinguishable from a record of US stock prices- the raw material used by market technicians to predict future price levels. Indeed he wrote, 'the main reason for this paper is to call to the attention of financial analysts empirical results that seem to have been ignored in the past, for whatever reason, and to point out some methodological implications of these results for the study of securities'.

Whereas Roberts was throwing the gauntlet to practitioners, Osborne (1959) analyzed US stock price data out of pure academic interest, presenting his results to other physicists at the UN Naval Research Laboratory. Osborne shows that common stock prices have properties analogous to the movement of molecules. Osborne applies the methods of statistical mechanics to the stock market, with a detailed analysis of stock price fluctuations from the point of view of a physicist.

Despite the emerging evidence on the randomness of stock price changes, there were occasional instances of anomalous price behaviour, where certain series appeared to follow predictable paths. This includes a subset of the stock and commodity price series examined by Working (1934), Cowles and Jones (1937) and Kendall (1953).

In 1960, however, there was a realization that autocorrelation could be induced into returns series as a result of using time-averaged security prices. Working (1960) and Alexander (1961) independently discovered this. Once returns series are based on end of period prices, returns appear to fluctuate randomly. The problem of time-averaging identified by Working is the first research on thin trading (Dimson, 1979) and a precursor to studies of market microstructure.

The mid-1960s was a turning point in research on the random character of stock prices. In 1964, Cootner published his collection of papers on that topic, while Fama's (1965) doctoral dissertation was reproduced, in its entirety, in the *Journal of Business*. Fama reviews the existing literature on stock price behaviour, examines the distribution and serial dependence of stock market returns, and concludes that 'it seems safe to say that this paper has presented strong and voluminous evidence in favor of the random walk hypotheses'.

2.2 Review of Empirical Works

There are many studies that are undertaken to study the market efficiency or to test the efficiency of the stock market. Major studies are here reviewed to know the results of studies and tests.

The results and the tested market are being presented in a tabular form in chronological order. Reviews of empirical works have been undertaken in five subsections. First section focuses on the review of empirical works carried out up to 1980s with their major findings. The second section deals

with the review of studies during 1980s. Later on studies undertaken during 1990s and 2000s are presented and finally, the last section deals with the review of Nepalese studies.

Empirical Works up to 1980s

Major studies that are carried out up to 1980 after the development of the EMH theory are shown in table 2.1.

Dryden (1970) tested the UK stock market. Under the study, filter test is used to test the UK share prices. The study resulted that the existence of non-random price movement on UK shares.

Kemp and Reid (1971) undertook the study on 'The Random Walk Hypothesis and the Recent Behaviour of Equity Prices in Britain'. The study found the non-random price movement.

Conrad and Juttner (1973) made the study on 'Recent Behaviour of Stock Market Prices in Germany and the Random Walk Hypothesis.' The study found that the greater degree of dependency is appeared on German stock prices.

Jennergren & Korsvold (1975) undertook the study on 'The Non-random Character of Norwegian and Swedish Stock Market Prices'. The study concluded that the random walk hypothesis is probably not a very exact description of share price behaviour on Norwegian and Swedish stocks.

Table- 2.1

**Review of Empirical Works up to
1980s**

This table presents the studies that are undertaken to test the efficiency of stock market up to 1980s. First column of the table shows the sur-name of the people who make the studies with the date of study. Middle column of the table shows the name of the market where the efficiency was tested and last column presents the findings of the study. Reviewed studies that are undertaken before 1980s are shown in chronological order.

Study	Market	Findings/Results
Dryden (1970)	UK Stock Market	Existence of non random price movement.
Kemp & Reid (1971)	Britain Stock Market	Price movement is not random.
Conrad & Juttner (1973)	Germany Stock Market	Existence of greater degree of dependency.
Jennergren & Korsvold (1975)	Norewgian and Swedish Stock Market.	RWH is probably not a very exact description of share price behavior on Norwegian and Swedish stocks.
Kenedy & Sharma (1977)	Comparative analysis of stock price behaviour of Bombay, London & NYSE.	Bombay stock Exchange obeys a random walk as equivalent in this sense to behaviour of stock price in London stock exchange and NYSE.
Ang & Pohlman (1978)	Far east Asian stock Market	Support of weak form of efficiency.

Kennedy and Sharma (1977) tested the applicability of the Random Walk Hypothesis in Indian stock market and to compare the result with the behaviour of stock market of industrialized country. Study employed the comparative analysis of the stock price behaviour of the Bombay, London and New-York stock exchange. The study concluded that BSE obey a random walk as equivalent in this sense to behaviour of stock price in LSE and NYSE.

Empirical Works during 1980s

Major studies that are carried out during the decade of 1980s are shown and explained in table 2.2

***Table-
2.2***

Review of Empirical Works during 1980s

This table presents the studies that are undertaken during the decade of 80s. Studies for testing the efficiency of stock market from 1980 to 1989 are shown in chronological order. In the table, first column reveals the name and date of the stud. The second column presents the market of study and final column shows the results of the related studies.

Study	Market	Findings/Results
Gandhi (1980)	Kuwati stock Exchange	Rejection of random walk model.
Law (1982)	Hong-Kong stock Exchange	Stocks behave inefficiently in pricing.
Gupta (1985)	Indian Stock Market.	Support the evidence to support RWH.
Pandey & Bhat (1988)	Indian Stock Market.	Denied the existence of market efficiency in any of its three forms.
Lo & Mackinlay (1988)	American Stock market.	Strongly rejection of random walk model.
Washbarn & Binkley (1989)	Informational efficiency of markets for Stumpage (U.S. South)	Weak form of efficiency.

Gandhi (1980) used monthly data for the period 1975-1978 for the Kuwait stock Exchange and found that both simple linear regression of returns on lagged returns and runs tests for autocorrelation rejected that random walk hypothesis for the all share and industrial indices.

Law (1982) tested the efficiency of Hong-Kong stock exchange. The study concluded that a large subset of Hong-Kong stock behave inefficiently in pricing shares.

Gupta (1985) analyzed the equity share price behaviour in India. The analysis is performed by employing different econometric tools. The study found the evidence in support of random walk hypothesis.

Pandey and Bhat (1988) surveyed market participants' attitude and perceptions in the understanding and acceptance of EMH and their analysis denied the existence of market efficiency in any of its three forms.

Lo and Mackinlay (1988) studied NYSE-AMEX over the period of 1962-1985. They used the sample of 1216 observations of the firms in NYSE-AMEX. This study concludes the strongly rejection of random walk model.

Washburn and Binkley (1989) undertook the study to test the informational efficiency of markets for Stumpage (U.S. South). The study concluded that Stumpage markets are weak form of efficient.

Empirical Works during 1990s

Major studies that are carried out during the decade of 1990s are shown and explained in table 2.3

Yong (1992) investigated the behavior of Malaysian stock market with respect to the weak form of EMH. Weekly closing prices of all 170 stocks traded on Kuala Lumpur Stock Exchange (KLSE) from January 1977 to May, 1985 were used. The study tested four main hypotheses: (a) the population correlation coefficients of successive price changes at all lags are zero. (b) Percentage change in stock prices is random. (c) Percentage price follow normal distribution. (d) Efficiency of the market is independent of continuity in trading. The evidence generated from the study suggested that high percentage of stock deviated from weak form

of EMH and also found that KLSE are characterized by thinness of the market and discontinuity in trading.

Table- 2.3

**Review of Empirical Works during
1990s**

This table presents the studies that are undertaken during the decade of 90s. Studies for testing the efficiency of stock market from 1990 to 1999 are shown in chronological order. In the table, first column reveals the name and date of the study. The second column presents the market of study and final column shows the results of the related studies.

Study	Market	Findings/Results
Yong(1992)	Malaysian Stock Market.	High percentage of stocks deviated from weak form of EMH.
Lee, Yen & Chang (1992)	Taiwan stock Exchange	Taiwan Stock market does not satisfy semi-strong form of informational efficiency.
Bhatia & Shekhar (1996)	Bombay Stock Exchange	Behavior of Bombay Stock Exchange confirms to the weak form of EMH.
Balaban, Candemir & Kunter (1996)	Developing economy (evidence of Turkey)	The Turkish stock market is not informational efficient with respect to daily changes in some monetary variables.
Olowe (1998)	Nigerian Stock Market	Inefficient in the semi-strong form of EMH.
Lo & Mackinlay (1998)	American stock market	Random Walk Model is strongly rejected.
Oludoyi (1999)	Nigerian Stock Market	Not strong in the semi-strong form of EMH.
Grieb & Reyes (1999)	Brazilian Stock Market	In favor of market efficiency.
Mecagn & Sourial (1999)	Egyptian Stock market	Inefficient (Departure from EMH)

Lee, Yen and Chang (1992) tested the market efficiency in Taiwan Stock Exchange around the Chinese Lunar New Year festival. The study found that a profit making rule existed over the period of 1975-84. Investors who bought stock before the arrival of New Year and sold it later earned good profit. Thus study concluded that Taiwan Stock market does not satisfy

semi-strong information efficiency.

Bhatia and Shekhar (1996) made a study on the impact of past share price series on its present market price by making a univariate analysis in context of India. The data used for the study was the time series data form 1982-90 of the Bombay stock Exchange. Applying random sampling technique a total of 42 companies were selected from four industry classifications. Serial correlation and Run analysis were used to test the Random Walk model. The results of both tests do not generate any strong evidences on the validity of RWM. Thus the study concluded by commenting that the behavior of BSE confirms to the weak form of EMH.

Balaban, Candemir and Kunter (1996) undertook the study on stock market efficiency in developing economy: Evidence from Turkey. The study concluded that the Turkish stock market is not informational efficient with respect to daily changes in some monetary variables.

Olowe (1998) investigated whether securities prices on the Nigerian Stock market adjust to stock splits. Using residual analysis methodology, he employed the market model, the market deducted returns model and the mean adjusted returns model to test the semi-strong form of efficiency of the market. The study centered on monthly data of 86 stock splits involving 59 quoted companies between 1981 and 1992. Under this study all the stock splits data were used without isolating any other simultaneous event. The study showed that statistically and economically abnormal returns could be earned on the Nigerian Stock Market. These results are unaffected by the choice of model. The results also hold for a sample of actively traded securities. The study concluded that the Nigerian Stock Market appears to be

inefficient in the semi-strong form.

Lo and Mackinlay (1998) tested the for random walk model in American stock market by using a sample of 1216 observations of firms n the NYSE-AMEX over the period 1962-1985. The study showed the evidence of strongly rejection of random walk model.

Oludoyi (1999) studied the impact of earnings announcements on share prices on NSM using weekly dada. Result of this study showed that the Nigerian capital market is not efficient in the semi-strong form as share prices still drift ten weeks after corporate earnings had become public information.

Grieb & Reyes (1999) tested the efficiency of Brazilian Stock Market. They employed variance ratio test on weekly stock returns. The result of the study seems in favor of market efficiency.

Melagni & Sourial (1999) looked at the Egyptian Stock Exchange and found that the four best known daily indices exhibited significant departure from the EMH.

Empirical Works during 2000s

Major studies that are carried out during the decade of 2000 are shown and explained in table 2.4

***Table-
2.4***

Review of Empirical Works during 2000s

This table presents the studies that are undertaken during the decade of 2000. Studies for testing the efficiency of stock market from 2001 to 2009 are shown in

chronological order. In the table, first column reveals the name and date of the study .The second column presents the market of study and final column shows the results of the related studies.

Study	Market	Findings/Results
Hassan, Islam & Basher(2000)	Dhaka Stock Exchange	Processing of the now information in Bangladesh is rather weak and such might gave resulted from (a) Persistent large number of inactively traded share (b) Limited role of mutual fund and professionally managed investment and Brokerage houses (c) non compliance of companies to guidelines for instance timely disclosure and holding of annual general meeting.
Darnnat & Zhong (2000)	Chainese stock Market	Rejection of Random Walk Hypothesis.
Ming, Nor & Guru(2000)	Kuala Lumpur Stock Exchange	Rejection of Random Walk Hypothesis.
Shukla & Chowhan (2000)	Indian Stock Market	Highly Volatile
Chiwira(2000)	Zimbabwean Stock Exchange	Weak form of Efficiency
Abeysekera(2001)	Colombo Stock Market	The stocks traded in CSE do not behave in a manner consistent with the weak form of EMH.
Yongsawadvanich (2001)	Thai Stock Market	Random Walk Hypothesis cannot be rejected.
Nath(2002)	Indian Sock Market	Stock price movement does not follow random movement.
Pant & Bishnoi(2002)	Indian Stock Market	Indian stock market indices do not follow random movement
Osei(2002)	Ghana Stock Exchange	Inefficient.
Smith & Jefferis(2002)	Zimbabwean Stock Exchange.	Couldn't accept the weak form of efficient.
Hall & Urga(2002)	Russian stock Market	Initially inefficient but it took around two and half years to become efficient.
Mlmabo, Biekpe & Smith(2003)	African stock market. (Egypt, Kenya, Morocco & Zimbabwe)	Not enough evidence to accept the hypothesis of a random walk.

Pandey (2003)	Indian stock market	Inefficient.
Cooray & Wickremasinghe (2005)	Emerging Stock markets (South Asia: India, Sri-Lanka, Pakistan and Bangladesh)	The classical unit root tests support weak form efficiency for all four countries while the DF-DIS and ERS test do not support weak form efficiency for Bangladesh. Hence the post-deregulation stock markets of South Asia appear in general to be efficient except in the case of Bangladesh for which the results are mixed.
Gillette (2005)	German Stock Market	Weak form of EMH can not be rejected.
Asiri (2008)	Bahrain stock Market	Support the efficiency in the weak form.
Ozdemir (2008)	Istanbul Stock Exchange	Weak form of efficiency.
Yalama & Celik(2009)	Istanbul stock Exchange	Money markets are semi-strong form efficient; however capital market is not in Turkey.
Kung & Wong (2009)	Taiwan Stock Market.	Efficiency of Taiwan Stock Market has been greatly enhanced by the liberalization measures implemented over last 20 years.

Hassan, Islam and Basher (2000) empirically examine the issue of market efficiency and time varying volatility and equity return for Dhaka Stock Exchange (DSE) for the period over 1990-1999. The study examined the distribution of equity returns by dividing the sample period in; period before and after the market was opened to international investors. The study employed the Generalized Autoregressive conditional Heteroskedasticity (GARCH) approach to examine the market efficiency. The result showed that Dhaka Stock Exchange volatility tends to change over time, and was serially correlated. In addition the DSE returns display significant serial correlation, employing the stock market inefficiency. Moreover, Hassan et.al concluded that processing of new information in Bangladesh is rather weak and such might have resulted from (a) Persistent large number of inactively traded shares. (b) Limited role of mutual fund and professionally managed investment and broker houses. (c) Non

compliance of companies to guidelines for instance timely disclosure and holding of annual general meeting.

Darrant and Zhong (2000) examined random walk hypothesis for the two newly created stock exchanges in china. They followed two different approaches- the variance ratio test and comparison of NAÏVE model with other models like ARIMA and GARCH. They rejected the random walk in newly created Chinese stock exchanges using both the methodologies. They further suggested Artificial Neural Network (ANN) based models as strong tools for predicting prices in the stock exchanges of developing countries.

Ming, Nor and Guru (2000) showed that variance ratio and multiple variance ratio tests reject random walk for Kuala Lumpur Stock Exchange. They further show that trading rules like variable length moving average (VAM) and fixed length moving average (FMA) have predictability of earning profits over and above transaction costs.

Shukla and Chowhan (2000) have conducted the study to examine the issue of volatility in the Indian stock market. Under this study, an empirical study of BSE sensx and set of representative stocks are carried out to find changes in their volatility during 1998 to 2000. The study finds the Indian stock market of highly volatile. This study further commented that market regulators are unable to curb speculative uprising and recommended that such can be done by allowing free trade, strengthening analytical media that highlight on better risk management coupled with investor learning.

Chiwira (2001) studied the efficiency of the Zimbabwean stock exchange. The study finds the ZSE was efficient in the weak sense i.e. weak form of EMH.

Abeyssekera(2001) studied the EMH and the emerging capital market in Sri Lanka: evidence from the Colombo Stock Exchange by employing daily, weekly and monthly returns of two value weighted portfolios of stocks listed in CSE during the period between January 1991 and November 1996. study employed the several commonly used tactical techniques to determine the level of independence of the successive returns; viz., run tests, serial correlation, test for stationarity, and security and portfolio return patterns. Results of this study indicate that the stocks traded in CSE do not behave in a manner consistent with the weak form of the EMH.

Yongsawadvanich (2001) tested the efficiency of Thai stock market by using the stock market data of Thailand from January 1976 to December 2000. The study employed variance ratio test, auto correlation coefficient test, the Ljung-Box test and run test. The study concluded that RWH cannot be rejected for all cases and for all methodologies.

Nath (2002) made an attempt to conform whether EMH is applicable to emerging market like India. The primary objective pursued in this study was to investigate if long memory models can characterize the price behavior in Indian stock market. The study used the daily closing values of the index for the period fro 1990 to 2001. Variance ratio test and rescaled range analysis was used which concludes that the movement of stock prices does not follow a random movement.

Pant and Bishnoi (2002) also made the study to analys4e the behavior of daily and weekly returns of vive Indian stock market indices for random walk during April 1996 to June 2001. The analysis included test autocorrelation using Q-statistic, Dickey-Fuller test fan variance ratio test.

The result of the study reject the random walk in Indian stock market indices and it provides an opportunity to the traders for predicting the future prices and earning abnormal profits.

Smith and Jefferis (2002) test the Zimbabwean stock Exchange for whether ZSE is in weak form of efficiency or not. The study could not accept the weak form of efficiency. Further more it concludes the inefficiency of ZSE.

Hall and Urga (2002) studied to assess the efficiency of Russian Stock Market between September 1995 and March 2000 under the hypothesis of 'Market in transitional economies start from an inefficient status and moved toward an efficient behavior'. Study found that for most liquid stocks, the market is initially inefficient, but it took around two and half a years to become efficient. For all the other shares, the overall performance of the market remained predictable for most of the time but there is evidence of tendency.

Mlambo, Biekpe and Smit (2003) investigated the random walk behavior of stock returns on four African stock markets; Egypt, Kenya, Morocco and Zimbabwe. On all four markets the hypothesis that stock returns are normally distributed was rejected. Almost half of the stocks on each of four markets showed significant positive serial correlation and there was therefore not enough evidence to accept the hypothesis of a random walk.

Pandey (2003) undertook the study on Indian stock market to test the efficiency of Indian stock market. Under this study an analysis of three popular stock indices are carried out to test the efficiency level in Indian stock market and the random walk nature of the stock market by using the

run test and the autocorrelation function $ACF(k)$ for the period from January 1996 to June 2002. Study prevailed the evidence of the inefficient form of Indian stock market.

Cooray and Wickremasinghe (2005) studied the efficiency of emerging stock markets: Empirical Evidence from the South Asian Region. The study included the stock markets of India, Sri-Lanka, Pakistan and Bangladesh to examine the weak form of efficiency. This study covers the data for the period January 1996 to October 2003. The conclusion of the study revealed that the classical unit root tests support weak form efficiency for all four countries while the DF-DIS and ERS test do not support weak form efficiency for Bangladesh. Hence the post-deregulation stock markets of South Asia appear in general to be efficient except in the case of Bangladesh for which the results are mixed.

Gillette (2005) undertook the study on German stock market to test the level of efficiency of German Stock market. The study concluded that the weak form of efficient market hypothesis cannot be rejected.

Asiri (2008) tested the weak form of efficiency in Bahrain stock market. Under the study RWMs such as unit root and Dickey Fuller tests are used as a basic stochastic test for a non-stationarity of the daily prices for all the listed companies in the BSE. In addition ARIMA and exponential smoothing methods are also used. Cross-sectional time series is used for the 40 listed companies over the period 1 June 1090 up until 31 December 2000. The result of the study revealed that random walk with no drift and trend is confirmed for all daily stock pieces and each individual sector. Other tests such as ARIMA, autocorrelation tests and exponential smoothing tests also

supported the efficiency of BSE in the weak form.

Ozdemir (2008) tested the weak form of efficiency in Istanbul Stock Exchange market (ESE, Turkey) using weakly data for the period 1990-2005. As employing different techniques (ADF test, unit root with two structural breaks, run test and variance test). Study accepts weak form of efficiency in Istanbul Stock Exchange Market.

Yalama and Celik (2009) tested the financial market efficiency in Turkey for Istanbul stock exchange market to investigate semi-strong form of efficiency in ISE. The study used the data of 02.01.1990 to 27.06.2008. Toda-Yamamoto causality method is used for testing or weak form and semi-strong form of efficiency which results that money markets are semi-strong form efficient; however capital market is not in Turkey.

Kung and Wong (2009) tested the efficiency of Taiwan Stock Market. The study used two popular technical trading rules to assess whether the gradual liberalization of Taiwan's securities market has improved the efficiency of its stock market. The results showed that the two rules have considerable predictive power for 1983-1990, they become less predictive for 1991-1997 and they cannot predict the market for 1998-2005. These results indicate that the efficiency of Taiwan Stock Market has been greatly enhanced by the liberalization measures implemented over last 20 years.

2.3. Review of Nepalese Studies

In this section the studies that are undertaken in context of Nepal are reviewed. There are few studies that are carried out in Nepalese stock market to test its efficiency like Aryal (1995), Upadhya (2001), Kharel (2002), Kharel (2003), Shrestha (2004), Pradhan & Upadhya (2004), Niraula

(2007) etc. Major ones of them are presented here under in tabular form in table 2.5

Aryal (1995) studied the daily prices of 21 stocks out of listed company's share for about eight months period. The study included serial correlation and run analysis which concludes that the Nepalese stock market is inefficient in pricing of shares in terms of information efficiency.

Updhaya (2001) tested the weak form of efficiency for the Nepalese stock market. The study used run analysis and serial correlation test. The result showed positive serial correlation and high number of expected runs for most of the stocks, which implies positive dependence in stock price series. This shows that Nepalese stock market is not in weak form of efficiency.

Table- 2.5

Review of Nepalese Studies

This table presents the major Nepalese studies that are undertaken to assess the extent of efficiency of Nepalese capital market. Major studies for testing the efficiency of Nepalese stock market up to now are shown in chronological order. In the table, first column reveals the name and date of the study and next column shows the results of the related studies

Study	Findings/Results
Aryal (1995)	Nepalese stock market is inefficient in pricing of shares in terms of information efficiency.
Updhya (2001)	Nepalese stock market is not in weak form of efficiency.
Kharel (2002)	The stock price changes of the NEPSE can be explained as serially correlated and are independent.
Kharel (2003)	Nepalese stock market is not even weakly efficient in pricing Shares

Shrestha (2004)	NEPSE market is not efficient with respect to any of so-called levels of efficiency.
Pradhan & Upadhya (2004)	Do not support the independence assumption of random walk model.
Poudel (2005)	NEPSE is not efficient with respect to any of so called level of efficiency.
Niraula (2007)	Nepalese stock market is not efficient either in weak form of in semi-strong form.
Bhattarai & Joshi(2007)	Existence of weak form of efficiency in the market.
Dangol (2009)	Inefficiency of the Nepalese stock market at the semi-strong level.
Neupane (2010)	Stock Market Efficiency: A Case of Nepal

Kharel (2002) examined the stock market efficiency and share price behavior in Nepal. The study included the daily closing prices of 30 listed companies from 1st July 2001 to 16th July 2002. Tools like serial correlation, run test and filter rules are used to analyze the data. The study concludes that the stock price changes of the NEPSE can be explained as serially correlated and are independent.

Kharel (2003) tested whether sophisticated mechanical trading rules can beat the average market return by using the filter rule. The finding indicated that annual rates of return obtained from all filter trading strategy were greater than buy and hold strategy. This shows that the Nepalese stock market is not even weakly efficient in pricing shares.

Shrestha (2004) undertook the study on EMH in context of Nepal. Methodologies like serial correlation, run test and other statistical tools are used in the study. The study covers the analysis of monthly closing price for thirty-five companies traded in NEPE from July 1997 to April 2004. Both primary and secondary data used in the study concludes that NEPSE market

is not efficient with respect to any of so-called level of efficiency.

Pradhan and Upadhyaya (2004) undertook the study 'The EMH and The Behaviour of Share Prices in Nepal'. Tools like run test, serial correlation and others are used in the study. The result of the both the tests- serial correlation and run test analysis do not support the independence assumption of random walk model. However, in terms of both tests, a few of the price series support the random walk model. One important implication of the non-random behaviour of share prices is that the Nepalese stock market may not be termed as 'weakly efficient' in pricing shares.

Poudel (2005) examined the efficiency of the Nepalese stock market. The study used serial correlation, run test and other statistical tools to analyze the data. It concludes that NEPSE is not efficient with respect to any of so-called level of efficiency.

Niraula (2007) conducted a study on stock market efficiency: a case of Nepal with the objective of testing the existence of weak and semi-strong form of efficiency in Nepalese stock market. The study used the tools like autocorrelation analysis, run test, ARIMA analysis, event study and others to analyze the data. Data used in the study covers for ten years period from 1st January 1997 to 31st December 2006 of randomly selected 35 enterprises listed in NEPSE. The study concluded that the Nepalese stock market is not efficient either in weak form or in semi-strong form. This revealed that the stock prices are not random and future prices can be estimated by analyzing the historical information i.e. price prediction is also possible by analyzing the news and thus the market can be explained with the help of technical and fundamental analysis.

Bhattacharai and Joshi (2007) undertook a study to investigate whether or not the Nepalese stock market is efficient in weak form with respect to economically neutral behavioral variables. Simple OLS technique with white's heteroskedasticity-corrected standard errors is used to test the relationship between stock returns and economically neutral behavioral variables. The findings indicate the existence of weak form of efficiency in the market for 'temperature' and 'seasonal effective disorder' but not for the 'cloud cover'.

Dangol (2009) undertook the study on 'Abnormal Returns of Dividend Announcements: Evidence from Nepalese stock market. This study examined the abnormal returns of dividend announcements in the Nepalese stock market using the market model of event methodology. The overall 49 dividend announcement samples are partitioned into dividend-increase (good news), dividend-decrease (bad news), and no dividend-change (no news) sub samples between 1998 and 2006. The average abnormal return around the dividend announcement days (0, +1) has been found to be positive and statistically significant. The abnormal returns were found much higher around the dividend announcement day. The market identifies the dividend-increase, dividend-decrease and no dividend change announcements on two signaling effect on Nepalese stock market. The study also finds inefficiency of the Nepalese stock market at the semi-strong level.

Neupane (2010) conducted a study on Stock Market Efficiency: A Case of Nepal. The study showed that the stock prices are not random and future prices can be estimated by analyzing the historical information. This conclusion states that the Nepalese capital market can be exploited with the help of technical analysis. Study also concludes that the Nepalese capital

market is in the weak form of efficiency. This indicates that the price sensitive information is not evidently leaked before formal announcement and stock prices immediately adjust the new information that is released in the market.

2.4. Research Gap

The efficient markets hypothesis is simple in principle, but remains elusive. Evolving from an initially quailing set of observations about the random character of security process, it became the dominant paradigm in finance during the 1970s. during its heyday, the efficient markets hypothesis came to be supported by a growing body of empirical research demonstrating the difficulty of beating the market, whether by analyzing publicly available information or by employing professional investment advisors.

Testing for market efficiency, however, is difficult. This study has documented a number of studies that indicate anomalous behaviour which appears, at first sight, to be inconsistent with market efficiency, Ball (1978) points out that such evidence may equally well be interpreted as indicative of shortcomings in our models of expected returns. Indeed, Fama (1997) takes issue with the view that apparent anomalies require new behaviorally based theories of the stock market. Rather, they are indicative of a need to continue the search of better models of asset pricing.

Regarding EMH, the empirical results came first, followed by theory to explain the results. The empirical results were dominantly based on developed capital markets, where the notion was strongly supported during 1970s and the researchers are now indicating the anomalies. However, the conclusions are less clear in the countries with less-developed capital

market, commonly called emerging markets. In general it is believed that these markets are less efficient than their developed counterparts but the results are not conclusive. Thus, the research findings on market efficiency in such market would obviously help the development of realistic theoretical models. There are only few studies undertaken in context of Nepal to test the stock market efficiency. These studies have not succeeded to draw the solid conclusion regarding the level of market efficiency.

Chapter- III

RESEARCH METHODOLOGY

Research methodology is a tool, which enhances to systematically solve the research problem. Research Methodology facilitates the research work and provides reliability and validity to it. Research methodology employed in this study is presented below.

3.1 Research Design

The research design is an integrated approach, which involves a series of rational decision-making choices that guides the researcher in formulating, implementing and controlling the study. The extent of scientific rigor in research depends on how appropriately the design alternatives have been chosen (Sekaran, 1999). As the study is based on fact finding and survey of opinions, the research design employed is of descriptive type.

3.2 Nature and sources of Data

The efficient market theory gives no indication about the characteristics of data or the time horizon over which the data should be examined. The tests therefore are conducted for alternative holding period of a day, week, month or even years (Cuthbertson, 1996). A variety of data set e.g. Stock price indices, daily closing prices, week end closing prices, end of the month closing prices etc are considered for testing weak form of efficiency. Similarly, in event studies, to test the semi-strong form of efficiency, previous literature exhibits the use of monthly and daily stock return data. There are number of practices that exist in testing market efficiency, however the use of daily individual stock's return data is considered appropriate for this purpose. For

testing weak form of efficiency, the use of stock indices may show positive autocorrelation if some of the securities index trade infrequently. Further, Alexander and Gavin (1971) state that use of index numbers appeared to be the most obvious weakness in many of the earlier studies of random walk hypothesis. The use of week-end and month-end stock prices is also not satisfactory because the results are affected materially by neglecting the within week or within month fluctuations.

In case of event studies, the standard parametric tests are well specified using abnormal returns computed using either the market model or the market adjusted model and as expected, the power of each test is greater with daily returns than with monthly returns (Brown & Warner, 1985). Moreover, the use of daily returns is potentially effective in that it permits the researchers to take advantage of precise information about the specific day of the month on which an event takes place. An additional argument for using daily over monthly data is that the response of stock prices to new information is rapid. By considering these facts, this study has been carried out by employing daily individual stock returns. The stock prices are adjusted for cash dividends, stock dividends and issue of right shares while calculating stock returns.

To test the semi-strong form of market efficiency, event study has been used in the study. The cash dividend declaration is considered as the public information. Since the practice of issuing cash dividend is common for Nepalese enterprises, the data on this event has been analyzed in this study to observe whether the prices in Nepalese stock market adjust instantaneously to arrival of new publicly available information.

The daily closing prices of sample companies have been collected from NEPSE. Various issues of NEPSE trading reports are also used for the

purpose. The information on cash dividend announcement, stock dividend announcement and issue of right shares are collected from annual reports of SEBON and from related enterprises.

Primary data are also used to draw inferences on efficiency of Nepalese stock market by analyzing the opinions of the financial executives. In the study opinions of those who have sufficient knowledge about the Nepalese stock market (investors, brokers, listed companies etc) are also used. Primary data for the study are collected by using a questionnaire which contains 10 questions concerning market efficiency i.e. weak, semi-strong and strong. The pro-forma questionnaire used for the study is presented in Appendix-IV

For this, about 90 questionnaires were distributed in which only 40 are returned with logical responses.

3.3 Population and Sampling

In case of secondary data analysis, test of weak form of efficiency is based on the three years data from 1st December, 2008 to 1st December, 2011 of randomly selected 15 enterprises that are listed in NEPSE. In case of selecting the samples randomly, adequate care is taken to include the companies which has more trading frequency over the study period of 1st December, 2008 to 1st December, 2011. Enterprises selected for the study are shown in table 3.1

Table-3.1

Enterprises selected for the study

This table presents the enterprises selected to test the weak form of efficiency. Frequency of trading indicates the percentage of total trading days during the study period in which the shares of particular company are traded. NEPSE was opened for 695 days during the study periods of three years.

S.N.	Company	Frequency of Trading.
1	Nabil Bank Limited.	92.52%
2	Nepal SBI Bank Limited	91.98%
3	Sanima Bikas Bank Limited	70.74%
4	Standard Chartered Bank (Nepal) Limited	89.60%
5	Nepal Bangladesh Bank Limited	93.40%
6	Chilime Hydropower Co. Limited	77.03%
7	Kumari Bank Limited	95.12
8	Everest Bank Limited	89.71
9	Bank of Kathmandu Limited	97.62%
10	Himalayan Bank Limited	85.81%
11	National Hydropower Co. Limited	66.84%
12	Nepal Investment Bank Limited	91.98%
13	International Leasing & Finance Co. Limited	57.20%
14	NMB Bank Limited	76.50%
15	Development Credit Bank Limited (DCBL)	86.67%

Source: NEPSE

For semi-strong form of efficiency test, the 'Event Study' is based on the cases of cash dividend declaration. In FY 2067/68, 43 companies have declared cash dividend and bonus shares. Out of these companies, 25 declared cash dividend, 13 declared bonus shares and 19 companies declared both cash dividend and bonus shares. The range of cash dividend is from 0.35 to 560 percent and the bonus share declaration is 1.975 to 40 percent. Among 25 companies declaring cash dividend, only 9 cases of the cash dividend are considered for event study. In case of selecting the samples randomly, adequate care is taken to include the companies of all sectors which offered highest dividend rate in FY 2067/68. Sample includes 2 commercial banks, 2 development banks, 2 finance companies, 1 insurance company, 1 manufacturing

company and 1 from others company. The enterprises selected for event study are shown in table 3.2

Table-3.2

Enterprises for Event study

Table presents the detail about 9 cases of cash dividend used for 'Event Study' to test the semi-strong form of market efficiency. In table declaration date and percentage of cash dividend on paid-up values are shown.

S. N.	Company	Declaration Date	% on paid-up value
1	Laxmi Bank Limited	2067/07/14	13%
2	Citizens Bank International Nepal Ltd	2067/06/08	12.64%
3	Swabalamban Microfinance Dev. Bank	2067/09/26	15.79%
4	Clean Energy Development Bank	2067/08/28	15%
5	Fewa Finance Co. Ltd	2067/08/25	15.79%
6	I.C.F.C. Finance Co. Ltd.	2067/07/14	15%
7	Alliance Insurance Co. Ltd	2067/08/24	10%
8	Unilever Nepal Ltd.	2067/08/02	560%
9	Nepal Telecom Co. Ltd.	2068/01/19	40%

Source:SEBO/N

3.4 Method of Analysis

The price behaviour of efficient market may be easy to describe in theory, but in practice it is very difficult to determine the degree to which actual market are efficient (Jrennepohl & Gray, 1993). In this regard different statistical and econometric tools like autocorrelation analysis, run test, ARIMA analysis, event study etc have been used as per the needs to analyze the data involved in study.

For the purpose of testing weak form of efficiency, the secondary data have been analyzed with both traditional tests (run test and autocorrelation test) and

dynamic time series model (ARIMA). Runs test and autocorrelation test are well known and widely used to determine whether there is randomness in successive values of price changes. ARIMA model is comparatively new generation of forecasting tools, which perhaps claims better findings. Basically the analyses are uni-variate time series analysis. ‘Event Study’ is also used to test the weak form of market efficiency. To analyze the primary data, statistical tools like weighted mean, chi-square test and Spearman’s rank correlation analysis are used. Computer software SPSS and SAS are use to analyze the data. The details of used tools have been given under.

Autocorrelation Analysis

As recommended by Fama (1965), auto-correlation is the most direct and intuitive test of random walk for an individual time series. It is reliable measure of dependency or independency of random variables in a series. The test measures the correlation coefficient between the value of a random variable in time (t) and its lagged value of the ‘k’ period earlier in the same series (Gujrati, 1995). The autocorrelation function for the time series y_t at lag k is defined as-

$$r_k = \frac{\sum_{t=1-k}^n (y_t - \bar{y})(y_{t-k} - \bar{y})}{\sum_{t=1}^n (y_t - \bar{y})^2}$$

Where, \bar{y} is the sample mean of series with n observations.

The standard error r_k is given by

$$SE_{r_k} = \frac{1}{\sqrt{(n - k)}}$$

(For small sample)

But when n is sufficiently large ($n \geq 50$), the standard error of ‘ r_k ’ is given by

$$SE_{r_k} = \frac{1}{\sqrt{n}}$$

To test whether r_k is significantly different from zero, the following distribution of 't' is used

$$t_{r_k} = \frac{r_k}{SE_{r_k}}$$

Instead of testing the static significance of any individual autocorrelation coefficient, we can test the joint hypothesis that all the r_k up to certain lags are simultaneously equal to zero. This can be done by using Q statistics (Gujrati: 2003, 813). Q statistics is defined as-

$$Q = n \sum_{k=1}^m r_k^2$$

Where, n= sample size and

m= lag length

A variant of the Box-Pierce Q statistic is the Ljung-Box (LB) statistic which is defined as (Ljung and Box, 1978)

$$LB = n(n+2) \sum_{k=1}^m \left[\frac{r_k^2}{n-k} \right]$$

In large samples both Q and LB statistics follow the chi-square distribution with m degree of freedom.

The auto-correlation test is most commonly used and significant test as the first tool for detection of random walk behavior. A significant positive auto-correlation implies that a trend exists in the series whereas a negative auto-correlation indicates the existence of a reversal in price movements. A price series that is truly random needs a zero auto-correlation coefficient.

Run Test

The run test is a nonparametric test of randomness in a series. Unlike the autocorrelation the run test does not require the normal distribution of the time series. This approach tests and detects statistical dependencies which may not be detected by auto-correlation analysis. It is possible that security prices might change randomly most of the time but occasionally follow trends that autocorrelation can not detect and runs test are used to determine if there are such trends in price changes. The seminal use of runs test in examining the random walk characteristics of stock prices is of Fama (1965).

A run is defined as the sequence of price changes of the same sign preceded and followed by price changes of different sign. In a given share price series, there are three types of price changes in a series i.e., positive, negative and no-change, thus implying three types of runs. Therefore a plus run of i length may be defined as a sequence of positive price changes preceded and succeeded by either negative or zero price change (Fama). Likewise, a run of length i of minus and no-change signs can be defined as a sequence of i consecutive price changes of the same sign followed and preceded by negative and no-change sign of price changes. A run test is performed by comparing the actual number of runs with the expected number of runs on the assumption that price changes are independent. If the actual (observed) runs are not significantly different from the expected number of runs then it is concluded that successive price changes are independent. On the contrary, if these differences are significant, the price changes would be dependent. Runs test ignores the magnitude of price changes and observes only direction of changes in a given time series. The difference between expected and actual number of runs will be analyzed by the total number of runs. The total number of runs of all

types can be computed as follows (Walls & Roberts, 1956) –

$$E(R) = \frac{N(N + 1) - \sum_{i=1}^3 n_i^2}{N}$$

Where, E(R) = expected number of runs

N= total number of price changes and

n_i = number of price changes of each sign.

The standard error of E(R) is

$$\sigma_r = \sqrt{\frac{\sum_{i=1}^3 n_i^2 [\sum_{i=1}^3 n_i^2 + N(N + 1)] - 2N \sum_{i=1}^3 n_i^2 - N^3}{N^2(N - 1)}}$$

Thus, the difference between the actual number of runs and the expected number can be expressed by means of the usual standardized variable.

$$Z = \frac{\left(R \pm \frac{1}{2}\right) - E(R)}{\sigma_r}$$

Where R is the total actual number of runs of all signs, $\frac{1}{2}$ in the numerator is a discontinuity adjustment and E(R) and σ_r are respectively the mean and standard error of the sampling distribution of runs. For large sample, Z will be approximately normal with mean 0 and variance 1. Thus, the standard normal variable (Z-test) is used for testing the significance. The Z statistics gives the probability of difference between the actual and expected number of runs. The Z value, greater than or equal to ± 1.96 , reject the null hypothesis at 5% level of significance (Sharma & Kennedy, 1977)

Auto-Regressive Integrated Moving Average (ARIMA) Model

The uni-variate version or the Box-Jenkins Autoregressive Integrated Moving Average (ARIMA) methodology is a new generation of time series models,

which examine if the object series depends not only on its past values of the same series but also past and current disturbance terms. Popularly known as the Box Jenkins (BJ) methodology, the emphasis of this model but technically known as the ARIMA methodology, the emphasis of this model is not on constructing single-equation or simultaneous-equation models but on analyzing the probabilistic, or stochastic, properties of economic time series on their own under the philosophy ‘let the data speak for themselves’ (Gujrati, 2004).

Theoretically, any time series can be represented as consisting of two parts, a self-deterministic part and a disturbance component. The self-deterministic part of the series can be tested from its own past by an autoregressive (AR) model with some number of terms (p) as:

$$y_t = \mu + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \dots + \beta_p y_{t-p} + \varepsilon_t$$

The residuals from the autoregressive model can be modeled by a moving average (MA) with a large enough number (q) of elements-

$$y_t = \mu + \omega_1 \varepsilon_{t-1} + \omega_2 \varepsilon_{t-2} + \dots + \omega_q \varepsilon_{t-q} + \varepsilon_t$$

An autoregressive model of order p is conventionally classified as AR (p) and moving average model with q terms is classified as MA (q). A combined model containing p autoregressive terms and q moving average terms is classified as ARMA (p, q). If the object series is difference d times to achieve stationarity, the model is classified as ARIMA (p, d, q), where the symbol ‘I’ signifies ‘integrated’. An ARIMA (p, d, q) is the same as an ARIMA (p, q) model. Likewise an ARIMA (p, 0, 0) is the same as an AR (p) model, and an ARIMA (0, 0, q) is the same as an MA (q) model. ARIMA (p, d, q) is a combination of AR, MA and difference (d) terms, expressed as follows:

$$y_t = \mu + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \dots + \beta_p y_{t-p} - w_1 \varepsilon_{t-1} - w_2 \varepsilon_{t-2} - \dots - w_q \varepsilon_{t-q} + \varepsilon_t$$

Where, μ is a constant, ε is the white noise stochastic error term and $\beta_1, \beta_2, \dots, \beta_p; w_1, w_2, \dots, w_q$ are model parameters to be estimated.

Theoretically, the weak-form efficiency of the market persists when the share prices cannot be predicted from the historical price information. Thus, the series of stock prices need to fit the model ARIMA (0, 1, 0), where the future value of share prices cannot be predicted on the basis of past information. Specifically, future share prices do not depend on past values of share pieces or on the disturbance terms. The significant coefficient different from zero suggests dependency of the series, which violates the assumption of random walk model and weak form of efficiency.

Event Study

'Event Study' has been employed to test the semi-strong form of market efficiency. It is a standard methodology used to evaluate the reaction of share prices to public announcements, which was employed as early as 1933 by Dolley. Over the decades from the early 1930s until the late 1960s the level of sophistications of event studies increased. Mers and Bakay (1948), Barker (1956) and Sshley (1962) are examples of studies during this time period. In the late 1960s seminal studies by Ball and Brown (1968) and Fama, Fisher, Jensen and Roll (1969) introduced the improved version of the methodology that is essentially still in use today for testing semi-strong form of market efficiency. Ball and Brown considered the information content of earnings, and Fama et al. studied the effects of stock splits after removing the effects of simultaneous dividend increases.

In the years since these pioneering studies, several modifications of the basic methodology have been suggested. These modifications handle complications arising from violations of the statistical assumptions used in the

early work, and they can accommodate more specific hypothesis. Brown and Warner (1980, 1985) are useful papers that discuss the practical importance of many of these modifications. The 1980s paper considers implementation issues for data sampled at a monthly interval and the 1985 paper deals with issues for daily data.

Event studies are widely applicable to events including mergers and acquisitions, earnings announcements, announcement of cash dividends and stock dividends, issue of right shares, issue of new debt etc. Since cash dividend announcements are much popular among Nepalese enterprises these events are analyzed in this study to examine the reaction of stock prices to public information.

Under the study, cumulative abnormal returns of every sample enterprises declaring cash dividend is calculated. To determine abnormal returns, each stock's predicted daily returns have been estimated by applying market model and then abnormal returns ϵ it are calculated by subtracting the normal daily returns from actual daily returns.

Mathematically-

$$\epsilon_{it} = r_{it} - (\alpha_i + \beta_i r_{mt})$$

Where

r_{it} = return of stock-i at day t

r_{mt} = market return at day t as calculated from market index

α_i = intercept term of market model

β_i = coefficient that measures the marginal effect of the market return on the return of stock i

ε_{it} = abnormal return of stock i on day t

Here linear Regression Model has been used to measure the normal returns and t-statistics are calculated for abnormal returns on an event date.

Mathematically-

$$t = \frac{\varepsilon_t}{S(\varepsilon_t)}$$

Where, ε_t is an average abnormal return of stocks involved in the test at day t, and $S(\varepsilon_t)$ is the corresponding standard deviation.

Chapter-IV

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the results of analyzed by applying various tools described in previous chapter on Research Methodology. This chapter has been divided into three sections. First section deals with the presentation and analysis of secondary data. The results of primary data are described in second section and third section deals with the concluding remarks.

4.1 Analysis of Secondary data:

Random walk properties of stock prices have long been a prominent topic in the study of stock market efficiency in its weak form. The information contained in the past prices is fully and instantaneously incorporated in weak form of EMH and hence stock returns will display unpredictable behavior. In stock prices not characterized by a random walk, the return generating process is dominated by a temporary component and therefore future returns can be predicted by the historical sequence of returns. The early studies conducted by Fama (1970) generally provide evidences in support of the EMH. However, some studies report evidence of predictability of returns on market indices and portfolios. For example, Fama and French (1988) report negative serial correlation in market returns over observation intervals of three to five years and Lo and MacKinlay (1988) report positive serial correlation in weekly returns. While these evidences of stock return predictability reported by Fama and French and Lo and MacKinlay are statistically significant, it is not clear whether these results suggest economically important deviations from the random walk model for stock prices in the context of Nepal.

The semi-strong form hypothesis has been tested extensively in terms of the reaction of securities prices to various types of information. Many studies on semi-strong form efficiency of stock market are focused on the information content of the annual earnings and dividend announcements. The purpose of these public disclosure announcements is to provide information that meet investors' needs for decision making. A major difficulty in assessing dividend information content lies in the fact that dividend and earnings announcements often are closely synchronized (Aharony and Swary, 1981). Besides dividend, event studies test also documented the stock price reaction to other releases of information like stock dividends and splits announcements, rights announcements, earnings announcements, mergers and acquisitions and the like. Fama et al. (1969) conducted the first study using the event study methodology to examine the reaction of stock prices over the split announcements. The study supported the conclusion that stock market is efficient enough to capture the new information. Other contributors in this regard are Grinblatt et al. (1984), Muscarella and Vetsupens (1986), and Dhatt et al. (1994). However, Ohlson and Penman (1985), and Brennan et al. (1988) did not support the information content of stock dividend and split announcements. Likewise, some evidences of rights announcement effect were documented in Smith (1977), Marsh (1979), White and Lusztig (1980), Dann and Mikkelsen (1984), Isa and Tan (1996) and Kabir and Roosenboom (2001). Despite weak evidences in some markets, the studies did support the semi-strong form EMH in the respective markets. It is, however, not clear in the context of Nepal that how speedily the market reacted to such events like dividend and earnings announcements. Within the context of event study model, this study makes an attempt to evaluate reaction by stock market to the announcement of dividends by Nepalese

enterprises.

Under this study, the secondary data collected from different sources are used to test the weak form and semi-strong form of efficiency of Nepalese capital market by applying different statistical tools. In this section testing of weak form of efficiency is presented and analyzed first and further it deals with the presentation and analysis for testing the semi-strong form of efficiency.

Test of Weak Form of Efficiency

The test of weak form of efficiency has been carried out by applying Autocorrelation Test, Run Test and Autoregressive Integrated Moving Average (ARIMA) model. The collected data have analyzed by using autocorrelation first. After this test, the similar data are proceed to run test and finally the results are verified by using ARIMA which is more reliable and dynamic time series model.

Auto-correlation Analysis

Auto-correlation analysis is a parametric tool used to measure dependence of successive number in series. In general, Auto-correlation coefficient provides a measure of relationship between the value of a random variable in time 't' and its value of the 'k' period earlier. A significant positive auto-correlation implies that a trend exists in the series and a negative Auto-correlation indicates the existence of reversal. For truly random series, Auto-correlation coefficients should be zero. Value of autocorrelation coefficient is affected by lag length. In this study Auto-correlation in 25 lags are observed.

To test the joint hypothesis that all the autocorrelations up to 25 lags are

simultaneously equal to zero, Ljung-Box Statistics is used. As LB statistics follows the chi-square distribution with m-degrees of freedom (here, m=lag length=25), calculated value of LB statistic is compared with critical chi-square value where χ^2 at 5% level of significance for 25 degrees of freedom is 37.65. If calculated value of LB statistics is less than 37.65, the hypothesis that the series of price is random will be accepted otherwise it is rejected.

The result of Auto-correlation analysis is presented in table 4.1.

Table 4.1 presents the calculated value of LB-statistics of autocorrelations for 25 lags. To test whether the joint hypothesis of Auto-correlations being zero is true or not, the calculated values of LB-statistics for the sample companies should be compared with the critical value. If calculated value of LB-statistics is lower than the critical value of chi-square, hypothesis that series is random is accepted. For this study, values of LB-statistics are compared with the value of chi-square at 5% level of significance with 25 degrees of freedom (equals to lag length). Here the critical value of chi-square is 37.65.

As only for *Standard Chartered Bank (Nepal) Limited* and *Nabil Bank Limited* has the LB-statistics lower than 37.65, random walk hypothesis is accepted for two companies. For other remaining 13 companies, RWH is not true or is rejected. The result of auto-correlation analysis indicates that the random walk hypothesis is true only for 13.33% of sample companies and other 86.67% do not follow random walk hypothesis which advocate the predictability of future prices. This result is not sufficient to give any conclusion regarding the existence of weak form of efficiency in Nepalese capital market

Table-4.1

Result of Auto-correlation analysis

This table gives the value of LB-statistics of the autocorrelations up to 25 lags for the sample companies that are used in the study. Calculated value of LB-statistics is compared with the critical value of chi-square at 5% level of significance for 25 degrees of freedom.

S.N.	Companies	Abbreviation Used	LB Statistics
1	Standard Chartered Bank (Nepal) Limited	SCB	34.267
2	Nepal SBI Bank Limited	SBI	257.058
3	Sanima Bikas Bank Limited	SANIMA	112.327
4	NMB Bank Limited	NMB	529.923
5	Nepal Investment Bank Limited	NIBL	169.413
6	National Hydropower Co. Limited	NHPC	295.233
7	Nepal Bangladesh Bank Limited	NBB	373.726
8	Nabil Bank Limited.	NABIL	21.990
9	Kumari Bank Limited	KBL	76.235
10	International Leasing & Finance Co.	ILFC	91.629
11	Himalayan Bank Limited	HBL	177.472
12	Everest Bank Limited	EBL	47.181
13	Development Credit Bank Limited	DCBL	248.396
14	Chilime Hydropower Co. Limited	CHCL	97.133
15	Bank of Kathmandu Limited	BOK	124.622

Source: Appendix I

The result of the study supports the result of Fama, 1965 and Jennergren and Korsvold, 1975 but deviated from the result of Ma and Barnes, 2001; which concluded that the random walk hypothesis is accepted in daily stock price data. The result also contradicts with the result of Chordia and Swaminathan, 2002; concluded high volume stocks adjust more rapidly to market information and shows random walk behaviour.

As the result is not sufficient to give any conclusion regarding the existence of weak form of efficiency in Nepalese capital market so requires further investigation. As the Auto-correlation coefficients can be dominated by

extreme values i.e. an extremely large or extremely small value or two in the series can influence the results (Fisher & Jordon, 2002). To overcome such problem, Run-test is a better alternative.

Run Test

Run test is a nonparametric test of randomness in a series. This tool ignores the absolute values of the numbers in the series and observes only their movement. The number of runs is computed as a sequence of the price changes of the same sign (such as ++, --, 00). When the expected number of runs are significantly different from the observed number of runs, the test reject the null hypothesis that the observed series is random. If the series is random, the number of runs is normally distributed and the test converts the total number of runs into ‘Z’ statistics which gives the probability of difference between the actual and expected number of runs. The absolute value of Z-statistics i.e. value of $|Z|$ higher than or equal to 1.96, reject the null hypothesis that the series is random at 5% level of significance. The result of run test for sample companies are presented in table 4.2

Table-4.2

Result of Run Test

This table presents the result of run test. In the table actual and expected runs are presented where actual runs are described with each type of runs. In the last column of the table, run test statistics (i.e. Z-value) are given. If the absolute value of Z-statistics are greater or equal than 1.96, the random walk hypothesis should be rejected at 5% level of significance.

S.N.	Companies	Abbreviation Used	Actual Runs	Expected Runs	Z- value
1	Standard Chartered Bank (Nepal) Limited	SCB	333	580.82	-5.65
2	Nepal SBI Bank Limited	SBI	321	602.81	-7.01

3	Sanima Bikas Bank Limited	SANIMA	333	590.112	-6.01
4	NMB Bank Limited	NMB	277	520.104	-7.172
5	Nepal Investment Bank Limited	NIBL	312	602.93	-7.54
6	National Hydropower Co. Limited	NHPC	328	531.069	-4.485
7	Nepal Bangladesh Bank Limited	NBB	377	593.957	-4.031
8	Nabil Bank Limited.	NABIL	321	616.45	-7.43
9	Kumari Bank Limited	KBL	369	605.746	-4.68
10	International Leasing & Finance Co. Limited	ILFC	220	409.72	-6.997
11	Himalayan Bank Limited	HBL	311	540.47	-5.722
12	Everest Bank Limited	EBL	348	559.57	-4.36
13	Development Credit Bank Limited	DCBL	339	562.26	-4.94
14	Chilime Hydropower Co. Limited	CHCL	315	551.11	-5.78
15	Bank of Kathmandu Limited	BOK	380	618.48	-4.55

Source: Appendix II

Above table demonstrate the actual runs (positive, negative and zero) and expected runs of the daily share price over the study period of three years. If the actual runs are significantly different from the expected runs, the hypothesis that the randomness for series of daily prices should be rejected. For the decisional purpose in run test, value of Z-statistics has calculated which are shown in last column of the table. If the absolute value of Z-statistics is higher or equal to 1.96, the hypothesis of randomness in series should be rejected at 5% level of significance i.e. the series will not have random behaviour. For the sample companies of this study, absolute values of z-statistics are higher than 1.96 for all the samples studied in this study. And hence concluded that the series of daily price records for all the sample companies do not follows the random walk behaviour. From this result of run test we can conclude that the daily share prices of the companies in Nepalese capital market do not follow the random walk behaviour.

Two tools i.e. auto-correlation analysis and run test have the similar results for

13 companies where as results are contradict for two sample companies. Auto-correlation analysis shows the acceptance of RWH for Standard Chartered Bank (Nepal) Limited and Nabil Bank Limited, where run test reject the RWH for all the sample companies including two which were supported by auto-correlation analysis.

The result of the study is similar with the study of Poshakwale, 1996; who founded that the actual number of runs significantly lower than expected number of runs for daily returns in India, Philippines, Malaysia, and Thailand. The results of runs test are also similar to the findings of and Muragu, 1994; found statistically insignificant values for majority of sample companies in Nairobi Stock Exchange. Beside this the result of run test seems controversial with the studies of Ojah and Karemera, 1999, Branes, 1986, and Dickison and Muragu, 1994. Tools that are used above to test the random walk behaviour are not sufficient. Both the techniques examine whether the stock price series depends on its past values of the sample series, however fails to test the effect of past and present disturbance terms. If the RWH is rejected and weak form of efficiency does not hold then actual return might not only depend up on past returns but could also depend on disturbance terms. Auto- correlation analysis and runs test fails to consid3r the past and present values of disturbance terms in the stock returns. To consider the disturbance terms, Autoregressive Integrated Moving Average (ARIMA) model is used. ARIMA judge the integrative effect of past values of a given object series and their disturbance terms on the current value.

Autoregressive Integrated Moving Average (ARIMA)

A series of stock price can be said to be random when it fits the model ARIMA (0, 1, 0), where the future values of the stock price cannot be

predicted on the basis of past information; the lag values of same series and the disturbance terms. The result of auto-correlation analysis and run test can also be examined with the ARIMA model with considering disturbance terms. As the diagnostic checking is sufficient to judge either the model ARIMA (0, 1, 0) fits the stock price series or not, only the result of diagnostic checking is provided. For diagnostic checking, ARIMA model is used to forecast all of the known values of the data series, compute the difference (or residuals) between the known and forecasted values, and generate the simple Auto-correlation correlograms for the residuals. If none of the residual autocorrelations is significantly different from zero, the model may be judged adequate. As applied in auto-correlation analysis, the Ljung-Box (LB) statistics can also be observed to find if the auto-correlation coefficients of the residuals up to certain lag (25 lags for this study) are jointly equal to zero. If the joint auto-correlation coefficients of the residuals are not found significantly zero (if the associated probability of LB statistics is greater than 0.05), the specified ARIMA model can be said to better fit. The result of the model ARIMA (0, 1, 0) for the 15 sample companies are provided in table 4.3

Table-4.3

Result of ARIMA Analysis

This table provides the results of ARIMA (0, 1, 0) model for sample companies used in the study. If the model ARIMA (0, 1, 0) fits the series, the random walk hypothesis is accepted. Fitting is examined from auto-correlation analysis of residuals. The LB-statistics of auto-correlation coefficients of residuals for 25 lags are presented in third column and their probabilities are given in last column. If the value of probability is higher than 0.05, the series is fitted with ARIMA (0, 1, 0) and hence follow the RWH.

S.N.	Companies	Abbreviation Used	LB Statistics	p-value
1	Standard Chartered Bank (Nepal) Ltd	SCB	34.267	0.012
2	Nepal SBI Bank Limited	SBI	257.058	0.000
3	Sanima Bikas Bank Limited	SANIMA	112.327	0.000
4	NMB Bank Limited	NMB	529.923	0.000

5	Nepal Investment Bank Limited	NIBL	169.413	0.000
6	National Hydropower Co. Limited	NHPC	295.233	0.000
7	Nepal Bangladesh Bank Limited	NBB	373.726	0.000
8	Nabil Bank Limited.	NABIL	21.99	0.232
9	Kumari Bank Limited	KBL	76.235	0.000
10	International Leasing & Finance Co. Limited	ILFC	91.629	0.000
11	Himalayan Bank Limited	HBL	177.472	0.000
12	Everest Bank Limited	EBL	47.181	0.000
13	Development Credit Bank Limited	DCBL	248.396	0.000
14	Chilime Hydropower Co. Limited	CHCL	97.133	0.000
15	Bank of Kathmandu Limited	BOK	124.622	0.000

Source: Appendix I

Table 4.3 presents the value of Ljung-Box statistics of auto-correlation coefficients of residuals for 25 lags and their probabilities. For better fit of ARIMA (0, 1, 0) model, associated probability of LB statistics should be greater than 0.05, which shows the randomness in series. For this study, only Nabil Bank Limited has the associated probability higher than 0.05. Beside this, all the companies have the probability less than 0.05. So, ARIMA (0, 1, 0) is fitted only for the daily price series of Nabil Bank Limited. For other sample companies, this model is not fitted. So, only a single company among 15 sample companies i.e. 6.67% companies follow the RWH according to this measure. Remaining 14 companies do not follow the Random Walk which advocates 93.33% of sample companies. Hence, we can conclude that the daily share prices in Nepalese capital market do not follow the random walk behaviour or Nepalese capital market lacks the weak form of efficiency.

Test of Semi-strong Form of Efficiency

As explained in previous chapter (i.e. Research Methodology), semi-strong form of efficiency of Nepalese capital market has been tested by applying the

event study. In this chapter, the secondary data that are collected for event study has been analyzed and result of the test has been presented.

Event Study Analysis

The impact of dividend announcement on share prices, have been examined by using the popular 'event study methodology'. Historically, the methodology was first used by Ball and Brown (1968). However, FFJR (1969) popularized the use of the methodology for testing the semi-strong version of the EMH. Ball and Brown considered the information content of earnings, and Fama et al. studied the effects of stock splits after removing the effects of simultaneous dividend increases. It has since then been used by a number of researchers for studying the impact of variety of events on share prices. Therefore, it will be useful to briefly discuss the procedure adopted in using the event study methodology.

Event study is employed in this study to examine the effect of cash dividend announcement on share price as a test of semi-strong form of EMH. The focus is on the timing and speed of incorporation of information about the cash dividend declaration into the stock price. For this purpose, 15 companies which have declared only cash dividend in FY 2067/068 are assumed to be a population of the study and 9 companies are randomly selected to observe the timing and speed of incorporation of information about cash dividend declaration. In this case also, trading frequency of shares has been considered.

By observing the abnormal returns on selected stocks for the days around the announcement, conclusion regarding the speed of price adjustment and whether the related information is leaked before announcement or not can be made. If the company announces the cash dividend, in a semi-strongly

efficient market, there should be abnormal return immediately after the announcement within the event window. If there are statistically significant abnormal returns before and after the event window, the semi-strong form of efficiency is denied in such market. If there are statistically significant abnormal returns before the event window, the information can be said to have been leaked before the actual announcement date. Similarly, if there are statistically significant abnormal returns after the event window, the market can be said to be incompetent in instant incorporation of information on share prices.

Under event study, the abnormal returns of 41 days of investigation window have been observed to see the market for existence of semi-strong form of efficiency. Investigation window of 41 days includes three days of event window ($t = -1$, $t = 0$, and $t = +1$), 19 days of pre-event window ($t = -20$ to $t = -2$) and 19 days of post-event window ($t = +2$ to $t = +20$). Observation of abnormal returns for pre-event window helps to identify the leakage of information before formal declaration and the observation of abnormal returns for post-event window helps to assess the speed of stock price adjustment to the new information. The result of event study is presented and summarized in table 4.4

Table-4.4 and figure-4.1 of plotting CAARs reveals that CAARs are in decreasing trend before the event days which is also continuing after the event days or for post-event windows. This result shows that there is no any special effect of cash dividend on share prices in Nepalese capital market. This result contradicts with the study of Gordon, 1959, Ogden, 1994, Stevens and Jose, 1989, Kato and Loewenstein, 1995, Ariff and Finn, 1986, and Lee 1995 etc advocating the positive relation of dividend declaration on stock price. And it also contradicts with the results of Loughlin, 1989 and Easton

and Sinclair, 1989 who advocated the negative relation.

Table- 4.4

Cumulative Average Abnormal Returns

This table presents the Cumulative Average Abnormal Returns (CAARs) during the investigation periods of 41 day. The last column of the table shows the t-statistics of CAARs. If the absolute value of t-statistics is larger than 1.96, the relevant abnormal return is statistically nonzero at 5% level of significance. Event days with CAARs and t-statistics are shown in two panels; Panel A and Panel-B. Panel-A includes pre-event window and the event window and Panel-B includes post-event window:

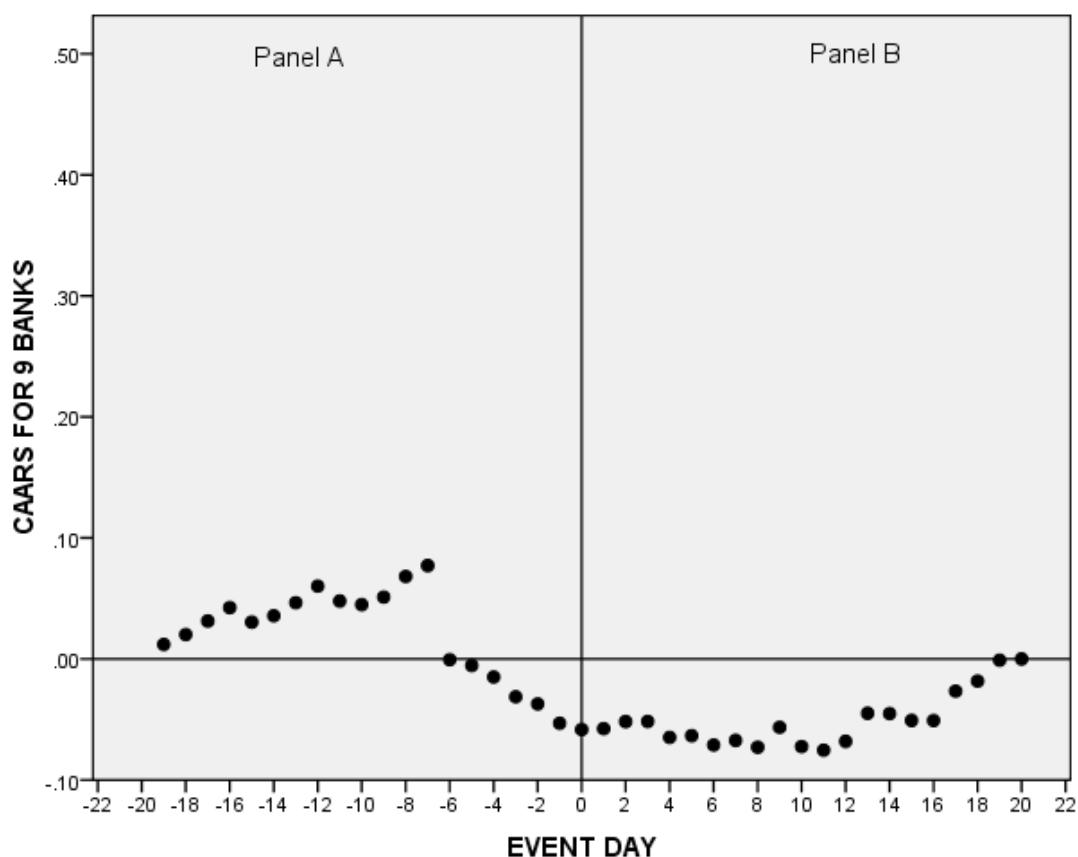
Panel-A			Panel-B		
Day	CAARs	t-statistics	Day	CAARs	t-statistics
-20	.	.	+3	-0.05	-0.27
-19	0.01	0.02	+4	-0.06	-0.34
-18	0.02	0.04	+5	-0.06	-0.34
-17	0.03	0.07	+6	-0.07	-0.39
-16	0.04	0.1	+7	-0.07	-0.38
-15	0.03	0.08	+8	-0.07	-0.41
-14	0.04	0.1	+9	-0.06	-0.33
-13	0.05	0.14	+10	-0.07	-0.42
-12	0.06	0.19	+11	-0.08	-0.45
-11	0.05	0.16	+12	-0.07	-0.41
-10	0.04	0.16	+13	-0.04	-0.28
-9	0.05	0.19	+14	-0.05	-0.28
-8	0.07	0.26	+15	-0.05	-0.32
-7	0.08	0.3	+16	-0.05	-0.33
-6	0.00	0	+17	-0.03	-0.17
-5	0.00	-0.02	+18	-0.02	-0.12
-4	-0.01	-0.06	+19	0.00	0
-3	-0.03	-0.14	+20	0.00	0.00
-2	-0.04	-0.17			

-1	-0.05	-0.25
0	-0.06	-0.28
+1	-0.06	-0.28
+2	-0.05	-0.26

Source: Appendix I

Figure- 4.1

Plot of CAARs during Investigation Window



The Cumulative Average Abnormal Returns (CAARs) with their t-statistics for pre-event window, event-window and post-event window are shown in table-4.4. As the decreased CAARs before the event window are not statistically significant at 5% level of significance because the corresponding t-statistics are not larger in absolute value than 1.96. Since the decreased CAARs before the event window are not significantly different from zero, the stock prices cannot be said to decrease or increase before formal

declaration of cash dividend. This implies that the sensitive information is not evidently leaked before formal announcement in Nepalese capital market. CAARs for event window and post-event window are in decreasing trend. CAARs in event window and post-event window are not statistically significant at 5% level of significance because the corresponding t-statistics are not larger in absolute value than 1.96. This result shows that the new information is incorporated instantaneously on stock price in Nepalese capital market. It has been seen that no any special effect of the information and hence incorporate instantaneously.

The result of event study reveals that the price sensitive information is not considerably disclosed before formal announcement in Nepalese capital market. Similarly, stock prices immediately adjust the new information i.e. in event window and post-event window period, no any significant effect is seen in stock prices. This result gives the impression that the Nepalese capital market is efficient in its semi-strong form.

4.2 Analysis of Primary data:

In this section, opinions are collected to find the level of efficiency of Nepalese capital market. Questionnaire includes different natures of questions relating to all forms EMH. The opinions of those who are assumed to be familiar with the Nepalese capital market (officials, analysts, brokers, investors etc) have been collected and these opinions have been analyzed to draw inferences on efficiency of Nepalese capital market. For this purpose, about to 75 questionnaires were distributed for the study in which only 40 questionnaires were returned (53.33 percent response rate). The questionnaire included 10 multiple choice questions

and one open ended question.

This section deals with the presentation and analysis of opinions regarding all questions. At the end, the section has been ended with the major issues that are focused by the respondents in open-ended question.

Sensitivity of stock price:

In efficient market, stock price are highly sensitive to the information that are released regularly in the market. Sensitive stock market shows the randomness in share price behaviour. The response of the respondents regarding whether Nepalese capital market is information sensitive or not is presented in table 4.5:

Table- 4.5

Responses on 'Sensitivity of stock price' in Nepalese capital market

Response	Number of Response	Response Percentage
Yes	27	67.5
No	13	32.5
Don't Know	0	0
Total	40	100

Table 4.5 shows that Nepalese capital market is information sensitive. Majority of the respondents (i.e. 67.5 percent) opined that the Nepalese capital market is sensitive to the information. Other respondents about 32.5 percent feel that the stick price is not sensitive to the information.

Position of current trading price of shares in Nepalese Capital Market: In efficient markets, trading price of share is equal with its book values. To know whether the current trading price of shares in Nepalese capital market is high or low, respondents are asked for their opinion. Opinion regarding current trading price of share in Nepalese capital market is presented in

table-4.6:

Table- 4.6

Response on 'Position of current trading price of shares in Nepalese Capital Market

Response	Number of Response	Response Percentage
Very High	3	7.5
High	22	55
Accurate	6	15
Low	6	15
Very Low	3	7.5
Total	40	100

Above table shows that current trading price of share in Nepalese capital market is high. Majority (i.e. 55 percent) of the respondents viewed that current trading price of share in Nepalese capital market is high. Beside this a few respondents opined in against the statement and agreed that current trading price of share in Nepalese capital market is low or very low.

Important approach in Buying and Selling of Security's Decision:

There are many approaches that they do prefer by the investors. Major approaches are analysis of available information, supply and demand situation, analysts' or brokers' advice, analysis of unpublished information etc. To find what approach is most important in buying and selling of security's decision, in context of Nepal, opinions were collected regarding four approaches. The ranking of respondents regarding these approaches that is important in buying and selling of security's decision is presented in table-4.7:

Table- 4.7

Response on 'Important Approach' in Buying and Selling of Security's Decision

(In percentage)

Rank	Analysis of Available Information	Supply and Demand Situation	Analysts' or Brokers' Advice	Try to acquire Unpublished Information
1	65	12.5	7.5	15
2	17.5	22.5	25	35
3	7.5	50	27.5	15
4	10	15	40	35
Total	100	100	100	100

Table-4.7 shows that, 65 percent respondents, they ranked 'analysis of available information' as a very important approach in buying and selling of security's decision. Similarly, 'try to acquire unpublished information' and 'supply and demand situation' seems second and third ranked approaches in buying and selling decision. Advice of brokers and analysts is the least important approach that is ranked in the last position.

Realistic method of Security Analysis:

Security can be analyzed by using two techniques; Technical and Fundamental. Under technical analysis, share price are estimated on the basis of past trends where current and real information are analyzed under fundamental analysis. Response regarding the realistic approach in Nepalese capital market is presented in table-4.8:

Table- 4.8

Responses on 'Realistic Method' of Security Analysis in Nepalese Capital Market

Method of Analysis	Number of Respondents	Respondent percentage
Fundamental Analysis	13	32.5
Technical Analysis	19	47.5
Don't Know	8	20
Total	40	100

Table-4.8 shows that technical analysis is the realistic method or approach of securities analysis. 47.5 percent respondents are in favor of technical analysis. Another important method of security analysis is fundamental analysis which is accepted by 32.5 percent respondents. Beside these, there are significant numbers of respondents who have no any special knowledge about the realistic method of security analysis.

Repetition of History of Share Price Movement:

In the market where the technical analysis seems the realistic method or approach, share price movement repeats again and again on the basis of history or past trends. The views regarding the repetition of share price movement in Nepalese capital market is presented in table 4.9:

Table-4.9 shows that the share price movement repeats again and again in Nepalese capital market. Most of the respondents (70 percent), they are in favor of repetition of share price movement. Beside this 15 percent are in against of this statement. Some respondents (15 percent), they have no more ideas about the repetition of share price.

Table- 4.9

Responses on 'Repetition of share price movement' in Nepalese capital market

Response	Number of Respondents	Respondent percentage
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Yes	28	70
No	6	15
Don't Know	6	15
Total	40	100

Role of Financial Statement in Forecasting Company's Share Price:

Financial statement shows the real position of any company and its share price should be based on the information related to financial statements. With the help of past and current financial statements, future share price can be estimated. The views of respondents regarding the role of financial statements in forecasting company's share price in Nepalese context is presented in table 4.10:

Table- 4.10

Responses on 'The role of Financial Statement in Forecasting the future share price Movement'

Response	Number of Respondents	Respondent percentage
Yes	30	75
No	6	15
Don't Know	4	10
Total	40	100

Table-4.10 of opinions reveals that one can forecast the future movement of any company's share price on the basis of financial statement. Most of the respondents (75 percent), they are agreed with the existence of role of financial statement in forecasting the future share price movement. Beside this, a few respondents (10 percent) viewed in against of this statement. Remaining respondents have no more idea about the role of financial statement in forecasting the future share price movement.

Ability of Management (Insiders) to Make Gain:

In inefficient market, one who has the access to the inside information, they would have the ability to make gains. The responses regarding whether the management or insiders of any organization have the ability to make gain or not in context of Nepal, the views of respondents is presented in table-4.11:

Table- 4.11

Responses on 'Ability of Management or insiders to make gains form inside information'

Response	Number of Respondents	Respondent percentage
Yes	28	70
No	8	20
Don't Know	4	10
Total	40	100

Table-4.11 reveals that the access to inside information make able to gain profits from investing in shares of related company. Most of the respondents (70 percent), they viewed that one who has access to inside information can make gains. Beside this, a few (20 percent) are in against of this statement and opined that management or insiders of the company cannot make any extra gains from inside information.

Responsible factor for Deficiency in the Development of Nepalese Capital Market:

There are so many factors which are responsible for being the capital market inefficient. Among the factors company information, market operation system, government policies regarding investment, lack of profitability of company, investor's awareness etc are the most important. Respondents' ranking of the factors for deficiency in the development of Nepalese capital market is presented in table 4.12

Table- 4.12

Responses on 'responsible factor for deficiency in the development of Nepalese capital market'

(In percentage)

Ranks	Company Information	Market Operation System	Government Policies regarding Investment	Lack of Profitability of Company	Investor's Awareness
1	15	7.5	37.5	5	37.5
2	15	32.5	22.5	5	27.5
3	25	42.5	15	10	7.5
4	30	10	17.5	30	10
5	15	7.5	7.5	50	17.5
Total	100	100	100	100	100

Table-4.12 reveals that two factors; 'government policies regarding investment' and 'investor's awareness' kept in first rank for deficiency in the development of Nepalese capital market. Similarly 'Market operation system' holds second and third ranked responsible factor that is responsible for deficiency in the development of Nepalese capital market. Company information' and 'lack of profitability of company' comes in fourth rank and finally lack of profitability of the company kept as a least important factor.

Consideration of Information:

Information that are released in the market or the information disclosed by the company has great influence in stock price movement. So the investors should be conscious about this information that is disclosed by the related company. The response regarding in what extent the Nepalese investors are aware about the information disclosed by the company is presented in table - 4.13:

Table- 4.13

Responses on 'Most of the investors ignore the information disclosed by the company'

Response	Number of Respondents	Response Percentage
Strongly Agree	8	20
Agree	14	35
Neutral	3	7.5
Disagree	10	25
Strongly Agree	5	12.5
Total	40	100

Table4.13 reveals that most of the investors ignore the information that are disclosed by the company. Majority of the respondents (i.e. 55 percent) were agreed with the statement that most of the investors ignore the company's information. Beside these, 37.5% of the respondents are in against of the statement and viewed that most of the Nepalese investors considers the related information that are disclosed by the company.

Favorable future Prospect of the Company Increase Market Price of Share:

If the investors are conscious about the actual information relating to the companies, the share price movement will be affected by the financial statements. The company which has the favorable future prospect, its share price should be increased in informational efficient market. The response regarding whether the favorable future prospect of the company increase market price of share of not is presented in table-4.14

Table- 4.14

Responses on 'Information on Favorable future Prospect of the Company Increase Market Price of Share'

Response	Number of Respondents	Response Percentage
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Strongly Agree	8	20
Agree	14	35
Neutral	3	7.5
Disagree	10	25
Strongly Agree	5	12.5
Total	40	100

Above table reveals that information of favorable future prospect of the company increase market price of share. Majority of the respondents (i.e. 55 percent) viewed in favor of this concept. Among them 22 percent are strongly agreed and other 35 percent are normally agreed. Beside this, 37.5 percent respondents are in against of the concept and viewed that information of favorable future prospect of the company does not increase the market price of share. A few (i.e. 7.5 percent) had no idea about the effect of favorable future prospect with market price of share.

Influence of Large Shareholders on Nepalese Stock Market:

In efficient capital market, there is no any role of large investors to influence the share price in capital market. Response on 'share price on NEPSE are fairly influenced by shareholders' is presented in table 4.15

Table- 4.15

Responses on 'Share Price on NEPSE is fairly influenced by Large Shareholders'

Response	Number of Respondents	Response Percentage
Strongly Agree	13	32.5
Agree	11	27.5
Neutral	9	22.5
Disagree	5	12.5
Strongly Agree	2	5

Total	40	100
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Table-4.15 of opinions of respondents reveals that share price in Nepalese capital market is influenced by large shareholders. Majority of the respondents (60 percent), they are in favor of the statement. Among them 32.5 percent are strongly agreed and 27.5 percent are normally agreed. Beside this, 17.5 percent respondents are in against and 22.5 percent are neutral for the statement.

Speculative Information in Share Price Movement:

In perfect capital market, share price movements are guided by the real information. But in inefficient market, there is some what role of speculative information in share price movement. The opinions regarding whether the price movements in Nepalese capital market are guided by speculative information or not is presented in table-4.16

Table- 4.16

Responses on 'Price Movement in NEPSE is guided by Speculative rather than Real Information'

Response	Number of Respondents	Response Percentage
Strongly Agree	15	37.5
Agree	13	32.5
Neutral	6	15
Disagree	4	10
Strongly Agree	2	5
Total	40	100

Table-4.16 reveals that most of the respondents are in favor of the statement that ‘price movement in NEPSE is guided by speculative rather than real information’. Among agreed respondents 37.5 percent are strongly agreed and other 32.5 percent are normally agreed. A few respondents (i.e. 15 percent) are in against of this statement and other 15 percent are neutral regarding this.

Inside Information and Returns:

If the share price considers all types of information (published and unpublished), no one can lead to greater return from the inside information. The response regarding whether the investors who have the access to inside information can lead to greater returns or not is presented in table-4.17

Table-4.17 reveals that most of the respondents (i.e. 75 percent) are in favor of the investors who have the access to inside information; they can lead to greater returns. Beside this 10 percent respondent are not agreed and viewed that access to inside information cannot lead to greater returns in Nepalese capital market. 15 percent respondents, they are neutral with this statement.

Table- 4.17

Responses on ‘Access to inside information can lead to Greater Returns’

Response	Number of Respondents	Response Percentage
Strongly Agree	13	32.5
Agree	17	42.5
Neutral	6	15
Disagree	3	7.5
Strongly Agree	1	2.5
Total	40	100

Disclosing Financial Information and Annual General Meetings of

Nepalese Companies:

Nepalese companies are blamed that most of the companies do not want to disclose financial information and delay annual general meetings. The responses regarding this aspect is presented as in table-4.18

Table- 4.18

Responses on 'In Nepal, most of the companies do not want to disclose financial information and delay annual general meeting'

Response	Number of Respondents	Response Percentage
Strongly Agree	10	25
Agree	13	32.5
Neutral	6	15
Disagree	8	20
Strongly Disagree	3	7.5
Total	40	100

Table-4.18 shows that most of the respondents, they viewed that Nepalese companies do not want to disclose the financial information and delay annual general meetings. Among the respondents, 25 percent are strongly agreed and 32.5 percent are normally agreed with this statement. There are some respondents (27.5 percent; 20 percent normally disagreed and 7.5 percent are strongly disagreed) are in against of this statement. Some respondents (15 percent) are neutral i.e. they have no more idea about this aspect.

Other Issues on Efficiency of Nepalese Capital Market:

The questionnaire included open-ended question to seek the respondents' independent views regarding the efficiency of Nepalese capital market. Major issues raised by the respondents are shown below:

- ▶ The regulator of the Nepalese capital market has not been performing as an independent entity. It should bring out and implement the necessary policies on time.
- ▶ There is the monopoly of limited number of brokers in Nepalese capital market. They are also playing some role in making the market inefficient.
- ▶ Investors in the Nepalese capital market are not aware and conscious about the market. Providing market related knowledge to the investors is essential in this time.
- ▶ Lack of institutional investors is another problem of being inefficient capital market. Such investors should be promoted.
- ▶ NEPSE should implement central depository system.
- ▶ Operating system of Nepalese capital market is not so suitable. It should be improved to attract more investors in the market.
- ▶ Stock market is limited. This market should be extended all over the country. Regional stock exchanges should be established to extend the market.
- ▶ There is the problem of not disclosing the real information by the Nepalese organizations. Regulator should make them compel to disclose the real information on time.
- ▶ There are limited choices of investment products in Nepalese capital market. That means Nepalese capital market has the lack of diversification of securities instrument.
- ▶ Nepalese capital market is dominated by financial sector companies. More real

sector companies should be entered for balanced and efficient development of Nepalese capital market.

- ▶ In this global period, Nepalese capital market should provide the investment opportunities to NRN and other foreign institutional investors. And Nepalese companies should be listed in foreign capital markets which increase the efficiency of Nepalese capital market.
- ▶ Government stability is another factor making the capital market inefficient. So government stability is the need of an hour to make the market efficient.

4.3 Major Findings

First section of this chapter dealt with the presentation and analysis of secondary data that are collected to test the efficiency of Nepalese capital market. For this, auto-correlation analysis, run test and ARIMA analysis have been used to test the weak form of efficiency. Similarly event study has been performed to test the semi-strong form of efficiency of the Nepalese capital market. In second section of the chapter, the opinions of the respondents have been presented and analyzed.

In testing weak form of efficiency, auto-correlation shows the randomness of share price for only two companies but run test shows form none. Similarly, ARIMA accept the randomness for only a single company. Since the exact conclusion cannot be drawn from these testing, it is an issue of further investigation.

The result of event study for testing semi-strong form of efficiency concluded that the price sensitive information is not considerably disclosed before formal announcement and stock prices immediately adjust the new

information. That means event study shows the existence of efficiency in semi-strong form.

The last section of this chapter deals with the analysis of primary data (i.e. opinion survey) that are collected from different personnel. Analysis of collected opinion shows that the Nepalese capital market has the lack of efficiency.

Chapter-V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary, conclusion and recommendation of the study. The first section summarizes the major findings of the study, second section attempts to conclude the major findings. Section three gives brief account of implication of the conclusion and also suggests measures to improve the current scenario.

5.1

Summar

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An efficient capital market is a market in which security prices fully reflect all relevant information that is available about the fundamental value of securities. Capital market is an important ingredient for economic development as it has valuable consequences in generating investment and creating more productive employment. So, assessing the extent of informational efficiency of the stock market is essential for ensuring its contribution to the economic development.

The empirical studies that are conducted regarding stock market efficiency dealt with, whether specific markets are efficient or not. Theory of EMH has been heavily tested in both developed and emerging capital markets. Generally the theory is supported strongly in developed capital markets. However, the conclusion regarding emerging capital markets are not conclusive.

This study is an effort to examine the existence of weak form and semi-strong form of efficiency in Nepalese capital market. The existence of weak form of efficiency has been tested by observing the predictability of future price movements and the existence of semi-strong form of efficiency has been tested by examining the timing and speed of price adjustment with arrival of new relevant information in the market. The EMH asserts that if the sequence of stock prices are random, future price movements can not be predicted and the market can be characterized as being efficient in its weak form. In weakly efficient market, the time series of stock prices move independently to their own past values. Similarly, if the stock prices are adjusted immediately after announcement of price sensitive information, the market is classified as being semi-strongly efficient. In this study it is intended to analyze these issues to characterize the Nepalese capital market concerning efficiency. The study is based on secondary as well as primary data analysis.

Under the study, secondary data analysis has been carried out to observe the statistical and econometric properties of stock prices to test whether they follow the characteristics as required in the context of weakly and semi-strongly efficient market. For the purpose of testing weak form efficiency, three years' time series data on daily stock prices of fifteen companies that are

listed in NEPSE has been analyzed. For the analysis of data, different econometric tools; auto-correlation tests, run tests and ARIMA analysis were used. Similarly for testing semi-strong form of efficiency, event study methodology has been employed. For the purpose, to observe whether the prices in Nepalese stock market adjust instantaneously to arrival of new publicly available information, the public information considered is the declaration of cash dividends. The test is based on eight companies that announced only the cash dividend.

The primary data analysis includes the questionnaire based on opinion survey of those who are assumed to have a few knowledge about Nepalese capital market (investors, market analysts, official persons working in capital market, brokers, academicians etc). The result has been drawn by analyzing 40 questionnaires. The major findings of the study, obtained from secondary as well as primary data analysis are summarized in next two sections.

The major findings of the study are summarized as follows:

- ◆ Auto-correlation analysis test support the random walk hypothesis only for two companies. Other companies do not accept the random walk hypothesis under auto-correlation test.
- ◆ Run test rejects random walk hypothesis for all the sample companies. So, run test analysis carries the controversy regarding random walk hypothesis for two companies. Resultfor remaining thirteen companies seems similar as showed by the auto-correlation analysis.
- ◆ The ARIMA test analysis supports the random walk hypothesis for only a single company. It denied the random walk hypothesis for all other sample companies.

Its result of supporting random walk hypothesis for single company is consistent with the result that showed by the auto-correlation analysis.

- ◆ The finding of the event study revealed that the price sensitive information is not evidently leaked before formal announcement. Similarly, stock prices immediately adjust the new information. It shows that cash dividend declaration has no more effect on stock price behaviour.
- ◆ Majority of the respondents opined that Nepalese capital market is information sensitive. So, the investors who have the access to inside information, they can lead to greater returns.
- ◆ Majority of the respondents viewed that most of the investors ignore the information that are disclosed by the company. The current trading price of share in Nepalese capital market is high.
- ◆ Even the respondents opined that the Nepalese capital market is information sensitive, most of them also viewed that technical analysis is the realistic method or approach of securities analysis. And hence the share price movement repeats again and again in Nepalese capital market.
- ◆ Most of the respondents accept the substantial role of financial statement in forecasting company's share price. One can forecast the future movement of any company's share price on the basis of financial statement.
- ◆ The survey of opinions also concluded that the access to inside information make able to gain profits from investing in shares of related company.

- ◆ Information of favorable future prospect of the company increase market price of share price in Nepalese capital market. Because of the lack of institutional investors and investors' awareness the Nepalese capital market is influenced by large shareholders. Similarly, respondents viewed that Nepalese companies do not want to disclose the financial information on time and delay annual general meetings

5.2

Conclusion

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The major conclusion of the study is study showed that the stock prices are not random and future prices can be estimated by analyzing the historical information. This conclusion states that the Nepalese capital market can be exploited with the help of technical analysis. This conclusion gives the support to the studies of Samuels and Yacout, 1981; Dryden, 1970; Kemp & Reid, 1971; Conrad and Juttner, 1973; Gandhi, 1980; Lo and Mackinlay, 1988; Yong, 1992; Lo and Mackinlay, 1998; Mecagn and Sourial, 1999; Abeysekera, 2001; Ming, Nor and Guru, 2000; Smith and Jefferis, 2002; Nath, 2002; Osei, 2002; Mlmabo, Biekpe and Smith, 2003 etc. Similarly this conclusion is contradict with the studies of Gupta, 1985; Pandey and Bhat, 1988; Washbarn and Binkley, 1989; Lee, Yen and Chang, 1992 etc.

This study also concludes that the Nepalese capital market is in the weak form of efficiency. This indicates that the price sensitive information is not evidently leaked before formal announcement and stock prices immediately adjust the new information that is released in the market. This conclusion support the results of Bhatia & Shekhar, 1996; Ang & Pohlman, 1978;

Washbarn & Binkley, 1989; Chiwira, 2000; Yongsawadvanich, 2001 etc

5.3

Recommendation

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On the basis of above findings of the study, following recommendations are made:

- ◆ The non-random character of stock prices implies that investors should take care of historical price and index data before making investment decision. They should use technical analysis tools like charts, histograms, moving averages etc. to detect information inherent in the stock prices. Technical analysts (or technicians) should also develop and provide such tools to the investors to help them make precise investment decisions.
- ◆ Investors should not be so conscious for early access to the price sensitive information because the price sensitive information is not evidently leaked before formal announcement and stock prices immediately adjust the new information that is released in the market.
- ◆ More autonomy and authority should be provided to the regulatory authorities to bring out and implementation of the necessary policies as most of the respondents opined that the inefficiency is the result of non-strength regulatory mechanism and ineffective stock market policies and their implementations.
- ◆ The investors should be made aware about the Nepalese capital market and investment methods. Beside this, some more real sector companies should be promoted in Nepal. The institutional investors should also be promoted in Nepal.

- ◆ Nepalese capital market lacks the sufficient number of market intermediaries like brokers, analysts etc. Sufficient number of brokers should be available for more efficient capital market. Also, market area should be extended by opening the regional stock exchanges and should implement the central depository system for more efficiency.

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Appendix I

Auto-correlation Coefficients of Daily Returns of Individual Companies

Lag	Auto-Correlation Coefficients							
	SCB	SBI	SANIMA	NMB	NIBL	NHPC	NBB	NABIL
1	0.073	0.09	0.168	0.365	0.01	0.141	0.099	0.737
2	-0.038	-0.083	0.08	0.268	0.01	-0.069	-0.025	0.538
3	-0.011	-0.099	0.017	0.084	-0.038	-0.016	0.001	0.549
4	-0.002	-0.018	-0.002	-0.065	-0.047	0.029	-0.1	0.536
5	0.008	-0.039	-0.031	0.025	0.072	0.013	-0.171	0.496
6	-0.002	-0.075	-0.101	-0.051	-0.005	-0.049	0.002	0.657
7	0.024	-0.054	0.019	0.054	0.075	0.017	0.17	0.809
8	0.014	-0.026	-0.008	0.052	-0.044	-0.087	0.065	0.64
9	0.018	-0.017	0.029	-0.01	-0.024	-0.051	0.056	0.475
10	0.003	0.068	-0.019	-0.012	-0.019	0.008	-0.033	0.492
11	0.013	-0.012	0.006	-0.036	-0.041	0.08	-0.052	0.48
12	-0.042	0.104	-0.029	0.033	-0.009	-0.004	-0.119	0.447
13	0.019	0.093	-0.102	0.039	-0.043	0	-0.046	0.588
14	0.089	0.037	-0.079	0.131	0.066	0.089	-0.054	0.72
15	-0.032	0.002	-0.031	0.111	-0.048	0.069	0.077	0.575
16	-0.023	-0.014	0	0.06	0.014	0.024	0.068	0.428
17	0.014	0.001	0.016	0.068	0.072	-0.039	0.01	0.444
18	0.007	-0.046	-0.016	-0.021	-0.037	0.087	-0.04	0.447
19	-0.033	-0.034	0.024	0.057	0.028	0.08	-0.062	0.42
20	0.011	-0.036	0.005	0.046	0.023	-0.06	-0.023	0.541
21	0.021	0.11	-0.087	0.064	0.082	0.014	-0.023	0.652
22	0.029	-0.02	-0.042	0.034	0.06	0.003	0.004	0.509
23	0.013	-0.021	-0.01	-0.007	-0.042	-0.059	-0.031	0.373
24	0.003	0.052	0.006	0.016	0.056	-0.068	-0.003	0.389
25	0.001	0.045	-0.005	-0.012	-0.025	0.006	0.004	0.395
LB	34.267	257.058	112.327	529.923	169.413	295.233	373.726	21.99
Prob.	0.012	0	0	0	0	0	0	0.232

Appendix I (Continued)

Auto-correlation Coefficients of Daily Returns of Individual Companies

Lag	Auto-Correlation Coefficients						
	KBL	ILFC	HBL	EBL	DCBL	CHCL	BOK
1	0.722	0.318	0.689	0.712	0.192	0.084	-0.013
2	0.559	0.319	0.474	0.538	0.147	-0.007	-0.141
3	0.563	0.257	0.509	0.54	0.062	-0.023	-0.017
4	0.546	0.295	0.513	0.518	-0.028	0.036	-0.054
5	0.51	0.262	0.478	0.508	-0.038	0.014	0.074
6	0.64	0.234	0.614	0.656	0.005	0.004	0.049
7	0.773	0.364	0.749	0.785	0.063	-0.026	-0.086
8	0.612	0.237	0.585	0.63	0	-0.065	0.006
9	0.475	0.286	0.41	0.476	0.023	-0.049	0.032
10	0.489	0.206	0.459	0.467	0.026	-0.002	0.015
11	0.486	0.262	0.467	0.466	0.027	-0.021	0.019
12	0.456	0.197	0.409	0.448	0.052	-0.004	-0.004
13	0.562	0.251	0.544	0.571	0.038	0.005	-0.016
14	0.666	0.326	0.677	0.69	0.177	-0.004	0.05
15	0.555	0.237	0.539	0.572	0.056	-0.068	0.025
16	0.427	0.232	0.395	0.43	0.01	-0.025	0.033
17	0.46	0.211	0.428	0.438	0.046	0.004	0.007
18	0.459	0.204	0.44	0.446	-0.057	0.051	0.006
19	0.432	0.154	0.391	0.422	-0.005	0.005	-0.004
20	0.544	0.155	0.527	0.556	-0.023	-0.014	0.03
21	0.647	0.178	0.663	0.667	0	-0.047	-0.026
22	0.533	0.204	0.546	0.542	0.029	0.02	-0.056
23	0.407	0.142	0.389	0.417	0.053	0.043	0.024
24	0.432	0.147	0.411	0.427	0.007	0.03	0.014
25	0.422	0.155	0.416	0.414	0.105	-0.013	-0.015
LB	76.235	91.629	177.427	47.181	248.396	97.133	124.622
Prob.	0	0	0	0	0	0	0

Appendix-II

Values of Actual runs (positive, negative or zero), Expected runs and their z-statistics of Run test Analysis

Companies	Abbreviation Used	Positive	Negative	Zero	Total	expected
Standard Chartered Bank (Nepal) Limited	SCB	144	136	53	333	5
Nepal SBI Bank Limited	SBI	133	133	55	321	6
Sanima Bikas Bank Limited	SANIMA	132	137	64	333	55
NMB Bank Limited	NMB	106	111	60	277	52
Nepal Investment Bank Limited	NIBL	125	137	50	312	6
National Hydropower Co. Limited	NHPC	120	140	68	328	53
Nepal Bangladesh Bank Limited	NBB	165	166	46	377	55
Nabil Bank Limited.	NABIL	132	136	53	321	6
Kumari Bank Limited	KBL	154	158	57	369	60
International Leasing & Finance Co. Limited	ILFC	95	82	43	220	4
Himalayan Bank Limited	HBL	130	131	50	311	5
Everest Bank Limited	EBL	147	152	49	348	5
Development Credit Bank Limited	DCBL	137	133	69	339	5
Chilime Hydropower Co. Limited	CHCL	120	137	58	315	5
Bank of Kathmandu Limited	BOK	159	164	57	380	6

Appendix-III (a)

Abnormal Returns

EVENT DAY	LAXMI	CITIZENS	SWABAL AMBVAN	CLEAN ENERGY	FEWA	I.C.F.C.	ALLIANCE	UNILEVER	NEPAL TELECOM
-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-19	-.00537	-.02623	-.00504	-.01080	.00963	.06936	-.00843	.02856	.05601
-18	-.00664	.02012	-.00504	.00635	.01206	.09658	-.00843	-.05298	.01153
-17	-.00694	-.01932	-.00504	.00737	.00153	.11139	.01133	.01634	-.01586
-16	-.00357	.02359	-.00504	.01047	.00098	.02825	.01139	.02521	.00836
-15	-.00438	-.01114	-.00504	.01208	-.00285	-.02978	-.02828	-.02223	-.01656
-14	-.00674	.02296	-.00504	.02171	-.00339	-.02924	.01139	.04380	-.00768
-13	-.00628	.01747	.01034	.00274	-.01327	-.00956	.00129	-.00045	.09485
-12	-.01048	.00807	.01920	-.02881	-.00827	.10765	-.06617	.00347	.09818
-11	-.00374	.01591	.00088	-.05031	-.01938	-.02998	-.02042	-.02483	.02122
-10	-.01018	-.00004	-.00504	.01290	.00907	-.02349	-.02821	.00228	.01587
-9	-.00816	.00208	-.00504	.01504	.07529	.03436	.01128	-.00582	-.06274
-8	-.00025	.08195	-.00504	.01069	.10459	.05331	-.02822	-.04866	-.01466
-7	-.00522	-.06652	-.00475	-.00725	.05000	.09778	.03148	.02468	-.03944
-6	-.00641	-.01412	-.00387	-.00788	-.04630	-.66739	.01142	.03835	-.00379
-5	-.00464	-.02144	-.00504	-.00980	-.03896	.01855	.01146	.04805	-.04088
-4	-.00541	-.02737	.00817	-.04354	-.02211	-.00958	-.02836	.06381	-.02184
-3	-.00730	-.01438	-.00493	.01075	-.05563	-.01950	.01147	-.05553	-.01199
-2	-.00780	.02761	-.01953	-.04724	.00688	-.03291	.01193	-.00216	.01012
-1	-.01046	-.02863	-.00004	-.04304	-.00674	-.03271	-.04793	.02684	-.00095
0	-.00880	-.00474	.04471	.00048	-.04673	-.04009	-.00843	.02026	-.00356
+1	-.00147	.02064	.01475	.01034	-.02221	-.00808	-.00843	.01555	-.01430
+2	-.00441	.01992	.01491	.00990	-.01032	.01921	.01148	-.00399	-.00384
+3	-.00530	.01470	.00005	.02643	-.07614	.05886	-.02273	.01565	-.01046
+4	-.00333	-.07898	.00827	-.00120	-.07922	-.01373	.07382	-.00531	-.01972

Contd.....

EVENT DAY	LAXMI	CITIZENS	SWABAL AMBVAN	CLEAN ENERGY	FEWA	I.C.F.C.	ALLIANCE	UNILEVER	NEPAL TELECOM
+5	-.00064	-.02137	-.00504	-.01638	-.02527	.07931	.01157	-.02429	.01487
+6	-.00384	-.04039	.02391	-.00508	-.03330	-.00132	.01157	-.02284	.00225
+7	.00081	.10171	-.00760	-.00327	-.03274	-.04184	.01156	.00707	-.00173
+8	-.00652	-.04371	-.02427	.01308	.01456	-.05449	.06205	.00241	-.01347
+9	-.00935	.10101	-.02491	.05264	-.01293	-.00575	.04157	.00722	-.00165
+10	.00291	-.11401	-.00477	-.00107	-.02520	-.00093	.01135	-.00965	-.00163
+11	.10837	-.02255	.00829	-.04068	-.00361	-.04239	.01621	-.05522	.00463
+12	-.03759	-.05274	.01496	.00962	.00775	.04359	.02383	.05788	-.00120
+13	.04074	.06524	.00115	.10923	-.03321	.03318	-.01307	.01018	-.00509
+14	.04195	-.03452	-.01786	.00016	.00044	.06788	-.00381	-.02430	-.03234
+15	.00055	.06044	.00146	.00406	.04884	-.09197	.01157	-.09070	.00510
+16	.00970	.03130	-.02310	.00268	.07469	.03018	-.02804	-.10378	.00533
+17	.02899	.00450	-.00396	.00475	.08802	.02643	-.04781	.10455	.01328
+18	-.02875	-.00215	.00282	-.01535	.09888	.02884	.00003	-.02383	.01443
+19	.00000	.00367	.02621	-.02694	.00667	.18329	-.00843	.00067	-.03024
+20	-.00405	.00145	-.00504	.00517	.00789	-.00326	-.00586	.01372	-.00044

Appendix-III (b)

Average Abnormal Returns (AARS), Cumulative Average Abnormal Returns (CAARS) and their t-statistics

EVENT DAY	AAR	t_Statistic (AAR)	CAARS	t_Statistic (CAARS)
-20	0.00	0.00	0.00	0.00
-19	.01	.01	.01	.02
-18	.01	.01	.02	.04
-17	.01	.01	.03	.07
-16	.01	.01	.04	.10
-15	-.01	-.01	.03	.08
-14	.01	.01	.04	.10
-13	.01	.01	.05	.14
-12	.01	.01	.06	.19
-11	-.01	-.01	.05	.16
-10	.00	.00	.04	.16
-9	.01	.01	.05	.19
-8	.02	.02	.07	.26
-7	.01	.01	.08	.30
-6	-.08	-.08	.00	.00
-5	.00	.00	.00	-.02
-4	.00	-.01	-.01	-.06
-3	-.02	-.02	-.03	-.14
-2	.00	.00	-.04	-.17
-1	-.02	-.02	-.05	-.25
0	.00	.00	-.06	-.28
+1	.00	.00	-.06	-.28
+2	.01	.01	-.05	-.26
+3	.00	.00	-.05	-.27
+4	-.01	-.01	-.06	-.34
+5	.00	.00	-.06	-.34

Contd.....

EVENT DAY	AAR	t_Statistic (AAR)	CAARS	t_Statistic (CAARS)
+6	.00	.00	-.07	-.39
+7	.00	.00	-.07	-.38
+8	.00	.00	-.07	-.41
+9	.02	.02	-.06	-.33
+10	-.02	-.02	-.07	-.42
+11	.00	.00	-.08	-.45
+12	.01	.01	-.07	-.41
+13	.02	.02	-.04	-.28
+14	.00	.00	-.05	-.28
+15	.00	.00	-.05	-.32
+16	.00	.00	-.05	-.33
+17	.02	.03	-.03	-.17
+18	.01	.01	-.02	-.12
+19	.02	.02	.00	.00
+20	.00	.00	.00	.00

Appendix-III (c)

Estimated Market Model Parameters

S. N.	Name of Company	Alpha (α)	Beta (β)
1	Laxmi Bank Limited	.0020	1.0210
2	Citizens Bank International Nepal Ltd	-.0110	.2000
3	Swabalamban Microfinance Dev. Bank	.0050	.0350
4	Clean Energy Development Bank	-.0040	-.9740
5	Fewa Finance Co. Ltd	.0070	.2630
6	I.C.F.C. Finance Co. Ltd.	.0030	2.7800
7	Alliance Insurance Co. Ltd	.0080	-.2850
8	Unilever Nepal Ltd.	.0000	.9700
9	Nepal Telecom Co. Ltd.	.0040	.5360

Appendix IV

Opinion Survey on Efficiency of Nepalese Capital Market

Name:

Position:

Institution:

- 1) Is the share price movement in Nepalese capital market information sensitive?
(Please make tick mark)

a- Yes b- No c- Don't know

- 2) What information is important in determining share price?
(Rank 1-5 where, 1= very important & 5=least important)

a- Cash Dividend.....	<input type="checkbox"/>
b- Right share.....	<input type="checkbox"/>
c- Earnings.....	<input type="checkbox"/>
d- External environmental events.....	<input type="checkbox"/>
e- Change in management of the company.....	<input type="checkbox"/>

- 3) What do you think about current trading price of share in Nepalese capital market?

a- Very high b-High c-Accurate
d- Low e- Very low

- 4) Which of the following approach do you think is more important in buying and selling of security's decision?

(Rank 1-4 where, 1=very important & 4=least important)

a- Analysis of available information.....	<input type="checkbox"/>
b- Supply and demand condition.....	<input type="checkbox"/>
c- Analysts' or Broker's advice.....	<input type="checkbox"/>
d- Try to acquire unpublished information.....	<input type="checkbox"/>

- 5) Which method of security analysis is more realistic and appropriate in Nepalese capital market?

d- Technical Analysis
e- Fundamental Analysis
f- Don't know

6) Do you think that history of share price movement repeats again and again?
 a- Yes b-No c- Don't know

7) Is financial statement helpful in forecasting the future price movement of company's share?
 a- Yes b-No c- Don't know

8) Do you think that the company's management (insiders) is able to make gains from inside information?
 a- Yes b-No c- Don't know

9) What factor is more responsible for deficiency in the development of Nepalese capital market?

(Rank 1-5 where, 1= very important & 5=least important)

- a- Company information.....
- b- Market operation system.....
- c- Government policies regarding investment.....
- d- Lack of profitability of company.....
- e- Investor's awareness.....

10) Please specify how far do you agree or disagree with following statements. Make tick on appropriate box as per following scheme:

- a- Most of the investors ignore the information disclosed by the company.....
- b- Information on favorable future prospect would increase market price of share.....
- c- Share price on NEPSE are fairly influenced by large shareholders.....
- d- Price movement in NEPSE is guided by speculative rather than real information.....
- e- Access to inside information can lead to greater returns.....
- f- In Nepal, most of the companies do not want to disclose the financial information and delay annual general meeting.....

1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11) Any other views on Level of Efficiency of Nepalese Capital Market?

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.....
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.....
.....

Thank you

Sita Chaulagain
Nepal Commerce Campus
Minbhawan,
Kathmandu