The behavior of stock price on ex-dividend day


Authors: Islam Md. Amirul
          Chowdhury Biplob

Supervisor: Isaksson Anders

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Umeå School of Business
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ABSTRACT

The main aim of this thesis is to analyze the behavior of stock price on ex-dividend day in London Stock Exchange and New York Stock Exchange and draw a conclusion about the market efficiency based. We collect 200 sample companies dividend, ex-dividend day and cum dividend day stock price to compare with NYSE composite index and FTSE 100 for London Stock Exchange.

To answer the research question and specific purpose of our thesis we developed five null hypothesis based on raw price ratio (RPR), market-adjusted price ratio (MAPR), raw price drop ratio (RPD), market-adjusted price drop ratio (MAPD) and market-adjusted abnormal return (MAAR). We used t-statistic to find the mean differences between observed values and standard values. We also show multiple regression analysis to show the relationship between ex-dividend day stock price and dividend, cum-dividend day stock price.

This thesis documented that same amount of stock price drop in 2008 New York Stock Exchange compare with dividend amount. In this case our null hypothesis accepted. On the other hand in London Stock Exchange shows higher drop of stock price than dividend amount in 2008 against the taxation rate rules of prior study. In 2007 both stock market shows the less drop of stock price than dividend amount. Therefore our null hypothesis rejected. We also documented that London Stock Exchange more volatile than New York Stock Exchange to consider the MAAR, tax rate and standard deviation. So we find significant evidence of market abnormal return which create an opportunity of market inefficiency and arbitrage opportunity for investors.

So, our thesis output shows mixed evidence for London Stock Exchange and New York Stock Exchange.

Key words: Ex-dividend day, cum-dividend day, dividend, and market efficiency.
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Islam Md. Amirul
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LIST OF ABBREVIATIONS:

SV = Standard value
Std = Standard deviation
LSE = London Stock Exchange
NYSE = New York Stock Exchange
RPR = Raw price ratio
RPD = Raw price drop ratio
MAPD = Market-adjusted price drop ratio
MAPR = Market-adjusted price ratio
TV = Total value.
SPSS = Statistical Package for the Social Sciences
GBX = Currency of United Kingdom for London Stock Exchange.
MAAR = Market-adjusted abnormal return
**List of Formulas:**

\[
\frac{(P_2 - P_1)}{DPS} = \frac{(1 - t_p)}{(1 - t_{pc})}
\]

This formula represents the relationship between the firm’s share prices and its dividend.

\[ P_{t-1} = P_{t0} + D \]

Cum dividend day investors’ wealth equal to ex-dividend stock price plus dividend paid.

\[
RPR = \frac{P_{t-1} - P_{t0}}{D} = \left( \frac{P_{t0} + D - P_{t0}}{D} \right) = 1
\]

RPR is the difference between cum dividend day stock price and ex-dividend day stock price expressed by dividend paid. Its standard value is one.

\[
RPD = \frac{P_{t-1} - P_{t0}}{P_{t-1}} = \frac{D}{P_{t-1}}
\]

RPD is the difference between cum dividend day stock price and ex-dividend day stock price expressed by cum dividend day stock price. Its standard value is equal to dividend yield.

\[
MAPR = \frac{P_{t-1} - \left( \frac{P_{t0}}{1 + r_m} \right)}{D}
\]

MAPR is the difference between cum dividend day stock price and market adjusted ex-dividend day stock price and which is expressed by dividend amount. Its Standard value is one.

\[
MAPD = \left[ \frac{P_{t-1} - \left( P_{t0} / (1 + r_m) \right)}{P_{t-1}} \right]
\]

MAPD is the difference between cum dividend day stock price and market adjusted ex-dividend day stock price and which is expressed by cum dividend stock price. Its Standard value is equal to the dividend yield.

\[
d = \frac{D}{P_{t-1}}
\]

The dividend yield “d” is the ratio of dividend amount and cum dividend day stock price.

\[
MAAR = R_0 - R_m
\]

MAAR is expressed by the difference of ex-dividend day and market return.

\[
R_0 = \frac{P_0 - P_{t-1} + D}{P_{t-1}}
\]

Ro can be defined as the difference between ex-dividend day return plus dividend which is expressed by cum dividend day stock price.

\[
t = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}
\]

t-test value is the difference between observed mean value and standard value which is expressed by standard deviation divided by route of total number of observations.
CHAPTER ONE
INTRODUCTION AND BACKGROUND

The idea of this chapter is to present an overview of the research problem. This chapter will help reader to get the basic knowledge and purpose of the study. Along with highlighting the advantages of the study, the chapter also attempts to underline the limitations or demarcation of study. This chapter also explains some important terms related to the study.

1.1. PROBLEM BACKGROUND

Stock market is an essential part of capital market. The economy of a country largely depends on a strong capital market. Contribution of any stock exchange generally leads to economic growth by increasing the funds to finance industry and other enterprises. It’s also helped the investors to gain profit from stock. In this case dividend decision is an important decision for both investors and the firm as this decision works as an indicator of the company’s performance in last year’s. In different context by providing higher or stable dividend company try to attract new investors and thus the value of the stocks. When company takes the dividend decision then they considered two essential elements, stockholders value and cash flow of the company. Company takes annual or quarterly or semiannual dividend decision which derives from net earnings of the company. Company’s dividend decision depends on company’s capital requirement for further investment, investor’s preferences on capital gain or dividend and other economical events (Arnold, 2008).

Moreover, the importance of market efficiency (information is available and easier to attain about stock, firms, interest rate, inflation rate etc) is increased day by day. In an efficient market (under perfect capital market) it is easy to get all kind of information and it is also possible to reduce arbitrage opportunity by using the available information (Ross et al., 2005). The market efficiency refers the reflection of all relevant information in stock prices. This stock price is a signal of the firm’s relevant information (Copeland et al., 2005). So, investors can valued the firm’s stock price based on past, present and future growth of that firm. Sometimes this assumption work and sometimes it does not work. In this case, arbitrage opportunity created. Because general assumption of an investors is that they buy share at lowest price (assume that price of stock is lower than original value of that stock) and sell it in future when stock price will increase. In the volatile market this strategy does not work because of arbitrage profit in short term. If the stock price falls more or less than the dividend amount it will create the arbitrage opportunity. Therefore, we can say that in this situation market does not reflect all kinds of available information in full and instantly (Ross et al., 2005). In this case dividend announcement is an important issue for stock price of the company.

Cash dividends are a vital source for an investor’s return on their stock investment. However, the returns of NYSE stocks has gradually fallen from the year 1952 to 1982. In the period 1952-1982, the dividend and capital gains of average annual returns on NYSE were 4.2% and 8.0% and for 1983-1999 figures were 3.2% and 12.8%, respectively (Ogden et al., 2003:461).
Often the ex-dividend day impact on stock price has been a topic of many. According to the financial asset theory, the value of any financial asset is the present value of discounted future cash flows (the discount varies throughout asset types and maturity). As a result, on ex-dividend day, the decline should logically be equal to the amount of the dividend. In perfect capital markets (a market where all economical information are available and have same impact on stock price) ex-dividend day stock price should drop by the same amount as dividend paid to the investors. But many researchers’ (Fedenia & Grammatikos-1991, Campbell & Beranek-1955) empirical results do not support this argument.

Modigliani and Miller (1961:411-33) have shown that in perfect capital market, dividend policy is irrelevant. In other words, dividend policy does not affect the value of a firm. But empirical research has shown that drops in share price are less than the dividend on ex-date which is inconsistent with theory (Gruber, 1970:68-74 and Kalay, 1982:09-70). Elton and Gruber found that stock price declined by 0.78 % of the dividend on the ex-dividend day. Some researchers (Bhattacharya-1979, Asquith & Mullins-1983, Ogden et al., 2003) have concluded that stock dividend has a positive impact on the stock price i.e. if a firm announces stock dividend, its stock price will rise. On the other hand, some researchers (Campbell & Beranek-1955, Elton & Gruber-1970, Fedenia & Grammatikos-1991, Li & Weaver-2006) have concluded that on ex-dividend day the stock price will decline, but the extent of decline would be less than the amount of dividend. However, if the price drop is less than the amount of cash dividend, we can say that market is not efficient because the stock price drop ratio on ex-dividend day is not equal with dividend amount. And this inefficiency can lead to arbitrage profit on ex-dividend day. We agree that there will be a price drop on ex-dividend day, but the extent of the drop on ex-dividend day compared to cum-day has been widely debated.

So this finance puzzles still exist in the stock market. But the question is why this mix evidence about price drops on ex-dividend day? Different researcher’s shows different argument behind this, such as (1) different tax code and law (2) tax rate on individual dividend and capital gains (3) transaction cost and deduction of fixed commission (Nikolaos et al., 2006). Some other researchers (Dutta et al., 2004) explained that stock price drop depends on three major factors like the tax differential, market microstructure and the arbitrage opportunity in short term period. They also mentioned that in tax less world, on a stock’s ex-dividend day, the stock price will be dropped by the same amount of dividend to prevent arbitrage profit when it does not consider the time value of money in the short period between the ex-dividend day and the dividend payment date.

For the above controversial research findings we choose two largest stock markets (New York Stock Exchange and London Stock Exchange) to find the ex-dividend day behavior on stock price and compare each other. To sum-up this ex-dividend day effect we focus on the following research question.
1.2. **RESEARCH QUESTION**

The problem background led to the following research question:

To what extent does ex-dividend day have an impact on stock price?

That means we have to consider the following question also:

Does stock market hold the efficient market? If yes then which market is more efficient?

1.3. **PURPOSE OF THE STUDY**

The ex-dividend date impact on stock price analysis is an important issue for investors because they need the information about stock price movement in future for further investment and to take the decision about receiving the cash or stock dividend. We have studied the stock price dropping during 2007 to 2008 at ex-dividend date at London Stock Exchange (LSE) and New York Stock Exchange (NYSE).

The main purpose of this thesis is to understand the impact of dividend on the stock price during 2007-2008 of two top ranking stock exchanges NYSE and LSE; and try to recognize the factors which are related with this drop in stock price. This thesis also increase our analytical ability and general knowledge about stock market behavior like market efficiency, market abnormal return, arbitrage opportunity, tax effect and capital gain.

1.4. **DEMARCARATION AND LIMITATIONS OF THE STUDY**

In our thesis we try to examine the behavior of stock price on ex-dividend day that’s why this thesis is only about the dividend and the behavior of stock price on ex-dividend day. The information provided will reflect the data collection and observations made for both stock markets in the year of 2007 and 2008 which are related with the dividend and stock price.

This thesis researched New York Stock Exchange and London Stock Exchange. The main reason to choose only two stock exchanges was the limited time schedule. Moreover, both are world leading stock exchange. We have planned to do the research in several stock exchanges but as time is passing, we only implemented in NYSE and LSE.

In our thesis we used the secondary data. Due to time limitation we could not collect the raw data from the original sources. So, in our point of view this is the main limitations of our thesis because the secondary data are subjected to distortions.

Another limitation of this thesis is regularity of date and we do not know for which major events most of the stock prices started to decline. There are lots of environmental and political instability happened with in this study date which may have major impact on result. The analysis and conclusion part’s accuracy and reliability depends on the collection of data.
1.5. TERMINOLOGY

We study the ex-dividend day behavior of stock price. Three key words, which we will use during the thesis, are ex-dividend day, cum-dividend day, dividend and market efficiency. We discuss the concept of above key words in the below:

The term Dividend usually means a portion of company’s earnings that is distributed and paid among the stockholders. Generally two types of Dividend are distributed to the company’s shareholders either in form of Cash dividend or stock dividend (Arnold, 2008). The second day before the date of record (declared by the company) is called the ex-dividend day i.e. the date when the seller entitled to keep the dividend.

Cum dividend refers when a purchaser of stock is allowed to receive a dividend that has been declared but not paid.

An efficient market refers all kinds of available information which reflected in stock prices quickly and fully (Fama, 1970).

1.6. DISPOSITION

In this section we show the full outline of our study on “The Ex-dividend day behavior on stock price”.

Chapter One:
In introduction chapter, we present our topic, problem background; research questions, purpose, and demarcation, as well as we show the limitations of the study.

Chapter Two:
Chapter two represents the theoretical methodology which we used during the course of our study. It also shows the reason behind choosing the topics, perceptions, and which method we used in our study as well as sources of data.

Chapter Three:
In this chapter, we collect a number of theories and literature and we discuss them providing a theoretical framework and use these theories in the findings and analysis parts.

Chapter Four:
This chapter shows the practical methodology which is used in our study as well as the approach. This chapter explains the methods of sampling, data collection and analysis, mathematical model, and significance test etc.
**Chapter Five:**
*This chapter* represents the research findings (empirical result) as well as analyzes of these findings by using table and charts in a proper way.

![](image)

*Figure 1: Chapter layout.*

**Chapter Six:**
In *conclusion chapter*, we discuss and interpret our findings from chapter five and give conclusion as well as recommendation of our study. In this chapter we also discussed about our research quality and credibility.
CHAPTER TWO
THEORETICAL METHOD

This chapter enlightens the reader on what purposes and for what reasons we choose this topic. This chapter will also explain the perception, perspective and underlying philosophy of our research as well as methodology used for the research.

2.1. CHOICE OF THE TOPICS

Nowadays, stock markets are a hub for world economy and also a sensitive issue; where investors invest their savings for higher return. Stock market became modern business hub because of new technology (internet), global business, and higher demand of stable economy. Today many people invest money to buy stock and earning profits. But they face loss if stock prices decline. How much stock price decline? It is an important issue for investors as well as financial analyst.

For the above reason we selected this topic for our thesis. But it is so tough to choose a thesis topic because there are lots of subject area available for research including finance, marketing, management and accounting for business administration. Since we both are finance students, we choose finance related topics.

The master thesis should be related with a student’s academic background, work experiences and future career aspirations. Master thesis topic should be influenced by at least two of these issues.

2.2. PERCEPTIONS

In this part researchers should say something about themselves for readers as the readers have the right to know about the researchers and their background to understand why they chose the topic and what relationship it has with their background. Topic and preconceptions regarding the scope of study have been established in ours mind because of our educational background in finance.

There are four major factors related with the preconceptions viz social background, past experience, education and environmental influences. When someone investigates or studies something all of above features will strongly influences the person’s thinking, analyzing ability, and the ability to distinguish right or wrong and their behavior. All of above four issues might affect the researchers with the reality and their ability to critically examine the social, political and educational factors. Preconceptions refer the theoretical knowledge related with the researchers’ field of interest and consist of particular subject and experiences (Johansson-Lindfors, 1993: 76-77).

We, Md. Amirul Islam and Biplob Chowdhury, the authors of this thesis have the same origin and have the common social, cultural, educational and environmental background. Mr. Islam was
born in Noakhali and Mr. Chowdhury was born in Chittagong, the largest sea port city of Bangladesh. Bangladesh is a developing country. Population growth, unemployment, and illiteracy are the main problem of Bangladesh. Our economy depends on agriculture and export of garments. Bangladesh capital market is very young and more volatile. It has two capital markets- Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE), both under Security of Exchange Commissions (SEC)’s supervision.

We both have successfully completed our MBA (master of business administration), with major in finance from Chittagong University, Bangladesh. After that we got admitted to Umeå University for Masters Programme in Finance. Both of us did a bachelor programme in finance and banking field. This education has helped to go gather lots of theoretical background about financial management, corporate finance, economics, investment analysis and financial statement analysis.

We have some practical experience also about stock market and finance issue as both we have BO (beneficiary owners) account under CSE for trading stock. We also have some IPO (initial public offering) share account under our BO account. Recently Mr. Islam has invested in secondary market also. So both authors have real theoretical and practical knowledge about dividend and ex-dividend day. After MBA examination in 2008, Mr. Chowdhry successfully completed his internship programme (3 months) under CSE and improved his knowledge in the field of capital market investment and trading operation of CSE. On the other hand Mr. Islam successfully completed his three month internship in a telecom company (TM international BD Limited) under finance division, during which he learned practical knowledge about finance related area and analyst. We both have intentions to start our career as financial and investment analyst in future.

In conclusion, have academic and practical knowledge about finance related topics specifically in dividend. We developed our concept on the basis of our academics and practical knowledge as well as by studying previous literature and reviewing them. Our thesis is constructed on the basis of real capital market situation of New-York Stock Exchange (NYSE) and London Stock Exchange (LSE) and on some theoretical explanation.

2.3. PERSPECTIVES

The perspective of a study refers to the ideas and conceptual guideline of research aspects and data collection for research (Hantrais, 1996). Perspective is a way to answer the research question. In the same time different researchers have different perspectives for study and sometime they give different outcome as well as interpretation on the result. Generally perspectives refer the scientific reasons for which the research has been conducted. The research perspective can be define as a research which conducts for improving and better understanding the market or for scientific reasons to understand a process in more deeply way. A perspective is the combinations of research ideas and conceptions (Hantrais, 1996).

In this thesis, we clearly mention our research perspectives in the consideration of two main things. Firstly of all for the personal benefit to understand the ex-dividend day impact on stock
price in more detailed way and secondly for the investors’ perspective. This study based on a research perspective by reviewing the ex-dividend day related literatures in the field of stock market. This literature review and research findings and analysis parts increase the authors academic knowledge in the theoretically and practically also.

On the other hand this thesis can increase the awareness of the investors. Investors can get better information about ex-dividend day and stock price relationship for their safe investment. If investors can assume the future price change movement for the reason of dividend at ex-dividend day they can take decision very easily for selling or holding stock. We will try to find the empirical result of stock price dropping in the year of 2007 and 2008 at ex-dividend day and also try to interpret it.

2.4. RESEARCH TYPES

Research is a systematic and methodical process of enquiry and investigation with a view to increasing (or creating) new knowledge. Research is conducted in order to answer all or some of the questions posed in a project. All research is connected to theory. Theory guides and influences the collection and analysis of some or all the data associated with the research project.

Research refers to a scientific way by which a researcher find answers to some questions investigating, exploring, examining and interpreting the findings. It is a systematic process to gain knowledge by gathering and analyzing the data. A research conducted for the deep understanding of some things and answers the related questions that ensure the low errors and bias (Gail, 2002:5).

When researchers write their research report after investigation, they follow two types of methods. One is applied research and other is basic research. Applied research report provides information about some problem and tries to solve that problem. Applied research is used for practical study and to resolve problem directly. The area of applied research is academic or institution. On the other hand basic research is more difficult than applied research. Personal interest and curiosity of authors is the main issue of basic research. In basic research the researcher show their curiosity to increase knowledge. Basic research is the theoretical experience for gaining knowledge. The main difference between applied and basic research is applied research emphasize on the practical problem rather than the need to acquire knowledge like basic research (Gail, 2002:5-7).

This thesis is one kind of applied research, as it is academic study writing and tries to find the impact of ex-dividend day on stock price of NYSE and LSE. This thesis also works on the basis of research problem statement and tries to find the solution of research question in its findings and analysis part.
2.5. **Philosophy of Research**

Research philosophy or scientific ideal is an important part of any research. Researchers should concentrate on what scientific ideal they are going to undertake and this ideal influences the whole study. As a result the researchers show the reader which ideal, following his own thoughts, suits their study the best. There are two different types of ideal: positivism and interpretivism related with the research. Both are related with the epistemological consideration which refers the way of measures the ontology (the real world i.e., the reality of observation). In another way we can say-how we can study (know) the real world? (Bryman & Bell, 2007:16).

It’s very important issue for a researcher to recognize their belief about the topics they want to develop. This belief of thinking is defined as the research philosophy or research paradigm (Saunders et al., 1997:82). Saunders et al., 1997 have provided three kinds of paradigms: positivism, interpretivism and realism. The following figure shows these three research philosophy or paradigm:

![Figure 2: The research ‘onion’ (Sounders et al., 2007: 102)](image)

Interpretivism views the real world social activities in different way. Researchers need to interpret the reality as the subject matter of social sciences is fundamentally different from that of the natural sciences. The subjective meaning action is what is important. It is an alternative to the positivism orthodoxy which needs the social scientist to group the subjective meaning. In the qualitative study this interpretivism is very commonly used. According to Bryman & Bell (2007:17), values, norms and subjective position of the researcher and research community are important components in any kind of study. From the theoretical point of view interpretivism refers to the study of direct experience taken from face value and determines the behavior from phenomena of experience not from external reality (Cohan and Manion, 1987:30-40).

Interpretivism is in contrast with positivist because positivist accepts the social world by natural scientist where the interpretivism never feels comfortable with this natural scientist. In interpretivism research the social world treats as complex phenomena to define (Saunders et al., 1997:82). Interpretivism always emphasize on the subjects to understand what and why happened such as interpret on the subject. Interpretivism research is used with inductive to test theory by interpretation.
Table-I: Key characteristics of the Scientific Idle: Positivism vs. Interpretivism

<table>
<thead>
<tr>
<th>Subject</th>
<th>Epistemological Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positivism</td>
</tr>
<tr>
<td>Ontology</td>
<td>Researcher is independent of reality.</td>
</tr>
<tr>
<td>Scientific Approach</td>
<td>Deductive approach</td>
</tr>
<tr>
<td>Methodology</td>
<td>Statistics tools used for analysis.</td>
</tr>
<tr>
<td>Research Strategy</td>
<td>Quantitative methods of research</td>
</tr>
<tr>
<td>Focus of the research</td>
<td>Focus on fact</td>
</tr>
<tr>
<td>Natural Scientist</td>
<td>Positivist accepts the social world by natural scientist.</td>
</tr>
<tr>
<td>Subjective/objective</td>
<td>Objectivity</td>
</tr>
</tbody>
</table>


In the other side, positivism philosophy conduct with objectivity, which deals with the natural social sciences no need to interpret subjectively but should, measured through objectively (Easterby-Smith et al., 2002:40-60). In positivism reality exist objectively out there and it’s only by following the scientific method of testing hypothesis that can get knowledge about it. Positivism is used in quantitative design and researchers should be neutral to the objective of their study i.e., value free. Positivism research is used with deductive method to test the theory by observation (Bryman & Bell, 2007:16).

We follow the epistemological consideration. Because our study is depend on the previous research and also the existing theory. We gather quantitative information and analyze those data by statistical tools that means used some scientific model to conclude our thesis. The main focus of this thesis is that to find out the impact of ex-dividend day on stock price. How much stock price decline in that day in the year of 2007 and also 2008? Both we read different related theories and summaries them for their analysis of reason behind this decline of stock price. This is related with ontology and the real situation (how we know?) refers the epistemology. This thesis adopt the positivism view as scientific ideal because first of all we deducing a hypothesis that is stock price decline at ex-dividend day and how much decline i.e., showing a relationship between stock price and dividend at ex-dividend day, which is called operational hypothesis. Both we use statistical tools to find the specific outcome from quantitative data. So our study follows the positivism view.
2.6. RESEARCH APPROACH

All kind of research project depends on the theories and empirical studies. Researchers now need a scientific approach for their studies and they must select their scientific methods on the basis of their scientific philosophy used in previous section. There are only two different approaches available for researchers to study their research project such as inductive and deductive methods.

The researchers can start with an existing theoretical basis and then generating hypothesis. After generating hypothesis they used empirical research result and data collection to test their hypothesis. This is called deductive method that is use mainly in the quantitative research. It’s represent the relationship between existing theory and research. It is also called a hypothesis testing theory because in this method a conceptual theoretical structure (model) is developed and then tested it by using empirical data (Bryman and Bell, 2007:11).

Robinson provides five steps of deductive research:

- Deduct a hypothesis
- Convert deducted hypothesis into operational terms
- Testing Operational hypothesis
- Examining the outcome
- Modification of theory (If needed)

*Figure 3: Deductive research stage (Robinson, 2002 cited in Saunders et al., 2007:117)*

On the other hand, inductive approach is the opposite of deductive approach. In this method researcher should start with the empirical observations and findings. After this they generate a new hypothesis that is used as a new theory. By this methods researcher produce/develop a new theory. So theory is the main outcome of this method. Data is collected to build the general theories and often associated with the qualitative research design (Bryman and Bell, 2007:12). According to Ghauri and Gronhaung (2002:13), induction is depend on empirical evidence and on the other hand deduction is depend on logic.
The main differences between inductive and deductive approach are as below:

<table>
<thead>
<tr>
<th>Deduction</th>
<th>Induction</th>
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<tr>
<td>Scientific principles</td>
<td>Gaining an understanding of the meanings humans attach to events.</td>
</tr>
<tr>
<td>Moving from theory to data</td>
<td>Moving from data to theory</td>
</tr>
<tr>
<td>The need to explain causal relationships between variables</td>
<td>A close understanding of the research context</td>
</tr>
<tr>
<td>The collection of quantitative data</td>
<td>The collection of qualitative data</td>
</tr>
<tr>
<td>A highly structured approach</td>
<td>A more flexible structure</td>
</tr>
<tr>
<td>High concern on generalize conclusions</td>
<td>Less concern with the need to generalize</td>
</tr>
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</table>

*Source: Saunders et al., 2007:120*

In our study we focus on deductive approach because our research is a quantitative base, moving from theory to data collection, analysis the data and draw a conclusion based on this analysis. Usually all academic reports which are based on quantitative data follow the deductive approach. We analyzed different theories that are related about the ex-dividend day and previous study on ex-dividend day, market efficiency and arbitrage opportunity. After that we collect quantitative data and used some statistical method to analyze the whole things and draw a generalize conclusion. So, our thesis is a deductive approach. This method also matches with this research questions and scientific ideal (positivism).

2.7. **Research Strategy**

Data collection is an important task of a research. In the case of data collection there are several methods available for researchers and he/she must decide which is appropriate for their research. The research strategy refers the identification and choice of research methods for investigation. Researchers data collection depends on the nature of research i.e., it is a quantitative (numerical number) or qualitative research/non numerical number (word). The researchers should decide which method is appropriate for his/her study and analysis (Ghauri and Gronhaug, 2002:86).

A qualitative research conducted for gain the knowledge to investigate, understand and interpret the phenomena. This kind of research methods related with the direct observations or interviews (Johns and Lee-ross, 1998). The main two features of qualitative research are natural occurrence and richness & holism (Saunders et al., 2000:84). According to Saunders et al., (2007:145), interview used as data collection technique, categorizing data or non-numerical data used as data analysis process. Therefore we can say that this research conduct for gaining insights knowledge of attitudes, beliefs, motivations and behaviors of individuals.

According to Bryman and Bell (2007:28), qualitative research means the word expression than quantification in the collection and analysis of data and this method related with inductive approach which reject the positivism and natural scientific method. Qualitative research is an investigation of unstructured data collection by conducting both interview and observation and
used the verbal description and explanations rather than quantifiable analysis (Hammersley, 1990).

In contrast a quantitative method refers the quantification of data, searching knowledge that will measure, describe and explain in numerical way with reality. This method always well structured and formalized by the researchers. This methods conduct in deductive approach with positivism of scientific ideal and natural science of reality. (Bryman and Bell, 2007:28). Quantitative research use questionnaire as collection technique, graphs, charts & statistical tools or uses numerical data for analysis. Therefore we can say that this kind of research conduct with the measurement of attitudes, behaviors and perceptions.

This thesis conducts as quantitative research on NYSE and LSE which reflects the 200 company’s dividend and stock price. The impact of ex-dividend on stock price will measure by the numerical and statistical tools. We can quantify data to describe and explain the changes of stock price before and after dividend declaration in numerical way. We investigate secondary data by using statistical tools for findings and analysis of assumption. So it is a purely quantitative research.

2.8. CHOICE OF THEORIES

For the collection of theories we both give our concentration on findings related and interesting literature, books and articles which are suit with our problem statement and purpose of the study. Literature review refers the critical examination, summarization, interpretation or evaluation of existing literature according to the subject matter of study. For this thesis both we prefer to review the efficient market hypothesis, signaling hypothesis, studies on ex-dividend day, tax effect, clientele effect, trading volume around the ex-dividend day, arbitrage opportunity etc. We collected research methodologies books, finance related books and literature and also summarized different theories according to research statement questions.

2.9. CHOICE OF DATA SOURCES

We used some data sources for our investigation and analysis by using internet sources, annual reports, newspaper and academic articles published in different times. We collected stock and dividend data from NYSE and LSE database system, USBE library database (Thomson DataStream) and internet sources. For literature and theoretical review we used USBE library database and also internet sources. We search word such as ex-dividend, dividend, stock price impact etc. on internet or data base system.
2.10. CRITICISM OF DATA SOURCES

We both have an interest to use new sources for our study and it is an important issue to ensure that uses of data are relevant, valid and up-to date. We used more up-to date information from literature and articles which we have referred in our thesis. The literature review part gives the up-to date information about the ex-dividend day impact on stock return. The sources we used in our thesis are mostly taken from business and economics journals, previous academic research and reports published by different universities.

We believe that their sources are more reliable and valid because they are published by well known university, national and international journal publications authority, which ensures reliability and quality also.

But it is really tough task to measure the quality, reliability and validity of the secondary sources. Since, the secondary data are subject to manipulation that’s why we have no control over secondary data. There are some literatures used as secondary sources in the theoretical framework which are not solely based on ex-dividend day theory. Many literatures emphasize on the empirical result and the effect of ex-dividend day rather than theoretical matter.
CHAPTER THREE
THEORIES AND LITERATURES REVIEW

In this section, we have tried to provide some key words and concepts which are related to the thesis and try to also relate with the previous studies on the similar subject.

3.1. THE EFFICIENT MARKET HYPOTHESIS (EMH)

This hypothesis stated that the capital market is efficient and the behavior of stock prices is related with the information i.e. under the efficient market hypothesis the investors are rational and they all have right to use the same information and have similar expectations regarding their investment. Also, in an efficient market, all available information is reflected in stock prices quickly and fully (Fama, 1970).

According to Fama, the capital market is considered to be efficient in three different forms: the weak form, semi-strong form and the strong form of efficiency. The different forms of efficient market hypothesis have been tested by Fama and he also documented the evidence in favor of the existence of efficient market.

According to the idea of the efficient market theory that in an efficient market the prices of stock are continuously adjusted to new and correct levels as and when the new information arrives in the market. As a result, investors cannot outperform consistently by doing the fundamental analysis and technical analysis (Kevin, 2006:124).

![Figure 4: Cumulative levels of market efficiency](source: Corporate Finance, Ross et al. (2005: 356).)
3.1.1. Weak form of efficiency

The market data is one of the most traditional types of information which is used to determine the value of stock prices. Here all past price information are considered as the market data. The weak form of efficient market hypothesis says that historical prices should be reflected in current prices of stocks (Jones, 2006: 317). It is one of the weakest forms of efficiency as it is based on the historical information about the stock prices, which are easily available. It has been argued that the weak form of efficiency will not be effective for the rational investors, because the movements of the new stock prices are completely arbitrary and the new pieces of information which is generated from the stock price movements are not dependent on the historical price movements of the stock (Kevin, 2006:124).

The weak form of efficiency was tested by Fama in 1970 and the result supported his theory. On the other hand, some researchers have argued that the weak form of efficiency does not exist in the stock market. For example, DeBondt and Thales (1985) have proposed an “overreaction hypothesis”. According to this hypothesis, generally it is seen that people respond excessively to unanticipated and dramatic events of news. Under this behavioral situation it becomes difficult to predict future stock prices by analyzing historic prices (cited in Jones, 2006:321).

3.1.2. Semi-strong form of efficiency

The semi-strong form of efficient market hypothesis states that stock prices not only reflect historical prices of information but also reflect all publicly known and available data. Examples of all publicly available information are company yearly reports, earnings announcement of company, forthcoming dividend announcements, press releases, stock splits etc. Thus a market can be said in the form of “semi-strong sense” if the current stock prices instantly adjust to all public information that is received from available sources (Ross et al., 2005: 356-357).

Numbers of researches have been done by different researchers such as Bill and Brown (1968), Fama (1970), etc. We studied the outcome of above researches and concluded that a great majority of the semi-strong form of efficiency test provide strong empirical evidence in favor of this hypothesis; though there have been some contradictory results too.

3.1.3. Strong form of efficiency

The strong form is the most extreme form of efficiency. It states that current stock prices reflect all information, both public and private. This means that no information, whether public or private can be used to earn abnormal returns consistently. Investors buying and selling decision of a security depends on such information which are generated by them and based on their findings they will determine whether they should buy or sell the security. And with this action, the stock prices will be adjusted instantly to reflect all information, including private information (Haugen, 2001).
Generally the efficient market hypothesis (EMH) states that the stock price should be reflected all available information and in that sense it has an impact both for firms and investors. The fact is that the prices of stock continuously absorb the all available market information. Due to this reasons the investor cannot outperform successfully by using the available information in a superior way. In this regard, investors always expect a usual rate of return as the prices of stock are adjusted the available market information automatically before the trade. Furthermore, some other mechanisms are also responsible for maintaining the market efficient (Ross et al., 2005).

It has been noted that the above three forms of market efficiency are cumulative. If one considers the semi-strong form of efficiency, it includes the weak form of efficiency also and if one considers the strong form of efficiency, weak form and semi-strong form of efficiencies are also included (Jones, 2006).

In efficient capital market, stock prices reflect all the available information both public and private. Also, it is generally known that stock price decline on ex-day, but we focus on the amount of decline. Some school of thoughts agrees that drop of stock price on ex-dividend day is same as amount of dividend paid on dividend day. However, other school of thought does not agree on that notion. The following reasons are forwarded to explain the differences in the behavior of stock prices on ex-dividend day. The first one is the tax differential between dividends and capital gains, the second one is different countries have different tax factors, the third one is cost of transactions, the forth one is the changes of tax policy and the fifth one is the exclusion of fixed commission. A number of extensive researches were done by a number of researchers in favor of above reasons. Like, Litzenberger and Ramaswamy (1979); Poterba & Summers (1984); and Barclay (1987) did a study on US market and their study support on the first one. The second reason was supported by following studies such as, Booth and Johnson (1984) for Canada; Hietala and Keloharju, (1995) for Finland; Michaely and Murgia (1995) for Italy; Lasfer (1995) for the U.K.; Kato & Loewenstein (1995) for Japan; and Frank & Jagannathan (1998) for Hong Kong. In 1982, Kalay and in 1994, Boyd & Jagannathan did their study in favor of the third reason. The study of Boyd & Jagannathan (1994) also supported the fourth and fifth reason (Cited in Nikolaos et al., 2006).

3.2. Dividend

Dividend as usually refers to any kind of direct cash distribution of company’s earnings (after tax) to the shareholders. Usually public companies pay regular cash payout as dividend and it may be four times in a year. Sometimes the company declares stock as dividend, either as an extra dividend or in place of cash dividend. The firm has various possibilities on how to use the cash they have acquired from past operations (Rose et al., 2005:502).

The firm can use two types of sources for financing. One is internal financing and another one is external financing. When a firm is able to generate a huge amount of cash, it has three general purposes: firstly it can use this cash to pay salaries, cost of materials and pay taxes etc.; secondly the firm can use this amount for development and the thirdly the firm can use the residual amount to pay dividend to its shareholders. The proportion of earnings of the company can be distributed to their shareholders in three different ways. Firstly it is made by a cash dividend,
secondly the firm can repurchase its stock and the thirdly the stock split or stock dividend (Pinches, 1996 cited in Alm & Arefjäll, 1999).

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*Figure 5: An example of standard method of cash dividend payment*

*Source: Corporate Finance, Ross et al., (2005: 503).*

**Stock Split Vs Stock Dividend:**

Stock split means if a company decreases the price per share by dividing existing shares into the multiple shares. For example: if Sony Ericson’s stock is at $150 and if the manager of Sony Ericson announces a three-for-one stock split, the price per share should decreases at about $50. And also stock dividend refers when a company rewarded the corporate dividend to its stockholders in the form of stock as a substituted of cash (Fama *et al.*, 1969:544). Stock split indicates the increased number of shares as a result of proportional reduction in the par value of the stock. For split or stock dividend increased no of shares cannot alter the proportion of ownership of an investor in a company. The ownership of an investor remains unaltered but in addition they got some extra stock certificates. In both case the market price of the share should decline proportionately to maintain the same value (Van Horne, 2003:325-326).

**3.2.1. Dates of cash dividend payment**

**Declaration date:**

The date on which the regular payment of dividend, dividend size and ex-dividend date and also payment date are declared by the board of directors is known as declaration date. It is also called the announcement date (Rose *et al.*, 2005: 503).

**Record date:**

The record date is the date, which is established by the issuer of a security in order to know who are the current shareholders and who are entitled to receive dividend. The investors who bought the shares between the record date and the payment date are not entitled to get the dividend (Rose *et al.*, 2005:503).
Ex-dividend date:

According to NYSE rules, on and after the second business day of record called the ex-dividend day. Therefore, we can say that the ex-dividend day refers the first trading day where a new buyer is not entitled to the dividend declared on a company’s share. In the standard method of dividend payment at NYSE, 28th January is the ex-dividend day which is two days before the record date (30th January) (Rose et al., 2005: 503).

Cum-dividend date:

The date before the ex-dividend date is called the cum-dividend date. The investors who buys stock during the cum-dividend date they are allowed to receive the dividend. However, investors who buy stock on the ex-dividend date they are not allowed to receive the dividend.

Payment date:

The payment date is the date on which the company mailed the check to those investors who bought the shares before the ex-dividend date and the dividend payment is recorded (Rose et al., 2005:503).

The ultimate goal of an organization is maximization of shareholders wealth. From the shareholders point of view maximization of shareholders wealth is the main objective of a manager. That’s why, it is necessary to know that if the investors prefer dividends or capital gains. Generally it is seen that, if the tax rate of capital gains is higher than the dividends, the investors prefer dividend rather than the capital gain. And on the other hand if the tax rate of dividend is higher than the capital gain, the investors prefer capital gain instead of dividend. There are a number of different theories, which are related to investor’s preference, and these theories try to explain the reasons for certain dividend level (Brigham and Houston, 2004).

For example: The first theory is the “Dividend irrelevance theory” documented by Merton Miller and Franco Modigliani (MM) in 1961. Dividend irrelevance theory states that dividend decisions are irrelevant, as it does not affect the value of the firm or its cost of capital. This irrelevance theory argues that the firm’s stock is not affected by the dividend. Hence, it is called dividend irrelevance theory as firm’s dividend policy has no influence on the market price of the shares (Brigham and Houston, 2004:523). MM argued that firm’s value is related to the earnings that is generated from its assets. It does not depend on dividend and retained earnings (1961, cited in Brigham and Houston, 2004:523). The second theory is the “Bird in hand” theory by Gordon and Linter. This theory is based on relevance concept of dividend policy. Gordon and Linter asserted that the investors are usually risk averse, so they prefer the current income in form of dividend, as against the uncertain future dividends and capital gains. In other word we can say that investors are not interested to take risk for future dividend, they always put positive premium on current dividend income. Gordon and Linter also argued that the value of share is adversely affected when the firm retains its earnings instead of paying dividend. For this reason, investors emphasize on less importance on future dividends (Gordon, 1963:264-272; Lintner, 1962:243-269). The third theory is the “Tax preference theory”. Investors have a preference a low dividend ratio is to high payout in spite of this theory (Brigham & Houston, 2004:523-524).
There are other competing theories which make the dividend related issues more complex. Some of these theories include Signaling hypothesis, Tax effects, and Clientele effects.

### 3.3. Signaling Hypothesis

According to Bhattacharya, the signaling theory refers that the positive excess of return is the consequence of an unanticipated increase in dividend (Bhattacharya, 1979:259-270). Some empirical research suggests that dividend acts as a signal for a firm. Usually it is seen that the stock price of a firm will increase if the firm declares to increase its dividend; however, the stock price of a firm will decrease if the firm announces to decrease its dividend (Ross et al., 2005: 519). In 1983, Asquith and Mullins estimated that on the declaration of dividend initiations the prices of stock increases about 3%. On the other hand, Healy and Palepu (1988) and Michealy et al., (1995) stated that on the declaration of dividend exclusions the prices of stock goes down about 7%. Some authors argue that firms are not interested to cut the dividend but the firm will only be interested to increase the dividend when there is a probability of increasing its future earnings and cash flow (Ross et al., 2005: 519-520).

Moreover, empirical research have found that, usually, the market responds positively if the firm declares to increase its dividend and the market responds negatively if the firm declares to reduce its dividend. The announcement of dividend will convey information about the future prospects of the firm (Ogden et al., 2003: 485).

### 3.4. Studies on Ex-dividend day

In this part we shall discuss the past study that has been done on Ex-divided day and what affecting the stock price behavior on ex-divided day. Past research has been documented an evidence that the stock price shall fall on ex-dividend day but did not documented the actual amount of stock price drop under the tax environment. In this study, we attempted to find out the amount of stock price fall on ex-dividend day in a tax environment. Most of the researcher argued that the stock price fall less than the divided amount on ex-divided day because of tax theory. Tax theory explains that due to higher tax tare on divided than capital gain, investor prefer not to have the dividend.

The earliest studies of stock price behavior on ex-dividend day were done by Campbell and Beranek in 1955. They observed that the price of stock on ex-dividend day drop less than the amount of dividend but the drop amount is very less (cited in Duatta et al., 2004). After the publication of the results of studies by Elton and Gruber (1970) the debate on the stock price behavior on ex-dividend day has become wide spread. Different schools of thoughts have suggested different reasons for the stock price behavior on ex-dividend day, some of which are contradictory to each other.

When an individual investor buys shares before the ex-dividend day he will be entitle to get the current dividend, on the other hand, an investor who buy shares on or after the ex-dividend day will not be entitled to receive the dividend. So, when a company pays out dividend, generally it
is seen that the stock prices fall on the ex-dividend day because cash has been sent out (Ross et al., 2005: 503-504).

Alm & Arefjall explained the effect of ex-dividend day. According to them, the effect is the cause of two price differentiations between cum-dividend day and ex-dividend day compare to the divided amount (Alm & Arefjäll, 1999).

Though many researchers have written and explained about ex-dividend day, Eades et al., (1984) and Grinblatt et al., (1984) were the probably first writers who wrote about the so called ex-dividend day effect on the surrounding ex-dividend days in their research paper. In fact, the word ex-dividend day effect is first coined by the Claesson in 1987. She did a study on the efficiency of the Stockholm Stock Exchange during the period from January 1978 to May 1985. In her analysis, she divided the dividend with the stock price of cum-dividend day and the result on average dividend yield was 4.25%. The average price dropped by 4.18% on the ex-day. The price to dividend ratio was 0.984 and the return that was given by 0.07% units ((1-0.984)*4.25%) is greater in comparison with the normal daily return. It is seen that on the ex-dividend day the price of the stock is almost exactly same as the dividend paid out (cited in Alm & Arefjäll, 1999).

Alm and Arefjäll, made an empirical study on the same topic. In their paper they investigated the above topic with other sub-topic as regards arbitrage possibilities. The study is based on the sample data of Stockholm Stock Exchange from the companies which paid dividend between 1996 and 1998. For testing the null hypothesis they did the t-test. They documented that on average stock prices drop was less than the amount of dividend paid out (Alm & Arefjäll, 1999).

Eades et al., (1984:3-34) made a study on the ex-date dividend return for a nonconvertible preferred share sample. The preferred stocks are characterized by a relatively preferred dividend yield. They used data between the time period of January 1, 1974 and December 31, 1981. They concluded that the average excess return was a considerably negative -0.141%, which indicates that the price of the stock dropped by the more than the dividend amount.

### 3.4.1. Tax Effect

Usually it has been said that tax has a great impact on dividend and capital gain. Moreover, market valuation of dividends depends on the tax, which is a gradually becoming more important issue. If the corporate tax is higher than the personal tax, the company would have an intention to increase the dividend yield and on the other hand if the corporate tax is lower than the personal tax, the company would have an intention to reduce the dividend yield (Ross et al., 2005:515).

In 1970, Elton and Gruber published an article about the stock price behavior on the ex-dividend day. They were the first researchers who said that the behavior of stock price on ex-dividend day was due to the effect of taxation.

Elton and Gruber did a study to measure the clientele effect and also identify the investor’s marginal tax rate by examining the average price decline on the ex-dividend day. Their study was based on the data of New York Stock Exchange. They used the data of all companies on
NYSE that paid dividend between the period of April 1, 1966 and March 31, 1967 and did trade on the previous day and on the ex-dividend day. Furthermore they developed a formal equation (1) given below.

\[(P_2-P_1)/DPS= (1 - t_p)/(1 - t_{pc}). \text{-------------------- (1)}\]

This equation represents the relationship between the firm’s share prices and its dividend. Here, \(P_2\) represents the closing price before the ex-dividend day, \(P_1\) represents the closing price on the ex-dividend day and DPS stands for dividend per share. By using the above expression, they discovered that the average price decline as a percentage of dividend paid was 77.7%. The price-change-to-dividend ratio is less than one when, \(t_p\) is less than \(t_{pc}\) for marginal investors (Elton and Gruber, 1970).

For Example:

Let firm ABC declares a dividend of DPS=$3. The stock is held by investors who share common tax rate of \(t_p=36\%\) and \(t_{pc}=18\%.\) The ex-dividend day price should be

\[P_2-P_1=$3(1-0.36/1-0.18) =$3(0.78) =$2.34\]

This implies that the price should be fall by 78 percent of the amount of dividend per share (Ogden et al., 2003:480).

According to their point of view, the investors will divide into dividend clienteles according to (a) individual investors face different tax rate, and (b) the shares that offer different dividend yields. They found evidence that the investors who are lower tax bracket holder on dividends than the capital gains prefer higher dividend yields and the investors who is higher tax bracket holder on dividends than the capital gains prefer the opposite (Ogden et al., 2003:480). That’s why they recommended that the ex-dividend day’s stock price does not require dropping as the same amount of dividend.

There is found a mixed evidence in favor of the behavior of stock price on ex-dividend day and a no of study proved that on ex-dividend day the stock price drop more than the dividend amount though Several study was done several researchers about the behavior of stock price on the ex-dividend day though the arguable explanation of Elton and Gruber (1970). Douglas and Hiemstra (1993) did a study on the same topic which is based on the tax reform act of 1986, and they came out with the conclusion that dividends and capital gains valuations are affected by the different taxation. Other researchers like, Litzenberger & Ramaswamy (1979), Poterba & Summers (1984), Barclay (1987) also did a related study and their research results documented significant evidence for clientele effect. In 1979, Litzenberger & Ramaswamy carried out a study on New York Stock Exchange (NYSE). After carried out their study, they observed that there exists a significant positive relationship between expected return and dividend yield (Cited in Islam and Jessie, 2010).

In the United States, a study was done by Lakonishok & Vermaelen (1986); and in Canada another study was done by Booth & Johnston (1984). They stated that taxes differential generate ex-day trading but these studies are not related in a country like Hong Kong where both capital gains and dividends are tax free. Study by Frank & Jagannathan (1998) on Hong Kong Market observed that drop of stock price is less than the dividend amount where either of the dividend or capital gain is subject to paying corporate/personal tax. According to Frank & Jagannathan
the reason of such stock price movement is bid and ask spread where investors expectation act as a rules of thumbs of such stock price behavior. By support of Frank & Jagannathan (1998), Bali and Hite (1998: 127-159) has been performed to observe the trading around ex-dividend day. His model explained that the stock prices are discrete and dividends are continuous and small. The study documented that the fall of stock price less the dividend amount is not tax effect but short-term trading effect.

In Japan, the tax system is quietly different from other countries in regards to dividend income. There is a complete different tax system for the short term and long term trading in other countries. But in the stock market of Japan, investors have no variation in their tax system either short term or long term trading (Kato & Lowenstein, 1995). This unique attribute of Japan stock market always create pressure on the corporate trading. Kato & Lowenstein (1995) also found that dividend or tax have no direct effect on the stock price behavior around ex-dividend day. According to some previous studies on the stock volume reveals that selling pressure and buying pressure increase before and after the declaration of ex-date respectively.

Changing of tax code has noticeable impact on the stock price behavior and volume on ex-date (Michaely & Murgia, 1995). In 1988, UK stock market has dramatically changed after the changes of income and corporate tax. A. Lasfer (1995) studied the UK stock market behavior before and after the changes in the taxation system. Significant differentiation in taxation especially on capital gains and dividends made positive effect on the stock return as well as when the differentiation was withdrawn it made return negative. A. Lasfer (1995) also found positive stock return on ex-date. Before tax, investors equally evaluated the dividend and capital gains. So, on ex-day stock price will fall the same amount as the dividend (Barclay, 1987).

The greater variation between the dividends and capital gains on the basis of tax rate gives higher returns on ex-date (Lasfer & Zenonos, 2003). Lasfer & Zenonos (2003) studied France, Germany, Italy & Uk stock market for the ex-date stock price behavior and got a positive relation with the modified tax rate.

Barclay’s (1987) documented strong evidence in support of tax effect. He stated in his study that before confirmation of income tax in US market, the drop of stock amount was same as the amount of dividend. A number of empirical researches presented evidence in support of tax effect. For example: Study done by Lakonishok & Vermaelen in 1983 and Booth & Johnston in 1984 for Canada; Lasfer in 1995 for U.K; Sarig & Tolkowsky in 1997 for Israel; Jacob & Akhmedov in 2006 for Denmark; and Hietala & Keloharju in 1995 on Finnish market (Cited in Islam and Jessie, 2010).

In 2002, Nikolaos et al., made a research on the behavior of ex-dividend day on share prices in the Chinese stock market. In his study, he used the data of companies in the share between the time periods of January, 1996 to December, 1998 and showed that the fall of stock price on ex-dividend day is exactly same as the amount of dividend.

For examining the non-taxable sample observations he used four hypotheses that added the raw price ratio (RPR), Market adjusted price ratio (MAPR), raw price drop ratio (RPD), and also the Market adjusted price drop (MAPD). The experimental and theoretical values of mean and median for RPR, MAPR, RPD, MAPD were represented and also the standard deviation. The differences that happened as regard the mean from their relating theoretical values where tested using the t-test.
They came out with the conclusion for their hypothesis testing that the results indicating that in non-taxable observations, the share price fall on the ex-dividend day is exactly same as the amount of dividend and for the taxable stock, he came out with the solution that the price of the stock drops as regard as the same amount of dividend (Nikolaos et al., 2002).

A number of empirical studies have challenged Elton and Gruber’s analysis. Due to the following two biases Kalay did not support the tax hypothesis. The following two potential biases are:

“First, the documented positive correlation can be the result of an incomplete adjustment for the "normal" daily price movement and the use of closing prices on the ex-dividend day.”

“Second, the statistical significance of the measured correlation is questionable as some of the observations are likely to be depended” (Kalay, 1982:1067-1068).

Another study done by Bhardwaj & Brooks (1999:503-514) has been performed on NYSE from year 1986 to year 1989. They compared the drop of stock price with dividend yield. The study argued that tax clientele effect play a vital role on ex-divided day stock price behavior. Nikolaos & Travlos (2006) did a study on Athens Stock Exchange where both capital gains and dividends were tax-free income. They documented that the price of stocks drops less than the amount of dividend which is the result of microstructure effect not tax effect.

3.4.2. Clientele effect

The theory that is related on the idea that that a company’s share price depends on the following factors such as investors’ preferences on different tax policies, investors demand, dividend or other policy change that affects the company. The clientele effect implies that investors are attracted to different company policies, and that an investor will adjust his stock holdings in correspondence with the change of company policies. So, the stock price will move due to this adjustment (Ross et al., 2005).

In 1961, Miller and Modigliani was suggested the clientele effect which states that clientele effect is the cause of management’s unwillingness of setting an exact payout ratio which may motivate stockholders to pay unwanted transaction cost (cited in Copeland et al., 2005: 663).

Elton and Gruber (1970) argued that an individual investor will not be able to receive the declared dividend if he sells the shares before the ex-dividend day. But on the other hand that if he sells the shares on the ex-dividend day, he has to sell it at a very low price since the dividend he has to retain. Moreover, they also argued that a company’s share price will vary in relation to the demand and goal of investors in reaction to tax policies and other policies. According to this theory it has been said that investors always concern about their interest i.e. they always think about the policies of different companies and they will adjust their holdings of stock quickly, if the company change their policy. The price will react because of these changes. For example imagine there are two companies A and B respectively. In order to attract the investor company,
A pay huge amount of dividend. This means that the stock price of company A is higher than the company B because investors are more interested to get share with a high dividend payout. But if company, A want to decrease their dividend and company B want to increase their dividend investors will move from company A to company B. As a result the stock price of company A will go down (Elton & Gruber, 1970:68-74).

The relationship between a Clientele’s marginal tax rate and choice of stocks are shown by the Ross et al. Table 3 shows investors with high marginal tax bracket favor a low dividend yield.

*Table 3: Clientele effect.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals in high tax-brackets</td>
<td>Zero-to-low-payout stocks</td>
</tr>
<tr>
<td>Individuals in low tax brackets</td>
<td>Low-to-medium-payout stocks</td>
</tr>
<tr>
<td>Tax-free institutions</td>
<td>Medium-payout stocks</td>
</tr>
<tr>
<td>Corporations</td>
<td>High-payout stocks</td>
</tr>
</tbody>
</table>

*Source: Ross et al., 2005: 522*

Blume *et al.*, (1974) and Lewellen *et al.*, (1978) carried out a study. After carry out a study, they came out a conclusion that the investors who face high marginal tax bracket will intend to buy securities that have low dividend and investors in low marginal tax bracket holders will like to buy securities that have high dividend yield. This is explained in the table 4.

*Table 4: Dividend Yield versus Marginal Tax Rate*

<table>
<thead>
<tr>
<th>Decile</th>
<th>Dividend Yield (% per annum)</th>
<th>Marginal Tax Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.9%</td>
<td>36%</td>
</tr>
<tr>
<td>2</td>
<td>5.4</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>4.4</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>3.5</td>
<td>39</td>
</tr>
<tr>
<td>5</td>
<td>2.7</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>1.8</td>
<td>41</td>
</tr>
<tr>
<td>7</td>
<td>0.6</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>0.0</td>
<td>41</td>
</tr>
<tr>
<td>9</td>
<td>0.0</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td>0.0</td>
<td>41</td>
</tr>
</tbody>
</table>

*Source: Lewellen et al., cited in Ross et al., 2005:523*

Other researchers like Brennan, stated that if tax has been considered, the drop in stock price on ex-dividend day is not equal to the same amount of dividend. He also stated that investors in different tax bracket will desire another payout polices if the amount of dividend is taxed more than the capital gains and investors who face high marginal tax bracket favor shares with low payout ratio (Brennan, 1970: 417-427). But other researchers like kalay, (1982a), Eades, Hess, and Kim (1985), Boyd and Jogannathan (1994), Lasfer (1995), Bali and Hite (1998), Koski and
Scruggs (1998), and Kalay and Michalely (2000) research papers suggesting that the behavior of stock prices on ex-dividend day is not only the result of tax effects (cited in Ogden et al., 2003:480).

In our thesis we are not going to examine the tax effect, clientele effect. But it is necessary to understand clientele effect in order to understand the ex-dividend day effect. The central theme of this thesis is, if the drop of stock price is more than the amount of dividend declared on ex-dividend day.

### 3.4.3. Trading volume around the ex-dividend day

In 1986, Lakonishok and Vermaelen made an empirical study on tax arbitrage by examining the volume of trading around the ex-dividend day. After carry out of their study, they suggested that the volume should be unusually high around the ex-dividend day. Moreover, it should be positively related to dividend yield and negatively related to costs of transactions and it is the result of existence of tax arbitrage. The outcome of their findings is that around the ex-dividend days the trading volume increasing extensively (Lakonishok, and Vermaelen, 1986, cited in Copeland et al., 2005:666-667).

Generally trading volume increases during the time of dividend declaration date and the ex-dividend date. One of the reasons for this incident is to shareholder’s tax category. If the shareholders are in the high tax bracket, they usually sell their share within the time of declaration date and the ex-dividend date to get the capital gain. On the other hand, shareholders in the low tax bracket do the opposite; they buy the share’s to get the dividend gain. Either capital gain or dividend induced the shareholders to change their ownership of shares which ultimately create the result of high volume of trading in the period of announcement and ex-dates. In 1974 Richardson et al., and in 1985 Acquith & Krasker studied the trading volume around the declaration date and also during the time of declaration date and ex-dates. Both studies find statistically unusual trading volume in that period (Copeland et al., 2005:673).

### 3.4.4 Arbitrage opportunity

Arbitrage is a mechanism by buying an asset in a lower price in one market and simultaneously selling the same product at a higher price on different market in order to make profit.

The theory that is documented by Ross in 1976 is called the “Arbitrage pricing theory.” The APT theory is based on these assumptions-1) the capital marker are perfectly competitive 2) all investors are risk-averse and they all have same expectations regarding their investments 3) the market are frictionless. APT represents a relationship between risk and return. In 2005, Ross states the factor model. Factor model explain different economic factors which has direct relation to determine the return of an assets. The factor model also explains that the risky assets expected return has linier relation with the different factors of the model (Ross et al., 2005).

Generally it is considered that arbitrage opportunity is the result of information asymmetry. For example, an investor who purchases a share of Volvo for 20 SEK from one market and
simultaneously sells it for 40 SEK, for another market this investor makes a 20 SEK arbitrage profit due to the information asymmetry. Moreover, Arbitrage opportunity exists as a result of market inefficiencies.

In 1988, David & Jarrow performed a study on the arbitrage opportunity around ex-day. Their study depends on two assets, one is risky stocks and other one is riskless bond. These assets are traded constantly over the time horizon. Other researchers like, Elton et al. (1984), Kalay (1984), and Lakonishok & Vermaelen (1986) also did a study on the arbitrage opportunity around the ex-dividend day and it has been observed from their study that the possibility of arbitrage opportunity due to short-term trading hypothesis (Cited in Islam and Jessie, 2010).

3.4.5. Taxation in different market:

There are exits different tax code on dividend and capital gain on different stock markets. The following table represents the different tax rate on dividends and capital gains on different stock markets.

_Table 5:_ Representation of different tax code on dividends and capital gains on different stock markets.

<table>
<thead>
<tr>
<th></th>
<th>Corporate tax rate</th>
<th>Individual Dividend tax rate</th>
<th>Capital gain tax rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York Stock Exchange (NYSE)</td>
<td>15% to 35%</td>
<td>10% to 35%</td>
<td>0% for low income earners. Generally 15%</td>
</tr>
<tr>
<td>London Stock Exchange (LSE)</td>
<td>28%</td>
<td>10% to 40%</td>
<td>18%</td>
</tr>
</tbody>
</table>

CHAPTER FOUR
PRACTICAL METHOD

The practical method section consists of sampling selection, data collection tools and types, data processing and data analysis. This section actually gives an idea to the readers about statistical and mathematical tools with hypothetical criteria used in our study to reach the research questions.

4.1. SAMPLE DESIGN

Every researcher must use samples from a population for their investigation and analysis. Population refers the total set of observation from which a sample is constructed. When every respondent of a population responses in a survey, then it is called census. But in research, it is not an easy task to manage and conduct a survey for the whole population. Better to select a sample that represents the whole population (Saunders et al., 2007:204-6). Therefore, a sampling is a technique of segmenting the whole population in small group of respondents that minimizes cost and time for data collection. This thesis also use quantitative methods and sampling from large population.

4.2. THE SELECTION OF SAMPLE

According to Bryman and Bell (2007:182), sample represents the part of population which is collected by observation for investigation. Sample is classified in two major categories - probability and non probability. In a probability sampling, each element or unit has the same chance or probability of being selected in a random basis. This sampling minimizes the sampling error. This is also called representative sampling. Probability sampling technique mostly conducts with a survey and experimental research in order to answer researchers’ questions and meet the objectives. There are five probability sampling techniques available; Simple Random Sampling, Systematic Sampling, Stratified Random Sampling, Cluster and Multistage Sampling (Saunders et al., 2007:207).

On the other hand, non-probability sampling is an alternative and more practical sampling technique which is based on subjective judgment of researchers i.e., researchers personal judgment. Non-probability survey associated as a pilot survey (Saunders et al., 2007:226). In this technique sample is not selected in random basis. There are three main categories of Non-probability Sample: the convenience sample, the quota sample and the snowball sample (Bryman and Bell, 2007:197)
For this thesis, we have chosen NYSE and LSE as our target population. At the end of December, 2008 total 8500 companies were listed under NYSE (New York Stock Exchange, 2011). In case of LSE at the end of September, 2010 total 2682 companies were listed (London Stock Exchange, 2010).

Therefore, total target population of this study is 11,182 companies. From this population we decided to take 200 (100 from each) companies on the basis of gross volume sales in 2007 and 2008 from both stock market. We randomly selected 200 companies, of which 100 companies from NYSE and 100 companies from LSE. We used stratified random sampling technique for this thesis. According to Saunders et al., (2007:221), stratified random sampling is a modification of random sampling in which researchers divide the total population into different categories and important strata based on a number of attributes. Under stratified random sampling, we have followed three steps. Firstly, we have selected one variable-gross volume sale. Secondly, we have chosen 400 companies out of 11,182 according to gross volume sale. Finally, we have set our sample size in 200 by using random sampling procedure. Sometimes we also used convenience sampling method. However, we faced some problems because some data represents extreme value. And that is why; we have ignored those values in our calculation.

So, our sample area is London Stock Exchange (LSE) and New York Stock Exchange (NYSE), which are two of the largest Capital Stock Markets in the world. According to the World Federation of Exchange, in respect of value, top 5 largest stock exchanges on September 2005 are as follow.
### Table 6: List of top 5 Stock Market

<table>
<thead>
<tr>
<th>Rank</th>
<th>Exchange Name</th>
<th>Country of Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New York Stock Exchange</td>
<td>United States</td>
</tr>
<tr>
<td>2</td>
<td>Tokyo Stock Exchange</td>
<td>Japan</td>
</tr>
<tr>
<td>3</td>
<td>NASDAQ</td>
<td>United States</td>
</tr>
<tr>
<td>4</td>
<td>London Stock Exchange</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>5</td>
<td>Euronext</td>
<td>Belgium, France, Holland, Portugal</td>
</tr>
</tbody>
</table>

*Source: stockexchangesecrets, 2010*

### 4.3. Collection of data

Data is an important tool for any research. In order to conduct a good research, it is vital to collect appropriate data followed by the research questions. For answering the research questions or to meet the objectives of the research, it is better to evaluate all kind of alternative of collection method and select the best one among them (Saunders, et al., 2000: 281). In this thesis, we gave our best efforts to collect appropriate data from reliable sources. There are two sources of data available for research; such as primary and secondary.

Primary data means the data that is gathered from its original sources and the data is not the subject of distortion. It is also called the raw data. Primary data can be collected from different sources such as, personal interview, mail and the use of internet sources etc. Internet is an important and popular way of collecting primary data in the forms of using e-mail and interactive forms for survey research (Aaker et al., 2004). The main advantages of e-mail and interactive forms are ease of analyzing data, faster, less expensive and less interviewer bias. On the other hand, main disadvantages of e-mail and interactive forms are low rate of respondent, limited reach and no possibility to further explain the questions (Strauss et al., 2003).

The data which is collected and gathered from the primary data and which is the subject of manipulation is called the secondary data. There are three types of secondary data; Documentary, Survey and Multiple Sources Data (Saunders et al., 2007:272). It is one of the fastest and cheapest way to access data and easy way to collect for study. The main disadvantages of secondary data are; very difficult to find appropriate data for current study, different units to measure, limited knowledge and control over data, and finally outdated (Aaker et al., 2000).

In our thesis, we used scientific articles, internet sources, annual reports and other documents as secondary sources that provide reliable information about the stock price of ex-dividend day and the behavior of stock price on ex-dividend day.

After selecting the sample size, for two years (2007 through 2008), we retrieve ex-date share prices, last Cum-day share prices as well as the dividend paid. We used NYSE composite index for New York Stock Exchange and FTSE 100 index for London Stock Exchange as standard for our comparison. Our sample data fulfilled the following criteria:
- Companies must be listed under NYSE composite index for New York Stock Exchange and FTSE 100 index for London Stock Exchange.

- Sample companies should pay cash dividend.

- Stock price must be available within (-4,+3) around ex-dividend day

- No stock dividends and stock splits.

We observed all of our data collected to conclude our empirical findings and results. We studied a total 1029 observations from LSE and 2265 observations from NYSE (including ex-dividend day stock price, cum-dividend stock price and dividend). In case of calculation, we excluded some extreme values which could provide unacceptable outcomes.

4.4. DATA PROCESSING AND ANALYSING

We collected data (secondary) from Thomson DataStream, company’s web site and internet. We summarized the collected data according to our research problem statement. We categorized the total 200 company’s dividend, ex and cum dividend stock price information for the year 2007 and 2008.

After data collecting and sorting, we analyzed the whole findings of our investigation. There are five issues must be considered when researchers try to analyze their findings: type of data (categorical and quantifiable), format of data to input for analysis software, impact of data coding, weight cases and methods for checking data errors. (Saunders et al., 2007: 408).

We choose the mathematical and statistical tools in our data analysis. The most statistical tools used for analyzing data are chi square, correlation coefficient and regression coefficient analysis. Chi square used to determine and verify the hypothesized results. A correlation coefficient is used to assess the strength of relationship between pairs of variables. On the other hand, regression coefficient used to assess the strength of a cause and effect relationship between variables-quantifiable dependent and one or more quantifiable independent variable. This is also called regression analysis (Saunders et al., 2007:451). In this thesis we constructed regression coefficient (using SPSS software) for analyzing linear relationship. For analysis we used some statistical graphical presentation and table for presenting data and results of findings; like scatter plot. In mathematical model we used Nikolas & Travlos, (2006) model.

4.5. MATHEMATICAL MODEL

Our main objective of this paper is to find the stock price behavior on ex-dividend day compare to cum-dividend day stock price. In a general sense an investors always prefer to cash or liquidity of stock i.e., sell of stock on cum-dividend day. On the other hand some investors prefer to hold the stock and take dividend if tax effects zero (Nikolas & Travlos, 2006:4-5). They provide the mathematical model to examine the direction of stock price change on ex-dividend
day. We followed that model as our mathematical model. The brief description of that model is as below:

\[ P_{t-1} = P_{t-0} + D \]  \hspace{1cm} (2)

Rearranging the equation 1 by deducting \( P_{t-0} \) and dividing by \( D \) we get:

\[ RPR = \frac{P_{t-1} - P_{t-0}}{D} = \left( \frac{P_{t-0} + D - P_{t-0}}{D} \right) = 1 \]  \hspace{1cm} (3)

This is the ratio that indicates the price changes from cum-dividend day stock price to ex-dividend day stock price. This ratio is called Raw Price Ratio (RPR).

\[ MAPR = \frac{P_{t-1} - \left( \frac{P_{t-0}}{(1 + r_m)} \right)}{D} \]  \hspace{1cm} (4)

Equation no 3 is called Market-Adjusted Price Ratio (MAPR). Where, \( r_m \) is the return of market index. For NYSE we use NYSE composite index and FTSE 100 index for LSE.

\[ RPD = \frac{P_{t-1} - P_{t-0}}{P_{t-1}} = \frac{D}{P_{t-1}} \]  \hspace{1cm} (5)

Above equation provide the Raw Price Drop ratio (RPD)

\[ MAPD = \frac{P_t - 1 - \left( \frac{P_{t-0}}{(1 + r_m)} \right)}{P_{t-1}} \]  \hspace{1cm} (6)

This equation will give the ratio of Market-Adjusted Price Drop (MAPD).

We also used dividend yield ratio ‘d’ for our analysis MAPD and RPD by using following equation:

\[ d = \frac{D}{P_{t-1}} \]  \hspace{1cm} (7)

For Market Adjusted ex-dividend day Abnormal Return (MAAR), we used the following equation:

\[ MAAR = R_0 - R_m \]  \hspace{1cm} (8)

Here \( r_0 \) calculated by the following formula:

\[ R_0 = \frac{P_0 - P_{t-1} + D}{P_{t-1}} \]  \hspace{1cm} (9)

For analyzing the output of our mathematical model, we developed 5(five) null-hypothesis. We followed the model from Nikolaos & Travlos (2006) on Athens Stock Exchange. We developed the following null hypothesis for our empirical analysis:
$H_1$: the standard mean value of Raw Price Ratio (RPR) = 1
$H_2$: the standard mean value of Raw Price Drop (RPD) = Dividend yield
$H_3$: the standard mean value of Market-Adjusted Price Ratio (MAPR) = 1
$H_4$: the standard mean value of Market-Adjusted Price Drop (MAPD) = dividend yield
$H_5$: the standard mean value of Market Adjusted Abnormal Return (MAAR) = 0

In case of null hypothesis 1 and 3, it will be acceptable if the stock price on ex-dividend day fall by the same amount of dividend paid. On the other hand, null hypothesis 2 and 4 will be acceptable if those are equal to dividend yield. And null hypothesis 5 will be acceptable if the expected mean value of MAAR goes to 0 on ex-dividend day.

We used t-test to find the deviations of our calculated expected mean value of RPR, MAPR, RPD, and MAPD from its hypothetical value. So we can say that t-test conduct to determine the significance of mean difference of two independent variables. In this thesis, according to null hypothesis, our two independent variables are standard or expected mean value and our observed or calculated mean value. We used the following t-test formula:

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

Where,
\begin{align*}
\text{t} & = \text{t-value of the t-test} \\
\mu_0 & = \text{Specific mean or standard value} \\
\bar{x} & = \text{Observed mean value} \\
s & = \text{Standard-deviation} \\
n & = \text{Number of observations}
\end{align*}

**4.6. Statistical Tools**

As statistical tools, we used multiple regression analysis to shows the relationship between dependent variables and independent variables. In this case we try to find out linear regression relationship between ex-dividend day stock price and dividend, cum-dividend day stock price.

In this multiple regression model, we defined Ex-date price ‘$P_t$’ as the dependent variable, the last Cum-day ‘$P_{t-1}$’ and the dividend ‘$D$’ as independent variables, we conducted a linear regression for each year. One might argue why not just run a regression using the price change on Ex-date ($P_t - P_{t-1}$) as the dependent variable and the dividend as the independent variable, they would have a direct relationship and the results would be much easier to interpret. The regression presented an R-Square of inferior to 1%. In response, we added more variables in order to procure a higher R-square with which both can work.

For Regression analysis, we set our null hypothesis are as below:

**Null Hypothesis**: There are no relationships between ex-dividend day and dividend, cum-dividend day stock price or previous day stock price.
CHAPTER FIVE
EMPIRICAL DATA AND ANALYSIS OF FINDINGS

This Chapter is a brief introduction of New York Stock Exchange and London Stock Exchange. In this chapter we represent our empirical findings related with the research problem and explain the behavior of stock prices on ex-dividend day in the two efficient stock markets in the world. We also stated previous researches which are consistent and which are not consistent with our study.

5.1. PRESENTATION OF TWO STOCK MARKETS

5.1.1. New York Stock Exchange

New York Stock Exchange first organized in May 17, 1792 after signing by 24 New York City merchants and stockbrokers in the Buttonwood Agreement. This agreement confirm about the NYSE’s commitment to their investors and issuers. In April 4, 2007 NYSE group, Inc. and Euronext N.V., jointly create NYSE Euronext. NYSE Euronext is the largest (more than 8,000 listed issues); leading and most liquid equities exchange which trade cash equities, futures, options, fixed-income and exchange-trade products across the United States and Europe. Firstly this market called the ‘curb market’. NYSE exchange used US $ as main currency. Total no of listed company is 2,304. Total market cap till August 2010 is $ 11.92trillion and total market volume is $17.52trillion as on December, 2009 (New York Stock Exchange, 2010).

Table 7: NYSE-At a Glance

| NYSE organization | - First organized: May 17, 1792  
|                   | - First constitution: March 8, 1817  
|                   | - Established the NYSE Group, March 7, 2006, as a for-profit corporation.  
|                   | - Creation of NYSE Euronext, April 4, 2007.  
| NYSE Market Information | - Total 7,341,505,961 shares on October 10, 2008 was the highest volume day.  
|                     | - 31 shares on March 16, 1830 was the lowest volume day:  
|                     | - Dow Jones Industrial Average biggest single-day drop: 777.68 points on September 29, 2008.  
| NYSE Market Indexes | NYSE Composite Index, Dow Jones Industrial Average.  

Source: New York Stock Exchange, 2010
5.1. 2. London stock exchange

London Stock Exchange is an important, oldest and largest stock market in Europe. Its history starts more than 300 years before. LSE was founded on 3rd March, 1801 at United Kingdom. There main currency is GBX. Total listed companies till August, 2010 is 2,697. Total market capital US $2.63 trillion till August, 2010. Total market volume US $1.73 trillion till December, 2009. LSE is the combinations of the main market and the alternative investment market (AIM). In 1986 LSE introduced ‘Big Bang’ for deregulation of the market. To increase market efficiency LSE provide SETS (Stock exchange electronically trading systems) from 1997. LSE create EDX London in 2003 for equity derivatives. In 2007 LSE created London Stock Exchange Group by merging with the Borsa Italiana. Main market index for LSE are as below:

- FTSE 100
- FTSE 250
- FTSE 350
- FTSE Small Cap Index
- FTSE all shares index

(Source: londonstockexchange, 2010).

5.2. FINDINGS FROM EMPIRICAL DATA

5.2.1 Multiple regression analyses

We used SPSS software to find out the multiple regression output (see the appendix A, table 13 to 24). In this section we try to analyze on that output we get from SPSS.

Information in the model summary (appendix A table 13) represents the value of R-square for the model. The model has a very high R-Square (1.00), indicates that the deviation in the ex-dividend day stock price (dependent variable) can be explained from other two independent variables. In case of multiple regression line R-square always increases if more independent variables added. So some analyst use adjusted R-square to avoid overestimating. In this model our R, R-square and Adjusted R-square is same i.e. 100%, which can be interpreted as: our model mimics or replicates 100% of our sample data. Same result we see from table no16, 19 and 22(see appendix A).

ANOVA (table no 14) represents the overall regression model’s results. Our model is statistically significant with higher F ratio 394800 and probability level 0.000. From table no 17, 20 and 23 also give same result with probability level 0.000.

From the coefficients (see table no 15) we consider the ex-dividend day stock price as dependent variable and dividend, previous day stock price as independent variables. In this case we set our null hypothesis such as there are no relationships between ex-dividend day stock price and previous day stock price, dividend. On the other hand our alternative hypothesis indicates the ex-dividend day stock price related with dividend and previous day stock price. From the table we
documented that the beta coefficient for previous day is significant because it’s higher than dividend’s beta coefficient with probability level 0.000. So our null hypothesis rejected i.e., there are a relationship between ex-dividend day and cum-dividend day stock price. Almost same result we get from table no 18, 21 and 24 (see appendix A).

5.2.2 Analyses of RPR, MAPR, RPD, MAPD and MAAR

5.2.2.1 New York Stock Exchange

Table no 8 represents both standard value and observed value of Raw Price Ratio (RPR), Market-Adjusted Price Ratio (MAPR), Raw Price Drop Ratio (RPD), Market-Adjusted Price Drop Ratio (MAPD) and Market Adjusted Abnormal Return (MAAR) from New York Stock Exchange in 2007. We also presented standard deviation and t-test value of RPR, MAPR, RPD and MAPD. T-test has been used at 95% confidence level to find the differences between observed mean value and Standard Value.

From New York Stock market, 2007, we documented that Raw Price Ratio (RPR) 0.8505 and corresponding t-statistic -0.4884. This indicates that stock price drop almost 85% of dividend amount. So the drop ratio of stock price on ex-dividend day is less than the dividend amount in 2007. Market-Adjusted Price Ratio (MAPR) of New York Stock market is 0.8078 (81% of dividend) and corresponding t-statistic -0.7174. It represents that stock price fall less than the dividend amount. So in both case our null hypothesis rejected and accept the alternative hypothesis.

<table>
<thead>
<tr>
<th>NYSE 2007</th>
<th>RPR</th>
<th>MAPR</th>
<th>RPD</th>
<th>MAPD</th>
<th>MAAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.8505</td>
<td>0.8078</td>
<td>0.0043</td>
<td>0.0049</td>
<td>0.556</td>
</tr>
<tr>
<td>Standard value</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.0053301</td>
<td>0.0053301</td>
<td>0000</td>
</tr>
<tr>
<td>T-test value</td>
<td>-0.4884</td>
<td>-0.7174</td>
<td>-1.0406915</td>
<td>-0.3704139</td>
<td></td>
</tr>
</tbody>
</table>

We also can explain the behavior of stock prices on Ex-day by RPD and MAPD. Our observed Raw Price Drop ratio (RPD) 0.0043 and corresponding t-statistic -1.0406915, and Market-Adjusted Price Drop Ratio (MAPD) 0.0049 and corresponding t-statistic -0.3704139. Both RPD and MAPD explain that stock price fall less than the dividend amount on ex-day. In this case again our null hypothesis rejected because there are significant difference between standard and observed value of RPD and MAPD. This finding is consistent with prior study by Campbell & Beranek (1955), Elton & Gruber (1970), Fedenia & Grammatikos (1991), Lamdin & Hiemstra (1993) and Cloyd, Li & Weaver (2006); in general who documented that stock price fall less than the dividend amount. According to them, the behavior of such stock price is due to higher taxation on dividend amount than the capital gain. However this findings is not consistent with
Barclay (1987) (as he presented that drop of stock price is equal to dividend amount on ex-dividend day).

We documented no significant evidence of Market Adjusted Abnormal Return (MAAR) on ex-day because P-value for this year is 0.556 (see appendix B table 25).

In New York Stock market, 2008 from above table 9, we find that Raw Price Ratio (RPR) 1.069 and corresponding t-statistic 0.169. It represent that drop of stock price on ex-dividend day is equal to dividend amount. In this case our null hypothesis accepted because our observed value is equal to standard value. Market-Adjusted Price Ratio (MAPR) of New York Stock market is 0.577 and corresponding t-statistic -0.824. It represents that stock price fall less than the dividend amount i.e. our null hypothesis rejected.

Table 9: Standard and observed mean, standard deviation, and t-test value of RPR, MAPR, RPD, MAPD and MAAR from NYSE, 2008

<table>
<thead>
<tr>
<th>NYSE 2008</th>
<th>RPR</th>
<th>MAPR</th>
<th>RPD</th>
<th>MAPD</th>
<th>MAAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1.069</td>
<td>0.577</td>
<td>0.007</td>
<td>0.004</td>
<td>0.246</td>
</tr>
<tr>
<td>Standard Value</td>
<td>1.000</td>
<td>1.000</td>
<td>0.007</td>
<td>0.007</td>
<td>0.000</td>
</tr>
<tr>
<td>T-test value</td>
<td>0.169</td>
<td>-0.824</td>
<td>0.076</td>
<td>-1.199</td>
<td></td>
</tr>
</tbody>
</table>

From the view point of Raw Price Drop ratio and Market-Adjusted Price Drop Ratio our observed RPD value is 0.007 and corresponding t-statistic 0.076. This RPD result conclude that the stock price on the ex-dividend day fall as equal to dividend amount because the observed mean and standard value of RPD is same. So our null hypothesis is accepted. So this study is not consistent with Campbell & Beranek (1995) but consistent with Barclay (1987). In this year MAPD value is 0.004 and corresponding t-statistic -1.199. This MAPD value explains that stock price fall less than the dividend amount on ex-day. So our null hypothesis rejected.

We documented no significant amount of Market Adjusted Abnormal Return (MAAR) on ex-day because P-value is 0.246 (see appendix B table 26).

5.2.2.2 London Stock Exchange

In table 10 we presented Standard Value and observed value of Raw Price Ratio (RPR), Market-Adjusted Price Ratio (MAPR), Raw Price Drop Ratio (RPD), Market-Adjusted Price Drop Ratio (MAPD) and Market Adjusted Abnormal Return (MAAR) from New York Stock Exchange 2007. We also presented standard deviation and t-test value of RPR, MAPR, RPD and MAPD. T-test has been used at 95% confidence level to find the differences between observed mean value and Standard Value.
From London Stock market, 2007, we documented that Raw Price Ratio (RPR) 0.6839 and corresponding t-statistic -1.4415. Which refers that drop of stock price on ex-dividend day is less than the dividend amount in 2007. Market-Adjusted Price Ratio (MAPR) of New York Stock market is 0.7768 and corresponding t-statistic -1.4866. This MAPR value also indicates that stock price fall less than the dividend amount. In both case our null hypothesis rejected because there are a significant difference between standard value (SV) and observed mean value.

Table 10: Standard and observed mean, standard deviation, and t-test value of RPR, MAPR, RPD, MAPD and MAAR from NYSE, 2007

<table>
<thead>
<tr>
<th>LSE 2007</th>
<th>RPR</th>
<th>MAPR</th>
<th>RPD</th>
<th>MAPD</th>
<th>MAAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.6839</td>
<td>0.7768</td>
<td>0.0094</td>
<td>0.0099</td>
<td>0.001</td>
</tr>
<tr>
<td>Standard Value</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.014345</td>
<td>0.014345</td>
<td>000</td>
</tr>
<tr>
<td>T-test value</td>
<td>-1.4415</td>
<td>-1.4866</td>
<td>-2.99128</td>
<td>-3.57964</td>
<td></td>
</tr>
</tbody>
</table>

Again we can see from the table 10 there are more significant difference between SV and OV of mean. Our observed Raw Price Drop ratio (RPD) is 0.0094 and corresponding t-statistic -2.99128, and Market-Adjusted Price Drop Ratio (MAPD) is 0.0099 and corresponding t-statistic -3.57964. Both RPD and MAPD explain that stock price fall less to the dividend amount on ex-day. Therefore in this case our null hypothesis rejected.

In this year our Market Adjusted Abnormal Return (MAAR) on ex-day is 0.001 i.e., P-value (see appendix B table 27) which is almost same with standard value 0.

In 2008 from table 11, we see that Raw Price Ratio (RPR), and Raw Price Drop (RPD) are higher than the Standard Value. In this year the RPR value is 1.3340 and corresponding t-statistic 1.1071. It indicate that drop of stock price on ex-dividend day is more than dividend amount. Market-Adjusted Price Ratio (MAPR) of London stock market is 0.6935 and corresponding t-statistic -1.0424. It represents that stock price fall less than the dividend amount.

Table 11: Standard and observed mean, standard deviation, and t-test value of RPR, MAPR, RPD, MAPD and MAAR from LSE, 2008

<table>
<thead>
<tr>
<th>LSE 2008</th>
<th>RPR</th>
<th>MAPR</th>
<th>RPD</th>
<th>MAPD</th>
<th>MAAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1.3340</td>
<td>0.6935</td>
<td>0.0203</td>
<td>0.0147</td>
<td>0.083</td>
</tr>
<tr>
<td>Standard Value</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.018158</td>
<td>0.018158</td>
<td>000</td>
</tr>
<tr>
<td>T-test value</td>
<td>1.1071</td>
<td>-1.04243</td>
<td>0.921885</td>
<td>-1.68774</td>
<td></td>
</tr>
</tbody>
</table>
According to Raw Price Drop ratio and Market-Adjusted Price Drop ratio our observed RPD value is 0.0203 and corresponding t-statistic 0.921885. This RPD result represent that the stock price on the ex-dividend day fall more than dividend amount because the mean value is higher than the Standard Value of RPD. This finding are inconsistent with prior study (see analysis of 5.2.2.1) who told that stock price decline less than the dividend amount and some told that equal amount of dividend. So, why a steeper decline in prices? On the other hand the MAPD value is 0.0147 and corresponding t-statistic -1.68774. This MAPD value indicates that stock price fall less to dividend amount on ex-day.

We find significant evidence of Market Adjusted Abnormal Return (MAAR) is 0.083 P-value (see appendix B table 28) on ex-day.

5.2.3. **Explanation of empirical findings**

Why do our findings differ from other empirical studies? The answer to the later resides in the financial crisis. Begins of financial meltdown, a time when the stock market started a nose dive. 2008 has been a very difficult, tearful and devastating year for the financial sector in general. The financial crisis mutated into a recession. The recession was the most severe since the great depression (1929). All companies were affected either by drop in revenues or lower margins because all are correlated more of less with to the global economy. In the stock market this translates in price drops through the mechanism of lower future cash flow.

In the this period the markets plummeted to new levels, the NYSE Composite dropped from 8347.24 points to 7073.94 point a free all of just over 15%. This period (last quarter of 2008) is characterized by:

- September 15th Lehman Brothers, the fourth largest I-Bank, on wall street files for bankruptcy
- September 16th American International Group (AIG) is rescued by an $85 Billion loan by the Federal Reserve of New York.
- September 17th Emergency short selling ban on stocks of all companies in the financial sector.
- September 25th Washington Mutual (WaMu) falls in the hand of JP Morgan Chase in an emergency rescue.
- October 3rd, Wachovia is acquired by Well Fargo
- October 8th, new rescue package for AIG ($37.8 Billion)
- December 19th, General Motor and Chrysler are bailed out for $13.4 billion and $4 billion respectively.

No need to say neither theory nor empirical research on ex-date stock price behavior holds in such conditions. The stock market continues plunging erasing more half a decade’s worth of gains.
5.3. Market to market comparison

Table 12: Comparison between NYSE and LSE of 2007 and 2008

<table>
<thead>
<tr>
<th>Subjects</th>
<th>New York Stock Exchange</th>
<th>London Stock Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007 TV</td>
<td>2008 TV</td>
</tr>
<tr>
<td>RPR</td>
<td>0.8505</td>
<td>1.069</td>
</tr>
<tr>
<td>RPD</td>
<td>0.0043</td>
<td>0.0053301</td>
</tr>
<tr>
<td>MAPR</td>
<td>0.8078</td>
<td>0.577</td>
</tr>
<tr>
<td>MAPD</td>
<td>0.0049</td>
<td>0.0053301</td>
</tr>
<tr>
<td>MAAR</td>
<td>0.556</td>
<td>0.246</td>
</tr>
<tr>
<td>STD</td>
<td>132.780</td>
<td>28.680</td>
</tr>
<tr>
<td>Tax Rate (%)</td>
<td>Capital gain</td>
<td>Dividend</td>
</tr>
<tr>
<td></td>
<td>0% for low-income earners. Usually 15%</td>
<td>10% to 35%</td>
</tr>
</tbody>
</table>

Source (Tax Rate): worldwide-tax, 2010

From the above table we can summarize our whole empirical findings. If we want to make a comparison between New York Stock Exchange (NYSE) and London Stock Exchange (LSE) we can analyze the ratio of RPR, RPD, MAPR and MAPD. For market efficiency comparison we can used MAAR, Standard deviation and tax rate of both stock market on capital gains and individual dividend.

In 2007 both stock markets’ ex-dividend day stock price drop ratio is lower than the dividend amount. In both market the mean value of observed RPR, RPD, MAPR and MAPD is lower than the standard value. Therefore there are a significant difference between SV and OV. So our null hypothesis rejected.

But in 2008 we get some difference result than 2007 in both stock markets. New York Stock Market shows quite good position in case of RPR, RPD and MAPD because those three observed value is equal to standard value 1. And our null hypothesis accepted. So we can say that in 2008 NYSE was stable and quite efficient. On the other hand in LSE the observed value of RPR and RPD shows higher value than the standard value. And our null hypothesis rejected. Those higher values indicate that LSE was more volatile market in 2008. We think the main reason was the financial crisis.

If we analyze the standard deviation, MAAR and tax rate impact on dividend and capital gain we can see that both markets have a significant evidence of MAAR which standard value is 0. NYSE stock market doesn’t fulfill these criteria so there is no market abnormal return but we can say that London stock market has an opportunity of abnormal return more than NYSE because of volatility. There are a significant evidence for market adjusted abnormal return in both year because of P value (in 2007 p value is 0.001 see table 3 and 0.083 in 2008). The standard deviation of LSE is quite higher than the NYSE and also their tax rate on capital gain is higher than the NYSE (no evidence of stock price drop less than dividend). So we can say that New York Stock Exchange slightly efficient market than LSE to consider volatility, standard deviation, tax rate and Market adjusted abnormal return (MAAR). But we need more analysis because both markets have significant MAAR. In 2008 NYSE was quite less volatile market.
CHAPTER SIX
CONCLUDING REMARKS

This chapter gives the overall conclusion of the thesis. We used five hypotheses in order to draw a conclusion. Based on these hypotheses we observed how stock price behave on ex-dividend day and also made a comparison between the two largest stock markets regarding their market efficiency. We also discussed about research credibility i.e., reliability, validity and generalization.

6.1. CONCLUSION

The main aim of this thesis was to find out the ex-dividend day stock price behavior in the New York Stock Exchange and London Stock Exchange for the period 2007 to 2008. We used above two largest stock market because of showing stock price behavior with the tax effects and to find the market efficiency. We choose NYSE composite index for New-York stock Exchange and FTSE 100 index for London Stock Exchange.

We used multiple regression analysis to find out the relationship between ex-dividend day stock price, and previous-day stock price, dividend. Our analyses reject the null hypothesis and accepts alternative hypothesis i.e. there are relationship between ex-dividend day stock price and previous day stock price.

In comparison with other prior studies we developed five null hypotheses for Raw Price Ratio (RPR), Market-Adjusted Price Ratio (MAPR), Raw Price Drop Ratio (RPD), Market-Adjusted Price Drop Ratio (MAPD) and Market-Adjusted Abnormal Return (MAAR).

Table-13: Summary of Hypothesis

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Standard Value</th>
<th>NYSE</th>
<th>LSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>RPR=1</td>
<td>Rejected</td>
<td>Accepted</td>
</tr>
<tr>
<td>H2</td>
<td>RPD=dividend yield</td>
<td>Rejected</td>
<td>Accepted</td>
</tr>
<tr>
<td>H3</td>
<td>MAPR=1</td>
<td>Rejected</td>
<td>Accepted</td>
</tr>
<tr>
<td>H4</td>
<td>MAPD= dividend yield</td>
<td>Rejected</td>
<td>Rejected</td>
</tr>
<tr>
<td>H5</td>
<td>MAAR=0</td>
<td>Accepted</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

Based on our empirical study we have inspired to say that market reacts after the ex-dividend day and it also absorbs the reaction within short period of time. That is the signal of semi efficient form of market where the market reacts in corresponding with the available information. In most of the theoretical study it has been identified that stock price goes down as the same amount of dividend at declaration of ex-dividend day and but in this study we observed the opposite reaction. In 2007 (both stock market) stock price drops less than the dividend amount. This result proves that higher taxation on dividend income than capital gains have an impact on ex-dividend day stock price. On the other hand, in 2008 London Stock Exchange shows the drop of stock price on ex dividend day is more than dividend amount. So our null hypothesis rejected. In 2008,
New York Stock Exchange shows that stock price drops similar with the dividend amount i.e., null hypothesis accepted.

We examine the market efficiency hypothesis by analyzing Market-Adjusted Abnormal Return (MAAR), standard deviation and tax code of both countries. In case of MAAR and standard deviation London Stock Exchange shows significant evidence of market abnormal return than NYSE. In London Stock Exchange tax on dividend is higher than the capital gain but in 2008 stock price decline more than the dividend is inconsistent with prior results. So, in case of London Stock Exchange market anomaly exist and no market anomaly in New York Stock Exchange.

6.2. **Practical And Theoretical Contribution**

Form the investors’ point of view; this paper will increase the awareness of an investor regarding the investment decision. By studying the level of market efficiency, investors can get better information about ex-dividend day and stock price relationship for their safe investment. In the question of investment decision, investors can take decision easily by analyzing and predicting the future price movement of a stock.

In the field of research, the thesis states about the behavior of stocks which are traded in the New York Stock Exchange and London Stock Exchange. From the stand of efficient market hypothesis, this paper also makes a comparison between two largest stock markets in the world. By explaining the stock market efficiency, this study makes a link between the stock market efficiency of the 20th century and that of the 21st century.

6.3. **Recommendations**

The chaos and turmoil that has prevailed throughout 2008, makes it impossible to analyze any specific rational behavior in stocks price on Ex-day. We, at our level cannot dissociate the fall in price due to EPS, future EPS, disappointment in regards to analyst predictions etc… or a price drops simply due to the fact that future buyer is not entitled to the next dividend. Therefore we are not able to make any thorough analysis of Ex-day prices based on our data.

It has been documented that before ex-divided day investors may have some abnormal return so we are suggesting buying before ex-divided day and selling it afterwards which might allow investors to gain short term abnormal return. However in long run this theory may not works.

In recession period, investors generally try to convert their investment in more risk free area like government bond, gold etc. instead of shares which creates downward pressure on share price much of the fall is led by fear rather than fundamentals.
6.4. **Further Research**

From our empirical findings we concluded that there are mixed results in different years. London Stock exchange shows stock price drops more than the amount of dividend in 2008 but in 2007 stock price drops less than the amount of dividend. We cannot conclude about real reason for that. Hence, further study is needed in case of London Stock Exchange. Stock price decreases more in London Stock Exchange in 2008 against the taxation effect on dividend. LSE is more volatile market than NYSE. So, further research is required to find out the behavior of investors and also for mixed evidence.

6.5. **The Credibility of Research**

In this section we try to give conclusion about our research credibility according to truth criteria for measuring quality or credibility of research i.e., the accuracy of the research findings according to research problem. This section enlightens to describe the credibility of research design: reliability and validity. “Scientific methodology needs to be seen for what truly is, a way of preventing me from deceiving me in regard to my creatively formed subjective hunches which have developed out of the relationship between me and my material” (Raimand, 1993:55).

6.5.1 **Reliability**

Reliability concerned with the exactness and accuracy of information collected and analysis. Reliability of a research can measure by the consistency of empirical findings. In fact reliability concerns a researcher’s conformability (Brayman, and Bell, 2007). “Is whether the findings of the research can be confirmed by another similar study” (Remenyi et al., 1998). “The economist’s advice of minimum number of 30 for statistical analyses provides a useful rule of thumb for the smallest number in each category within your overall sample” (Saunders et al., 2003:155).

We give our best efforts to get a high reliability of their study. From choice of topics we try to satisfy the above requirements. We design their research question statement and collect data and gather literature review of ex-dividend to solve the research problem statement and show the impact of ex-dividend on stock price.

We give the whole description of topics, research questions, preconceptions, theoretical framework and collect the data by using different methods and analysis the whole data by using reliable statistical tools. Therefore we ensured the reliability and transparency of the study to the reader.

We take our sample size very carefully so that this sample represents the whole study accurately. We take randomly 200 company’s stock price and dividend data to minimize the sampling error. We collect all data from Thomson DataStream so reliability is accurate and transparent one. We analyses the data to follow the research questions and interpreted the findings on theoretical framework to draw a best conclusions. For this reason we think that our findings and analysis give better reliable results and conclusion according to Saunders.
6.5.2. **Validity**

Validity is the second criteria for ensuring the credibility of a research. High validity rate ensure the greater acceptance of research.

Validity of a research shows the relationship between the theoretical framework (related with research question) and empirical findings. Validity concerned with the methodology of data collection and theory which used to achieve and solve the researcher problem questions (Cooper and Schindler, 2003:30-40). Both Saunders et al., (2007:149) and Remenyi et al., (1998) told that validity is concern with the result of research findings which match with the appropriate answer of research questions. According to Bryman and Bell (2007: 41), validity indicates the integrity of the empirical results conclusions. They divided validity into four types such as measurement or construct validity, external validity, internal validity and ecological validity. Measurement or constructive validity refers the measure of a concept which truly reflects that concept. Internal validity is concern with a causal relationship between two or more variables is match or not.

So data collection and literature review is an important elements of a research on which a conclusion about research question will be drawn.

In this study we used the valid data of ex-dividend day stock price and dividend from Thomson DataStream directly and we analyzed many literatures about related theories of impact on stock price on ex-dividend day. As a result we select the key important and reliable information for using theoretical framework part (chapter three). This theoretical positions part reflects and lead the authors to find out the appropriate answer in the empirical findings (chapter five) part.

In chapter five we use regression analysis for finding the relationship (between adjusted ex-dividend day stock prices with dividend) and mathematical model (RPR, RPD, MAPD, MAPR & MAAR) to find the stock price dropping position in 2007 and 2008. And finally we reached our research goal points i.e., achieve to solve the research questions.

6.5.3. **Generalization**

Generalization refers the transferability of research into different other study. Generalization is concern with an application of conducted research with other related organizations (Saunders et al., 2000:102). This word is used to know “to what extent the findings from a study can be generalized to other settings” (Ghauri and Gronhaug, 2002:10-20).

We generalized our result and interpret it on the basis of data collected and compare with the previous literature. We have studied on ex-dividend day and found the kind of changes happened on the stock price of 200 companies of NYSE and LSE respectively. And this study transferable to other stock exchange also. This study has the practical applicability to analyze the stock market behavior and investors preference also for any kind of stock market.
REFERENCE

LIST OF BOOKS:


LIST OF SCIENTIFIC ARTICLES:


**LIST OF SCIENTIFIC ARTICLES (ELECTRONIC):**


**INTERNET SOURCES:**


Appendix A

Multiple regression results (SPSS)

NYSE 2007

Table: 13-Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000a</td>
<td>1.000</td>
<td>1.000</td>
<td>2.8793027</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cumdividend day

Table 14-ANOVAb

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>6546087.562</td>
<td>2</td>
<td>3273043.781</td>
<td>394800.030</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>3075.732</td>
<td>371</td>
<td>8.290</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6549163.295</td>
<td>373</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cumdividend day

b. Dependent Variable: Exdividend day

Table 15-Coefficientsa

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>-.438</td>
<td>.171</td>
<td></td>
<td>.011</td>
</tr>
<tr>
<td>Cumdividend day</td>
<td>1.008</td>
<td>.001</td>
<td>1.001</td>
<td>705.722</td>
</tr>
<tr>
<td>Dividend</td>
<td>-.540</td>
<td>.326</td>
<td>-.002</td>
<td>-1.657</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Exdividend day
### Table 16-Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.999</td>
<td>.998</td>
<td>.998</td>
<td>1.284</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum day Stock Price

### Table 17-ANOVA<sup>b</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>2</td>
<td>157283.192</td>
<td>95365.377</td>
<td>.000&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>380</td>
<td>1.649</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>382</td>
<td>1.649</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum day Stock Price

b. Dependent Variable: Ex Dividend day Stock Price

### Table 18-Coefficients<sup>a</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-.176</td>
<td>.138</td>
<td>-1.271</td>
</tr>
<tr>
<td></td>
<td>Cum day Stock Price</td>
<td>1.003</td>
<td>.002</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Dividend</td>
<td>-.863</td>
<td>.395</td>
<td>-.005</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Ex Dividend day Stock Price
LSE 2007

Table 19-Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000\textsuperscript{a}</td>
<td>.999</td>
<td>.999</td>
<td>22.1318445</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum dividend day

Table 20-ANOVA\textsuperscript{b}

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>9.080E7</td>
<td>2</td>
<td>4.540E7</td>
<td>92691.392</td>
<td>.000\textsuperscript{b}</td>
</tr>
<tr>
<td>Residual</td>
<td>82779.333</td>
<td>169</td>
<td>489.819</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9.089E7</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum dividend day
b. Dependent Variable: Ex-dividend day

Table 21-Coefficients\textsuperscript{a}

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-.101</td>
<td>2.710</td>
<td>-.037</td>
<td>.970</td>
</tr>
<tr>
<td>Cum dividend day</td>
<td>.993</td>
<td>.003</td>
<td>1.001</td>
<td>.000</td>
</tr>
<tr>
<td>Dividend</td>
<td>-.131</td>
<td>.104</td>
<td>-.003</td>
<td>-.207</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Ex-dividend day
Table 22-Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.999a</td>
<td>.999</td>
<td>.999</td>
<td>25.0889416</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum dividend day

Table 23-ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.561E7</td>
<td>2</td>
<td>4.280E7</td>
<td>68000.353</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>103230.618</td>
<td>164</td>
<td>629.455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8.571E7</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Dividend, Cum dividend day
b. Dependent Variable: Ex-dividend day

Table 24-Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>-4.097</td>
<td>3.058</td>
</tr>
<tr>
<td>Cum dividend day</td>
<td>1.000</td>
<td>.003</td>
</tr>
<tr>
<td>Dividend</td>
<td>-.692</td>
<td>.208</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Ex-dividend day
Appendix B:

T-test result (SPSS) to find the P-Values for MAAR Analysis:

**NYSE 2007**

Table 25-One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAR</td>
<td>.589</td>
<td>369</td>
<td>.556</td>
<td>.0003923</td>
<td>-.000917 - .001702</td>
</tr>
</tbody>
</table>

**NYSE 2008**

Table 26-One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAR</td>
<td>1.176</td>
<td>382</td>
<td>.240</td>
<td>.0030222</td>
<td>-.002032 - .008076</td>
</tr>
</tbody>
</table>

**LSE 2007**

Table 27-One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAR</td>
<td>3.326</td>
<td>171</td>
<td>.001</td>
<td>.0044105</td>
<td>.001793 - .007028</td>
</tr>
</tbody>
</table>

**LSE 2008**

Table 28-One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAR</td>
<td>1.745</td>
<td>166</td>
<td>.083</td>
<td>.0034043</td>
<td>-.000448 - .007257</td>
</tr>
</tbody>
</table>