

# Measuring and Comparing the Efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange

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**Abstract-** Dhaka Stock Exchange and Chittagong Stock Exchange have experienced a massive crash in recent time. Regulated authorities of both stock exchanges are trying to reform the market. They are taking various kinds of initiatives to make the market attractive. This study is conducted to measure the efficiency level of Dhaka Stock Exchange and Chittagong Stock Exchange. Market efficiency is used to explain the relationship between information and share price of capital market. In this research it is tried to find out is there relation between the past information and the share price that means are the prices follow random walk or not. Distance of securities is calculated for Dhaka Stock Exchange and Chittagong Stock Exchange to make assumption are stock exchanges belong to strong form of efficiency or not and to conclude which stock exchange is more efficient. The result of the study shows that Dhaka Stock Exchange and Chittagong Stock Exchanges are not in the form of 'weak efficiency' and 'strong efficiency'. So both stock belongs to the 'semi strong' form of efficiency and Chittagong Stock Exchange is more efficient than Dhaka Stock Exchange.

**Index Terms-** DSE, CSE, Efficiency, Comparison

## 1. INTRODUCTION

### 1.1 Background of the Study:

Stock markets in the world individually and collectively play a critical role in the most national economies. The markets perform a wide range of economic and political functions while offering trading, investment, speculation, hedging, and arbitrage opportunities. In addition they serve as a mechanism for price discovery and information dissemination while providing vehicles for raising finances for companies. Stock markets are used to implement privatization programs, and they often play an important role in the development of emerging economies (Fabozzi and Modigliani, 1995). The performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others. Stock market performance is influenced by a number of factors key among them the activities of governments and the general performance of the economy. Economic activities do affect the performance of stock markets. Other factors that affect the stock market's performance include, availability of other investments assets, change in composition of investors, and markets sentiments among other factors (Fabozzi and Modigliani, 1995). So, Stock exchange is an important part of the economy of a country. It can be treated as the heart of economy. But in Bangladesh the stock exchange failed to perform its duty. As a result there is a massive crash. But if the market was, efficient there was less chance of crash. So it is important that Stock Exchange should be efficient. There are two stock exchanges in Bangladesh and they are Dhaka Stock Exchange and Chittagong Stock Exchange. The investors of these stock exchanges need to know the form of efficiency. This study will help them to know about the efficiency of stock exchanges and they will also able to compare the efficiency of the stock exchange with each other.

### 1.2 Rationale of the study:

The stock exchanges of Bangladesh play an important role to the economy. Both stock exchanges help to generate money from idle segment to productive segment. By moving the fund stock exchange creates value of money. Not only that many people of Bangladesh take investment as their career. So, stock exchange of Bangladesh also a great source of employment. The process of open B.O account and the process of trading security are too much easy. That is why people of different segment who have an opportunity to invest try to take the opportunity of investment. But this limited knowledge (opening account and trading system) about investment is not enough. Proper knowledge about the market and its movement must be acquired by an investor. Stock market creates an opportunity to invest for long time. But in Bangladesh it is found that most of the people try to make over night. That is when they find profit quickly they invest more amount in security market. For this reason huge amount of money come to market to purchase little amount of share. And for this reason very recent time Dhaka Stock exchange and Chittagong Stock Exchange experienced massive crash. So there is burning question are the stock exchanges efficient. To find out the efficiency of the stock exchanges and which stock is in a better situation study is needed. So it was the main motivation of the study.

### *1.3 Objective of the Study:*

The main objectives of the study are:

- I. Find out the form of efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange.
- II. Compare the Efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange with each other.

## 2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK:

### *2.1 Definition of Stock Exchange:*

Stock exchange is an organized market for buying and selling corporate and other securities. Here, securities are purchased and sold out as per certain well-defined rules and regulations. It provides a convenient and secured mechanism or platform for transactions in different securities. Such securities include shares and debentures issued by public companies which are duly listed at the stock exchange and bonds and debentures issued by government, public corporations and municipal (Butler, 1992). Stock exchanges are indispensable for the smooth and orderly functioning of corporate sector in a free market economy. A stock exchange need not be treated as a place for speculation or a gambling den. It should act as a place for safe and profitable investment, for this, effective control on the working of stock exchange is necessary. This will avoid misuse of this platform for excessive speculation, scams and other undesirable and anti-social activities (Ivankova, 2012).

### *2.2 Characteristics of Stock Market:*

- Market for securities: Stock exchange is a market, where securities of corporate bodies, government and semi-government bodies are bought and sold (Marisetty, 2004).
- Deals in secondary securities: It deals with shares, debentures bonds and such securities already issued by the companies. In short it deals with existing or second hand securities and hence it is called secondary market (Marisetty, 2004).
- Control the trade of securities: Stock exchange does not buy or sell any securities on its own account. It merely provides the necessary infrastructure and facilities for trade in securities to its members and brokers who trade in securities. It regulates the trade activities so as to ensure free and fair trade (Marisetty, 2004).
- Allows only listed securities: In fact, stock exchanges maintain an official list of securities that could be purchased and sold on its floor. Securities which do not figure in the official list of stock exchange are called unlisted securities. Such unlisted securities cannot be traded in the stock exchange (Marisetty, 2004).
- Transactions effected only through members: All the transactions in securities at the stock exchange are effected only through its authorized brokers and members. Outsiders or direct investors are not allowed to enter in the trading circles of the stock exchange. Investors have to buy or sell the securities at the stock exchange through the authorized brokers only (Marisetty, 2004).
- Association of persons: A stock exchange is an association of people or body of individuals which may be registered or unregistered (Marisetty, 2004).
- Recognition from Central Government: Stock exchange is an organized market. It requires recognition from the Central Government (Marisetty, 2004).
- Financial indicators: Stock exchanges are the financial barometers and development indicators of national economy of the country. Industrial growth and stability is reflected in the index of stock exchange (Marisetty, 2004).

### *2.3 Operation of stock exchange*

Stock Exchange performs many operations as an important part of economy.

The operation can divide into four categories:

#### 1. Main operation:

- To promote the savings and for them to be canalized towards of carrying through investment projects that otherwise wouldn't be possible you need that the issuing institution of the securities to be admitted for quoting. The negotiations will be done on the primary market.

- To provide liquidity to the investors. The investor can recuperate the money invested when needed. For it, he has to go to the stock exchange market to sell the securities previously acquired. This function of the stock market is done on the secondary market (Kithinji, and Ngugi, 2009).

## 2. Operation as an organization:

- To guarantee the legal and economic security of the agreed contracts.
- To fix the prices of the securities according to the fundamental law of the offer and the demand (Kithinji, and Ngugi, 2009).

## 3. Operation in favor of investors:

- It permits him the access to the profitable activities of the big companies.
- It offers liquidity to the security investments, through a place in which to sell or buy securities.
- It permits for the investor to have a political power in the companies in which he invests its savings due that the acquisition of ordinary shares gives him the right (among other things) to vote in the general shareholders meetings of the company in question
- It offers the possibility of diversifying your portfolio by enlarging the field of strategy of investments due to alternative options, as could be the derived market, the money market, etc. (Kithinji, and Ngugi, 2009).

## 4. Operation in favor of listed companies:

- It supplies them with the obtaining of long-term funds that permits the company to make profitable activities or to do determine projects that otherwise wouldn't be possible to develop for lack of financing. Also, this funding signifies a less cost than if obtained at other channels.
- The securities quoted at the stock exchange market usually have more fiscal purpose advantages for the companies.
- It offers to the company's free publicity, which in other way would suppose considerable expenses. The institution is objecting of attention of the media (television, radio, etc.) in case any important change in its owners (the share holders) (Kithinji, and Ngugi, 2009).

### *2.4 Stock Exchange of Bangladesh:*

There are two Stock exchanges in Bangladesh. They are

- i. Dhaka Stock Exchange
- ii. Chittagong Stock Exchange

#### *2.4.1 Dhaka Stock Exchange:*

The Dhaka Stock Exchange is the prime stock exchange of Bangladesh established in 1954 in Motijheel. Stock exchanges started in Bangladesh with the Dhaka Stock Exchange. The need to develop a new stock exchange in Bangladesh was realized by the government of Bangladesh ever since Calcutta Stock Exchanges had stopped the transactions in Pakistani shares and securities. The Dhaka Stock Exchange basically started with the formation of the Provincial Industrial Advisory Council. Initially it was named the East Pakistan Stock Exchange Association Ltd. It was revised in 1964 and since then it has used the present name. Although the Dhaka Stock Exchange was incorporated in 1954 it started trading formally from 1956 (Chaity and Sharmin, 2012).

Trading in the Dhaka Stock Exchange discontinued for a span of five years following the liberation war of 1971. Trading was regained from 1976. In 1976, there were nine listed companies in Dhaka Stock Exchange with a paid up capital of Tk 137.52 million. The Dhaka Stock Exchange actually witnessed high growth in 1983 when the market capitalization reached Tk 812 million. By 1987, there was a spurt in the market size with the number of listed companies shooting up to 92. With the opening up of the economy in the 90s the Dhaka Stock Exchange also rapidly developed (Chaity and Sharmin, 2012).

#### *2.4.2 Structure of the Dhaka Stock Exchange*

By 2001 the number of listed securities in the Dhaka Stock Exchange was 244, number of listed companies was 224, number of listed debentures was 10, and the number of shares issued by the listed companies was 666,553. The number of Mutual Funds was 72,250 and the market capitalization was Tk 72,168 million (Chaity and Sharmin, 2012).

### 2.4.3 Nature of Dhaka Stock Exchange

The Dhaka Stock Exchange was a physical stock exchange in its initial days when trading took place in the open outcry system. But with the advent of new technology, the traditional mode of trading was abolished and was replaced by a fully automated computerized Stock Exchange. The trading session occurs in five parts- the pre-opening session, opening session, continuous or regular trading session, closing session or post-closing session (Chaity and Sharmin, 2012).

### 2.4.4 Functions of the Dhaka Stock Exchange

The following are the functions of the Dhaka Stock Exchange:

- Listing of Companies
- Providing screen based automated trading of securities.
- Settlement of trading following the Settlement of Transactions Regulation.
- Market Administration and Control
- Market Surveillance
- Publication of monthly review
- Monitoring the activities of the listed companies following the Listing Regulations.
- Formation of the Investors' Grievance Cell
- Formation of the Investors' Protection Fund
- Online Notification of price sensitive and other information about the listed companies (Chaity and Sharmin, 2012).

### 2.5 Chittagong Stock Exchange

Chittagong Stock Exchange Ltd. (CSE) grants access to public limited companies to list in the Exchange, thus providing its securities a securities trading facility. CSE has an automated trading system with satellite based a network connecting three major cities: Dhaka, Chittagong and Sylhet. CSE also initiated Internet Trading Services for investors to trade its listed securities from anywhere in the world which in turn facilitates the listed companies to liquidate their securities with fair and transparent pricing. While listing CSE ensure the fulfillment of qualitative and quantitative eligibility criteria by the companies. At initial listing companies, CSE make sure of exacting compliance of listing rules and regulation by the listed companies to provide an efficient and transparent market of international standard (Chaity and Sharmin, 2012).

The Securities and Exchange Commission is the final authority to approve an IPO. The Exchanges' role is limited to comments of the information in the prospectus. Chittagong Stock Exchange has to compete with the other stock exchange in Bangladesh (the Dhaka Stock Exchange), who is much older and whose brokers are much experienced, in general. CSE often offer discounted fees to the new company listing (Chaity and Sharmin, 2012).

#### 2.5.1 The main objectives of CSE are:

- To develop a strong platform for the entrepreneurs for raising capital.
- To develop a transparent market ensuring investor protection
- To provide fully automated trading system
- To ensure quick, easy settlement system
- To attract non-resident Bangladeshis to invest in Bangladesh Stock Market
- To develop a high standard of commercial practice
- To develop a research cell for analysis status of the market (Chaity and Sharmin, 2012).

### 2.6 Earlier Studies:

A stock market is said to be efficient if it fully and correctly reflects all relevant information in determining security prices. Formally, the market is said to be efficient with respect to some information set if security prices would be unaffected by revealing that information to all participants. Efficiency with respect to information set also implies that it is impossible to make economic profits by trading on the basis of this information (Burton, 1989)

Factors such as weak regulation, lack of supervision, lack of market transparency which may influence the efficiency level of capital market; even recent market scam report also indicate these factors as vital for stock market crashes (Burton, 1989)

Haque et al., (2001) tested the Efficient Market Hypothesis (EMH) based on the data four months before and four months after the automation which was imposed in DSE market on 10th August, 1998. The test results indicated that the market does not improve and even after automation, manipulation continued.

Stock markets provide investors with an efficient mechanism to liquidate their investments. The very fact that investors are certain of the possibility of selling out what they hold as and when they want, is a major incentive for investment as it guarantees mobility of capital in the purchase of assets. The interactions of buyers and sellers in a stock market determine the price of traded assets; or equivalently the required return that investors demand and is this feature of stock market that signals how funds in the economy should be allocated among financial assets (Fabozzi, 1995).

A stock exchanges' efficiency can be measured by its liquidity and price discovery. An exchange that provides price discovery will have high liquidity. By measuring the speed of stock price adjustment to its intrinsic value with the arrival of new information we can understand price discovery process and productive efficiency of a stock exchange. Speed of adjustment is based on the information sharing process among the market participants and the information dissemination of the companies to the market participants. As mentioned above, speed of adjustment should be instantaneous in an efficient market. Such an instantaneous adjustment occurs when the information shared among the market participants, the information disseminated by the companies and the information transmitted by the media is symmetric. The technology involved to process information for instantaneous adjustment is also an important factor (Marisetty, 2004).

The misinterpretation of information can affect on market misleading and valuing. How to analyze information and the amount and optimism or pessimism level about information can affect on the pricing. Optimists are optimistic to deal with incoming information and set higher prices for them, and pessimists set lower prices even for that valuable information. In one hand, optimists risk more on unreliable futures and predict the future events incorrect. Also, market traders that have less information about upcoming events pay to stock price invasive than others. It is caused the market be inefficient in pricing of securities and they trusted more on incomplete information and excess in pricing based on. (Karimkhani et al., 2012)

An efficient stock market sector will have the expertise, the institution and the means to priorities access to capital by competing users so that an economy manages to realize maximum output at least cost. This is what economist refer to as the optimum production level. If an economy does not have efficient financial markets there is always the risk that scarce capital could be channeled to non-productive investments as opposed to productive ones, leading to wastage of resources and economic decline (Lee, 1998). To find out the efficiency of Stock exchange many scholar used Statistical tools like ARIMA, Autocorrelation, If prices conform to a random walk, then the security returns are independent over time (Leland, 1999 and Nyberg and Vaihekoski, 2011). They applied autocorrelation and run test to examine the nature and extent of serial dependence. The Efficient Market Hypothesis no longer holds the impervious position in finance it once did. Consequently the assumption that share prices follow a random walk is now uncertain. (Dupernex, 2007). Many researches have been conducted to find out or measure the efficiency of Dhaka Stock Exchange. (Chaity and Sharmin, 2012) try to evaluate the efficiency of the Dhaka stock exchange by using Statistical tools. They used both non-parametric and parametric test for the period 1993 to 2002.

### *2.7 Value of the Study:*

The study is basically conducted to find out the efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange. The study will also find out the better stock exchange between the two stock exchanges (Dhaka Stock Exchange and Chittagong Stock Exchange). It is very import at present for the investor to know the efficiency of the Stock exchange of Bangladesh. Because in Bangladesh the stock exchange has experienced two massive crashes (1996 and 2011) already. So, investors of the country are very much worried to invest. If this situation continues for a long time, the Stock exchanges as well as the whole economy will be affected roughly. But the study will help the party by providing information of efficiency about the Stock Exchanges.

So it can be said that, authority and stakeholders will be benefited by the study. Because at present there is general idea about DSE and CSE is very poor. The investors who have already invested at the market are very much upset after the recent crash. New investors who have money to invest are worried to invest. But if they can know about the efficiency level of Dhaka Stock Exchange and Chittagong Stock Exchange they will be able to find out their duty and can take decision.

There is no comparison parameter to compare the efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange. The study will find out the more efficient Stock Exchange. So investor will be benefited by the study and will be able to find out the better stock exchange between Dhaka Stock Exchange and Chittagong Stock Exchange. Regulated body will be able to take proper initiative about

the market. That is why further crash can be avoided. Authority of Dhaka Stock Exchange and Chittagong Stock Exchange can take proper decision by joining there plan and activities. Moreover the study will help to increase the efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange.

### 3. MATERIALS AND METHODS:

#### 3.1 Research Question:

This research is conducted to find out the answer of two question and the questions are

- How efficient the stock exchanges (DSE and CSE) are?
- Which stock exchange is more efficient?

#### 3.2 Research Design:

The research is basically a descriptive research. It will find out the position of DSE and CSE. That means it will find out which form of efficiency DSE and CSE belongs to. To conduct this research descriptive statistics test and ARIMA test is conducted. And to compare the efficiency of DSE and CSE equation of security market line for DSE and CSE is formulated. And after the distance of sample security is calculated.

#### 3.3 Data Collection and Analysis Techniques:

To conduct the research DSE General Indices and daily price for sample stock is used. All data is collected from the website of Dhaka Stock exchange and Chittagong Stock Exchange. The data is also collected from stockbangladeh.com. Sample stocks are the blue chip share of Dhaka Stock Exchange and Chittagong Stock Exchange. They are taken as sample because the position of blue chips should be more attractive.

Data analysis basically divided into two parts

- I. Find out the efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange.
- II. Compare the efficiency of Dhaka Stock Exchange and Chittagong Stock Exchange.

The daily market returns are calculated from the daily price indices without adjustment of dividend. Because in recent years many analysts have claim that trader paying more attention to information related to recent trends in return instead of information related to future dividend Daily Market returns ( $R_m$ ) are calculated from the daily price indices as follows:

$$R_m = \text{Ln}\left(\frac{P_t}{P_{t-1}}\right)$$

Where,  $R_m$  measures market return in period t;  $PI_t$  indicates price indices at day t and  $PI_{t-1}$  follows the price index at time period t-1. Ln = natural log, Logarithmic returns are more likely to be normally distributed which is prior condition of standard statistical techniques (Strong 1992; Mubarak 2000; Hossain 2010). If the market follows a hypothesis of weak form efficient then stock prices should be random walk. The Null and Alternative hypothesis of the study would be-

*H<sub>0</sub>*: Market returns series follow the random walk model.

*H<sub>1</sub>*: Market returns series do not follow the random walk model.

One of the basic assumptions of random walk model is that distribution of the return should be normal. Skewness helps to find is the distribution normal or not. Here skewness is measured by using the data of market return. If the skewness is 0 it can be said that the distribution is normal. If it is negative it can be said that the left tail is longer the right tail which indicate that the distribution of the return should not be normal. And if it is positive it can be said that the right tail is longer than the left tail. Which also indicate that the distribution of the return is not normal. To test the hypotheses ARIMA test is also conducted. The acronym ARIMA stands for "Auto-Regressive Integrated Moving Average." Lags of the differenced series appearing in the forecasting equation are called "auto-regressive" terms, lags of the forecast errors are called "moving average" terms. Under the random walk model, ARIMA model is (0, 1, 0) where future values of share returns cannot be determined on the basis of past information.

To compare the efficiency between DSE and CSE a security market line equation is formulated. The formula of liner equation is

$$Y = mx + c$$

Where ‘m’ is the slope and c is constant that means it is the intercept value of Y axis. To formulate the SML equation risk free rate is considered as ‘c’ and difference between market return and risk free return that means risk premium is considered as the slope ‘m’. After that distance of each sample stock is calculated by using the following formula.

$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

Here beta coefficient is considered as  $x_1$  and Actual Return is considered as  $y_1$ . The value of risk premium is considered as ‘a’ and the value ‘b’ is one (1). Beta coefficient ( $\beta$ ) is taken from the website stockbangladesh.com after that average distance for each stock is calculated. The lower average distance is indicate the higher efficiency than the others

#### 4. FINDINGS AND ANALYSIS:

In this part at first descriptive statistics of Dhaka Stock Exchange and Chittagong Stock Exchange are analyzed. To analyze descriptive statistics mean, standard deviation and skewness of the data are calculated. From the result of skewness it is tried to find out are the data following random walk or not. After that ARIMA test is conducted to make sure again that is it following random walk model or not. That means are the data influencing by the past information or not. If the data are influencing by the past information it can be conclude that there is a weak form of efficiency. Finally by formulating SML (security market line) equation and measuring the distance of selected stock it is tried to find out which stock is more efficient. In an efficient market all the stocks are laying on security market line. So if any kind of discrepancy is found it can be concluded that the stock exchange is not in the form of Strong form of efficiency. By making average of the distance of both the stock it is tried to find out which stock is more efficient. The stock exchange which shows the lower distance is said to be in higher form of efficiency. And the stock exchange which shows the higher distance is said to be in lower form of efficiency.

##### 4.1 Descriptive Statistics Dhaka Stock Exchange:

Table:1

Statistic	Market return (DSE)
N	237
Mean	0.001007
SD	0.020710
Skewness	-.155

Table-1 shows that data of 237 days is taken for descriptive analysis. It also shows that the mean of market return is 0.001007 and Standard deviation is 0.020710. Skewness is -.155. One of the basic assumptions for testing the random walk model and therefore, EMH is that return series should be normal. But Table 1 shows that there is a negative Skewness which is -.155 that means the left tail is longer than right tale. To be normal distribution skewness should be 0. So the distributions are not normal and reject the null hypothesis. But earlier studies shows that the skewness was .859 (Chaity. N. S & Sharmin .S, 2011) . That was near about unity. But in recent time the skewness is -.155 which is near about zero. That means in recent times there is enough chance that the data are influenced by the past information. Which indicate that market efficiency is going down. If all the data are followed by historical information then the market is said to be in weak form of efficiency.

##### 4.2 ARIMA Test (Dhaka Stock Exchange):

Table:2

Model	Parameters	Coefficient	Standard Error	T-statistics	Probability
(0,1,0)	Constant	.00002891	.002	.015	.988
(1,0,1)	AR1	-.360	.863	-.417	.677
	MA1	-.296	.883	-.336	.737
	Constant	.001	.001	.782	.435
(1,0,0)	AR1	-.055	.065	-.839	.402
	Constant	.001	.001	.788	.432

Table-2 shows the ARIMA test Result for the Model of (0, 1, 0) (1, 0, 1) 1, 0, 0). Under the random walk model, the ARIMA model needs to be fitted in to (0, 1, 0). The results of ARIMA are presented in the Table 2 evident that the return series for indices are highly insignificant. For ARIMA (0, 1, 0) the coefficient (.0002891) with T-ratio of (.015) reject the null hypothesis with a probability of .988 for indices. For ARIMA (1, 0, 1) the estimated values for AR1 and MA1 are found best fitted model for 1% level of significance. Additionally ARIMA (1, 0, 0) is to calculated for indices to examine the auto- regression coefficient is equal to unity. The coefficient showing for indices AR1 (-.055) indicates the changes in the return series do not depend on past information. In case of earlier study it is found that return of Dhaka Stock Exchange follow random walk model. That means that the information of stock is not influenced by the past information and the past information here means the price of the security. It can be concluded easily that Dhaka Stock Exchange is not in the form of weak efficiency.

4.3 Calculation the distance of selected stock from SML (DSE):

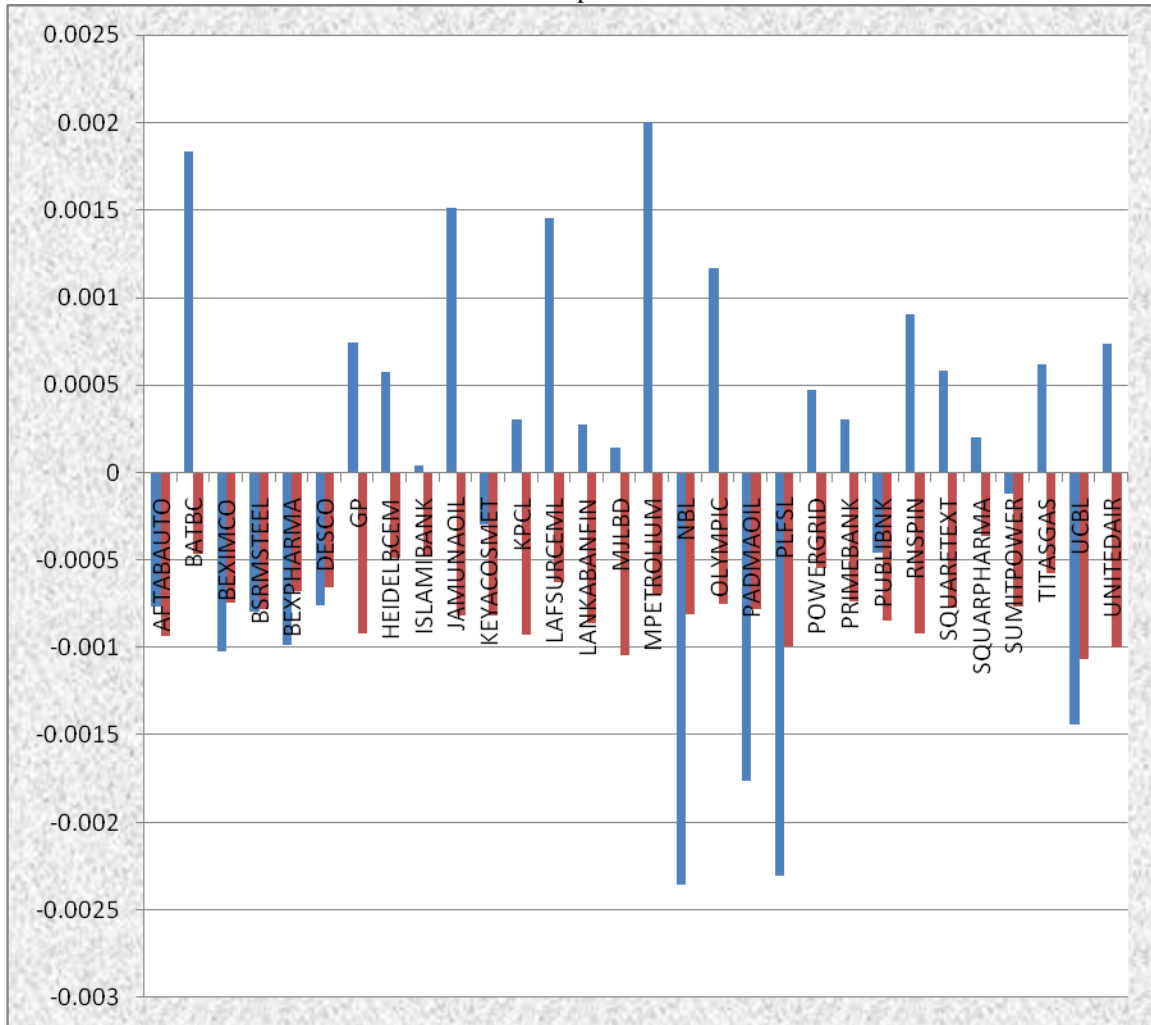
Table: 3

Name of the Stock	Actual Return	Risk	Required Return	Distance from SML
AFTABAUTO	-0.000764945	1.14413380233	-0.000935021	0.000170073
BATBC	0.001836778	0.64147118692	-0.000463211	0.002299987
BEXIMCO	-0.00102618	0.94467723432	-0.000747807	0.000278376
BSRMSTEEL	-0.000794628	0.98207989914	-0.000782914	.0000117172
BEXPHARMA	-0.000986818	0.87289155530	-0.000680427	0.000306394
DESCO	-0.000758099	0.84682345917	-0.000655959	0.000102143
GP	0.000745126	1.12647967975	-0.000918451	0.001663573
HEIDELCEM	0.000571297	0.6676010259	-0.000487737	0.001059032
ISLAMIBANK	0.0000407	0.66077506158	-0.00048133	0.000522028
JAMUNAOIL	0.001509531	1.01942653367	-0.000817968	0.002327496
KEYACOSMET	-0.000301207	1.01942653367	-0.000817968	0.000516758
KPCL	0.000300465	1.13767230565	-0.000928956	0.001229418
LAFSURCEML	0.001449408	0.81788385867	-0.000628796	0.002078201
LANKABANFIN	0.000271	1.06965967994	-0.000865118	0.001136115
MJLBD	0.000138385	1.26193827446	-0.001045595	0.001183977
MPETROLIUM	0.002002677	0.88267199064	-0.000689607	0.002692282
NBL	-0.002352547	1.00779965675	-0.000807055	0.001545495
OLYMPIC	0.001168716	0.94711174036	-0.000750092	0.001918805
PADMAOIL	-0.001762883	0.9772313210	-0.000778363	0.000984523
PLFSL	-0.002300692	1.20585143803	-0.000992951	0.001307745
POWERGRID	0.000473405	0.72768428694	-0.000544132	0.001017535
PRIMEBANK	0.000304792	0.93138165863	-0.000735327	0.001040116
PUBLIBNK	-0.000461604	1.05191402064	-0.000848462	0.000386855
RNSPIN	0.000902772	1.12903181242	-0.000920846	0.001823615
SQUARETEXT	0.000578103	0.96998563928	-0.000771562	0.001349662
SQUARPHARMA	0.00019859	0.53235811836	-0.000360795	0.000559383
SUMITPOWER	-0.000123483	0.96160685057	-0.000763697	0.000640211
TITASGAS	0.00061945	0.75843849988	-0.000572999	0.001192447
UCBL	-0.001437263	1.28578199385	-0.001067976	0.000369291
UNITEDAIR	0.000733301	1.21741033756	-0.0010038	0.001737098

Table-3 shows the actual return, beta co-efficient, required rate of return, and the distance of each stock from SML for the sample stock. DSE is showing very ridiculous scenario. Because it is very unusual that the market return is negative. It should be more than the risk free rate which is 5% per year ([http://www.stockbangladesh.com/resources/individual\\_return/11101](http://www.stockbangladesh.com/resources/individual_return/11101)). Because there is a risk in the market. So investor will demand more than the risk free rate as risk premium. Table 3 shows that actual return more of less satisfactory. But because of negative market return all the required rate of return is negative which is also unusual. The average distance of the stock from security market line is 0.0011150 and this is high. That means Stocks are not lies on SML. It indicates that market is not belongs to 'strong form of efficiency'. Because it is said that in an efficient market all the stocks must lie on SML. But in case of Dhaka Stock Exchange no stock is lies on SML because distance of any stock is not showing 0. If distance is 0 that represent the stock is laying on the Security Market Line.



Graph-1



■ Required Return  
■ Actual Return

Graph shows that the Actual return for most of the stock is greater than the required rate of return. It means this stock perform better in case of getting return. But the real case is the market fluctuated in the year so much and the price of most of the share decreased. As a result market return was negative. And for that reason required rate was negative. In case of getting return MPETROLIUM is highest and NBL is lowest. Required is highest for SQUAPHARMA and lowest for TITASGAS. Because the risk for SQUAREPHARMA is the lowest and the risk for TTASGAS is the highest.

**4.4 Descriptive statistics for Chittagong Stock Exchange:**

**Table-4**

Statistic	Market return (DSE)
N	236
Mean	-0.001007424
SD	.0265392
Skewness	.147

Table-5 shows that the mean of market return is -0.001007424 and Standard deviation is 0.065392. Skewness is .147. It shows the positive skewness. So the distribution is not normal. Its right tail is longer than the left tail. Because normal distribution shows 0

skewness. And to prove random walk for EMH skewness should be 0. So here we see that the data set is not following the random walk model. And reject the null hypothesis. The skewness is closer to zero. Which indicates that there is enough chance that data are influenced by the past information. Earlier it was that the skewness of Dhaka Stock Exchange was near about unity. It can be assumed from that situation is skewness for Chittagong was also high. But in recent time both the stock exchanges are showing very low skewness. That means investors are taking decision of buying and selling share by the influence of past information.

4.5 ARIMA Test (Chittagong Stock Exchange)

Table-5

Model	Parameters	Coefficient	Standard Error	T-statistics	Probability
(0,1,0)	Constant	-.00002891	.002	-.015	.988
(1,0,1)	AR1	-.001	.001	-.786	.433
	MA1	-.386	.778	-.496	.620
	Constant	-.318	.800	-.398	.691
(1,0,0)	AR1	-.001	.001	-.791	.429
	Constant	-.057	.065	-.867	.387

Table-5 shows the ARIMA test Result for the Model of (0, 1, 0) (1, 0, 1) 1, 0, 0). Under the random walk model, the ARIMA model needs to be fitted in to (0, 1, 0). The results of ARIMA are presented in the Table 5 evident that the return series for indices are highly insignificant. For ARIMA (0, 1, 0) the coefficient (-.00002891) with T-ratio of (-.015) reject the null hypothesis with a probability of .988 for indices. For ARIMA (1, 0, 1) the estimated values for AR1 and MA1 are found best fitted model for 1% level of significance. Additionally ARIMA (1, 0, 0) is to calculated for indices to examine the auto- regression coefficient is equal to unity. The coefficient showing for indices AR1 (-.001) indicates the changes in the return series do not depend on past information. But it can not be said that both exchanges are in the form of weak efficiency unless the skewness is zero.

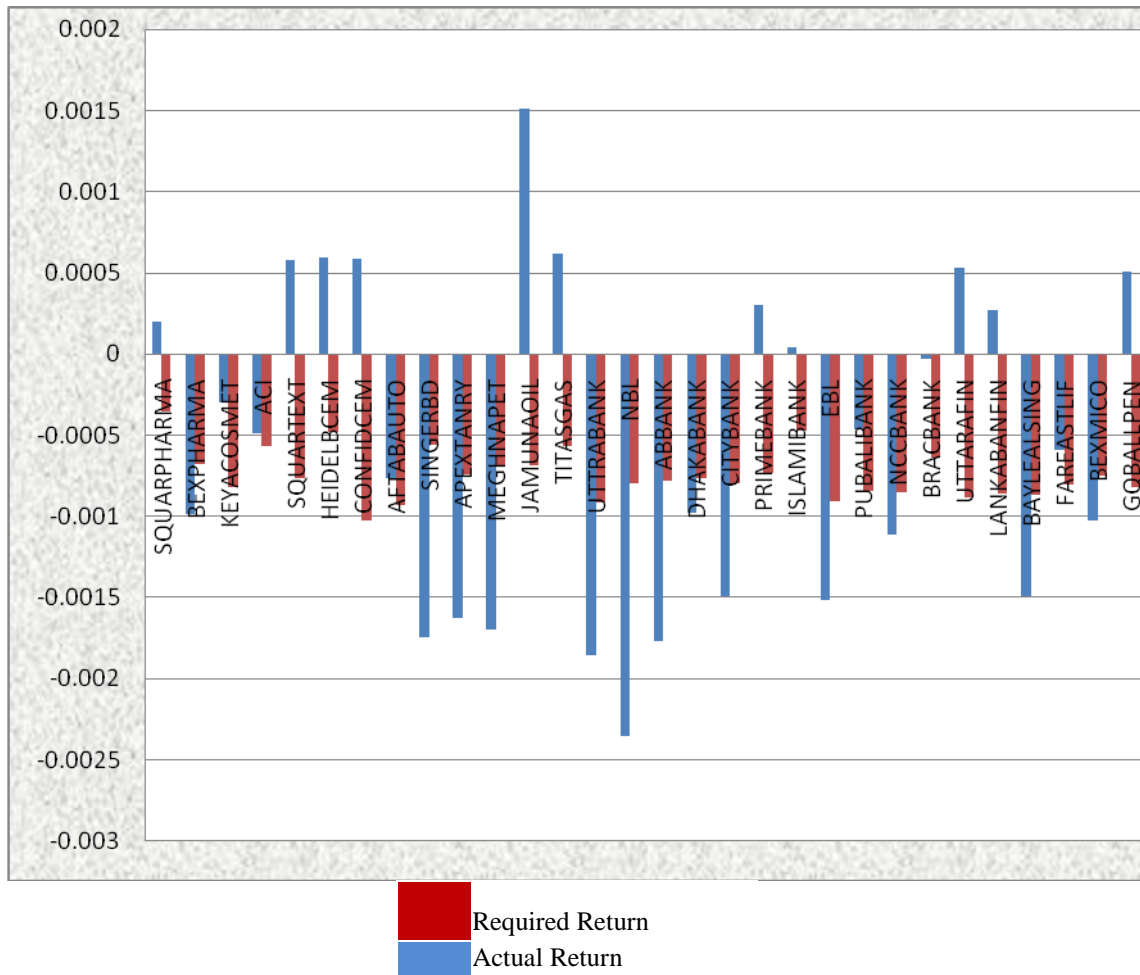
4.6 Calculation the distance of selected stock from SML (CSE):

Table-6

Name of the Stock	Actual Return	Risk	Required Return	Distance from SML
SQUARPHARMA	0.00019859	0.531773984	-0.000357459	0.0005588
BEXPHARMA	-0.000986818	0.875009407	-0.000677829	0.000304406
KEYACOSMET	-0.000301207	1.029200525	-0.000821748	0.000525932
ACI	-0.000488934	0.757740404	-0.000568372	0.00008340766
SQUARTEXT	0.000578103	0.97049993	-0.000766958	0.001350145
HEIDELBCEM	0.000592331	0.666825524	-0.000483514	0.001079338
CONFIDCEM	0.00058568	1.250611406	-0.001028409	0.00162064
AFTABAUTO	-0.000764945	1.143427636	-0.000928366	0.00016941
SINGERBD	-0.001748011	0.751258602	-0.000562322	0.001181754
APEXTANRY	-0.00162526	0.942681803	-0.000740993	0.000879329
MEGHNAPEM	-0.001693098	0.880542729	-0.000682994	0.001005492
JAMUNAOIL	0.001509531	0.88478816	-0.000686956	0.002201122
TITASGAS	0.00061945	0.759961175	-0.000570445	0.001193876
UTTRABANK	-0.001851945	1.130955155	-0.000916724	0.000929297
NBL	-0.002352547	1.003110322	-0.000797396	0.001549897
ABBANK	-0.001766769	0.985051234	-0.00078054	0.000981069
DHAKABANK	-0.000981337	0.969187523	-0.000765733	0.000210528
CITYBANK	-0.001494739	1.003391023	-0.000797658	0.000691825
PRIMEBANK	0.000304792	0.931634046	-0.000730681	0.001040353
ISLAMIBANK	0.0000407259	0.654258621	-0.000471784	0.000515937
EBL	-0.001514524	1.118014739	-0.000904646	0.000604022
PUBALIBANK	-0.000463568	1.050379123	-0.000841516	0.00038345
NCCBANK	-0.001111777	1.05854348	-0.000849136	0.000257096
BRACBANK	-0.0000335768	0.836630863	-0.000642007	0.000612813
UTTARAFIN	0.000531168	1.099081083	-0.000886973	0.001423899
LANKABANFIN	0.000270678	1.072356038	-0.000862029	0.001138323
BAYLEALSING	-0.001493644	1.075994097	-0.000865425	0.000622584
FAREASTLIF	-0.000588801	1.01433292	-0.000807871	0.000224383
BEXMICO	-0.00102618	0.950423417	-0.000748219	0.000272982
GQBALLPEN	0.000503164	1.025970559	-0.000818733	0.001327272

Table-6 shows the actual return, beta co-efficient, required rate of return, and the distance of each stock from SML for the sample stock. CSE is also showing very ridiculous scenario. The market return is also negative here. It should be more than the risk free rate which is 5% per year. Because there is a risk in the market. So investor will demand more than the risk free rate as risk premium. Table 6 shows that actual return more or less satisfactory. But because of negative market return all the required rate of return is negative which is also unusual. The average distance of the stock from security market line is 0.000831313 and this is high. That means Stocks are not laying on SML. It indicates that market is not efficient. Because it is said that in an efficient market all the stocks must lie on SML. But in case of Chittagong Stock Exchange no stock is lies on SML because distance of any stock is not showing 0. If distance is 0 that represent the stock is laying on the Security Market Line. So The Chittagong is not in the form 'strong efficiency'.

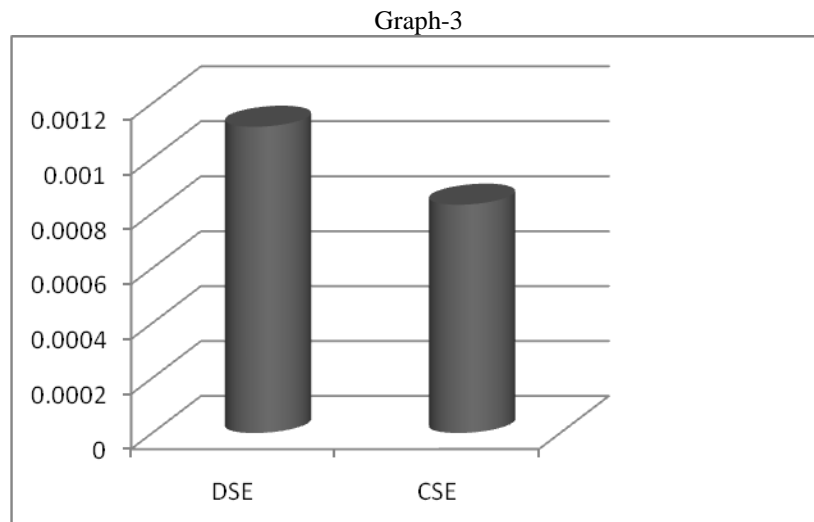
Graph-2



Here we see the same kind of scenario. Actual return for most of the stock is greater than the required rate of return. It means this stock perform better in case of getting return. But the real case is the market fluctuated in the year so much and the price of most of the share decreased. As a result market return was negative. And for that reason required rate was negative. Here we also see that the in case of giving return JAMUNAOIL is highest and like DSE NBL is the lowest. Required rate of return is highest for SQUAREPHARMA and the lowest is CONFIDCEM.

4.7 Comparison the Efficiency of DSE and CSE:

Analysis shows that the average distance of stock from SML CSE is lower than the SML of DSE.



Graph clearly shows that the average distance of the stock of Chittagong Exchange from SML is lower than the average distance of DSE. That means the stocks are closer to SML for the case of CSE. It indicates that CSE is more efficient than DSE. Because it is known to all that in a strong efficient market all the information about security is traded within a few times. And if any discrepancy is found by capitalizing those discrepancy investors try to earn extra profit. For that reason discrepancy is not found after few times. But in case of Dhaka Stock exchange and Chittagong Stock Exchange we see that all most all the security is not laying on Security Market Line. But the stocks of Chittagong Stock Exchange are closer than the stocks of Dhaka Stock Exchange. So it can be said that the discrepancy between risk and return is lower in case Chittagong Stock Exchange. Which indicate the greater efficiency. Analysis and graph indicate that Chittagong is more efficient than Dhaka Stock Exchange.

#### 5. CONCLUSION:

This study was designed to provide evidence on weak form of efficiency concentrating on following the random walk model for Dhaka Stock Exchange and Chittagong Stock Exchange. The results of the study conclude that the return series of both indices of Dhaka Stock Exchange do not follow the normal distribution. ARIMA (time series) forecasting strengthens the non-random nature of Dhaka stock Exchange and Chittagong Stock Exchange. The resulting situation by rejecting the null hypothesis would be that the investors can not gain a fair return by holding a well diversified portfolio. SML and the position of the stocks on SML graph shows that Chittagong Stock Exchange is more efficient than Dhaka Stock Exchange. In Chittagong Stock Exchange the stock lies closer to SML than Dhaka Stock Exchange. Analysis also shows that Dhaka stock Exchange and Chittagong Stock Exchange are not in the form of 'weak efficiency' and 'strong efficiency'. So both stocks belong to the 'semi strong' form of efficiency. Besides this, there are other factors such as weak regulation, lack of supervision, lack of market transparency which may influence the efficiency level of capital market; even recent market scam report also indicate these factors as vital for stock market crashes.

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