Distribution of Risk and Return: A Statistical Test of Normality on Dhaka Stock Exchange

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Abstract

The present study deals with the normal distribution of risk and return of the capital market of Bangladesh. Normal distribution of return is an essential assumption in the field of efficient market hypothesis which posits that the returns of a market must follow the random walk behaviour. Again it is an integral part of Capital Asset Pricing Model, which suggests that if an investor wants to get higher return then he must consider higher risk, this denotes to the normal distribution of risk and return. This study has used a set of parametric and non-parametric tools to examine the returns calculated from the three indices of Dhaka Stock Exchange: DGEN (from 2002 to 2010), DSE20 (from 2002 to 2010) and DSI (from 2006 to 2010). As positive skewness and kurtosis are evident in most of the cases, the returns are found to be suffering from some extremities. Daily, weekly and monthly returns are not normally distributed which shows the contra-evidence of random walk behaviour of market return. Besides the inconsistency between risk and return (daily and weekly) is found, which suggests that additional return may be achieved without having exposure to additional risk.

Keywords: Dhaka Stock Exchange, Efficient Market Hypothesis, Kurtosis, Non-parametric Test, Normal Distribution, Parametric Test, Risk and Return, Skewness.

1. Introduction

Test of normality is an important study in the field of statistical research, as there are so many statistical tests and models which assume the sample data set to be normally distributed. There are some capital market models which also assume that the data set (returns) must be normally distributed e.g., Capital Asset Pricing Model (CAPM). This paper is going to focus on the normality assumption of Efficient Market Hypothesis (EMH), where EMH posits that stock market return must follow random walk behaviour, which denotes to the normal distribution of risk and return. Basically Efficient Market Hypothesis tells us that the security prices fully reflect all available information (Fama, 1970). For this reason a person having a piece of information cannot expect to predict the future price and have some abnormal gain on that information if the market is held to be efficient. So, the future price must be always random and unpredictable. A person can only earn higher return by bearing higher risk. Hence the efficient market hypothesis can play an important role in investment strategy formulation. In an inefficient market as the return distribution is somewhat skewed, there, the probability for a particular return can be assumed. The technicians by using their technical trading rules can earn riskless profit in this circumstance. Investors can also be able to find out the implication of time horizon in their investment strategy to earn abnormal return. But in an efficient market condition, an investor has to bear an additional amount of risk for an additional amount of return. Basically here return is considered as a compensation for risk. The capital market of Bangladesh is an emerging market in South Asia. Day by day capital market is becoming an integral part of the economy of Bangladesh. Studies performed on market efficiency of the capital market of Bangladesh are not so many. And most of the articles present that the market is still not found weak form efficient (Mollah et al., 2005; Rahman and Hossain, 2006; Mobarek et al., 2008; Mollik and Bepari, 2009; and Nisar and Hanif, 2011). Besides some calendar anomalies like 'Saturday Effect', 'April Effect' and seasonality in monthly return

series (Hossain, 2004; and Bepari and Mollik, 2009) are also evident in the capital market of Bangladesh. As the evidence suggests that the market is not efficient in Bangladesh, the risk and return distribution will not be normal. So basically this paper is going to examine whether and to what extent the risk and returns are normally distributed in the capital market of Bangladesh within the sample time period. Again this paper can also be able to validate some of the previous findings from the literature.

2. Literature Review

Testing normality and market efficiency of capital markets has been a prime area of interest for researchers for a long time. In this part we are going to present some findings from the literature of both national (Bangladesh) and international (rest of the world) context. And at the end we will try to show the gap in the literature and the justification for the present study.

Aggarwal and Rivoli (1989) examined the efficiency in functioning of four large capital markets of Asia by studying to find out seasonal and daily patterns in stock returns of these markets. With twelve years data (September 1976-June 1988), the study concluded on the existence of such seasonal patterns in those markets. The study found out the existence of 'January effect' in markets of Hong Kong, Singapore and Malaysia. In addition to that, 'day-of-the-week effect' was also present in those markets in the form of low Monday returns and strong 'Tuesday effect'. Aparacio and Estrada (1997) strongly rejected the notion of normality in daily stock returns in their study on thirteen European securities market. The study used data of period 1990-1995. By using time series of daily stock returns, they argued that normality can be assumed for monthly returns but not for daily returns. Galai and Kedar-Levy (2002), in their working paper series, found the existence of day-of-the-effect on their study on Tel-Aviv stock exchange. They applied non-parametric tests and multiple comparison procedures on a data set of the period 1988-1998. The findings revealed that the first and last trading days' returns were closely related than to any other day of the week. Aly, Mehdian and Perry (2004) analyzed Day-of-the-week effect on Egyptian stock market with a four-day trading week. The study reported that returns do not vary among days in week indicating the absence of any such patterns. They also concluded on the weak form efficiency on Egyptian capital market. Naqvi (2004) tested the random-walk behavior of Karachi Stock Exchange in his study using KSE-100 index. The research employed normality test, autocorrelation using Q-statistic and Dickey-Fuller test on the data set of the period 1994-2004. The Karachi Stock Exchange was found to be weak form efficient in both weekly and monthly return series. Agrawal (2005) tested how the sample size can have an impact on the normality assumption of stock returns and came up with the conclusion that it really had. According to his research carried out on the stock returns of Nifty and Sensex, daily stock returns with large sample size were not normally distributed while monthly stock returns with small sample size were normally distributed. Onder and Zaman (2005) examined how the test statistics for the normality test of errors can have a different result if the regression residuals from robust regression are used in place of OLS residuals. They actually found out that such use leads to significantly superior ability in detecting lack of normality in suitable situations. O. (2008) attempted to test normality and market efficiency on Nigerian Stock Exchange. He examined that though in recent years Nigerian stock exchange has been growing rapidly in terms of volume trading and market capitalization; the market was not weak form efficient the stock returns were not normally distributed. The study was conducted using monthly all share index from January 1993 to December 2007 and the methods used for the analysis included Skewness, Kurtosis, Jarque-Bera, Runs test etc. He added to recommend reducing transaction costs and minimizing institutional restrictions on trading to improve market activities. Das and Bhattacharjee (2009) attempted to build up a graphical tool to check and visualize the normality of a dataset using empirical distribution function and K-S test statistic. Jeyanthi (2010) tested the weak-form efficiency of Asian emerging stock markets. The study used daily price indices of China, Indonesia, Kuala Lumpur, Korea, Taiwan and India for the period of April 1998 to March 2009. The study showed varying results as the K-S test, runs test, autocorrelation test and LB test proved that these markets were not weak-form efficient but on the other hand unit root test significantly proved the existence of weak-form efficiency among the markets. Kumar and Dhankar (2011) applied a set of parametric and non-parametric tests on Indian Stock Market to find out whether the risk and return of that market are distributed normally. They examined three listed indices of Bombay Stock Exchange for the period 1996 to 2006 and found the evidence of non-normality in case of daily and weekly returns but

normality in case of monthly and annual returns. Besides their study pointed out negative skewness in returns and emphasized on time horizon in investment strategy.

Such research on testing of normality and market efficiency has also been practiced on the stock market of Bangladesh namely Dhaka Stock Exchange (DSE). Hossain (2004) studied on the small banking portfolios in Bangladesh to find out any existence of days-of-the-week effect. The study revealed the existence of 'Saturday Effect' as Saturday was the then first trading day following the weekend. The study also identified the existence of 'beginning of the week effect' while buying and 'weekend effect' while selling securities. Rahman, Salat and Bhuiyan (2004) proved in their study that Dhaka Stock Exchange is weak-form efficient. They used monthly index of DSE for the period of 1990-2003 to apply unit root test and came up to support the null hypothesis of random walk model. Mollah, Rahman and Islam (2005) analyzed the behavior of daily DSE 20 index and prices of the securities. The ARMA, ARIMA, ACF, PACF and Dimson's Market Model identified that the return series was a stationary time series and the market was not weak-form efficient. Islam and Khaled (2005) applied heteroscedasticity-adjusted methods to test for weak-form efficiency of Dhaka Stock Exchange as historic study results gave conflicting evidences on weak form efficiency. They found that if the heteroscedasticity-robust test is used instead of an autocorrelation test then the result can be transformed from weak form inefficiency to weak form efficiency. Rahman and Hossain (2006) carried out a study to find whether Dhaka Stock Exchange is weak-form efficient assuming the data set is normally distributed. They applied both parametric and non-parametric tests on two renowned indices of the market from 1994-2005. The study concluded on the ground that the daily return series was not normally distributed and the market was not weak-form efficient. Mobarek et al. (2008) sought to find evidence on the randomness and independence of the return series of Dhaka Stock Exchange. Various statistical models like K-S test, Runs test, Auto-Correlation test, ARIMA model etc were run on the daily price index from 1988 to 2000. The study found that security returns did not follow the random walk model. The existence of significant auto-correlation coefficient at different time lags proved the market to be weak-form inefficient. She also added that such inefficiency might be due to delay in dissemination of price-sensitive information or biases in the responses of market participants. Bepari and Mollik (2009) investigated the presence of seasonality in monthly return series of DSE All Share Price Index for the period from 1993 to 2006. Their research confirmed the existence of monthly effect in the form of 'April effect' instead of 'January effect'. They also added to confirm that the market was not weak-form efficient meaning investors could earn above average income. Rahman, Ara and Zheng Sr. (2009) used a variety of volatility models such as GARCH model, Random walk model and Autoregressive model to test the volatility of Dhaka Stock Exchange returns from 1999 to 2004. The study found the market return to be more volatile after 27 November, 2001. Mollik and Bepari (2009) examined the weak-form efficiency of Dhaka Stock exchange by adjusting for the thin trading problem. The data set covered DSE General Index and DSE 20 index for the period of 2002-2007. The study found that the returns are not normally distributed and the market failed to be weak-form efficient. Nisar and Hanif (2011) tested the weak-form efficiency on four emerging stock markets in Asia including Bangladesh. According to their Runs test, Durbin-Watson test and Unit Root test which they applied on the monthly, weekly and daily return series of the markets from 1997 to 2011, none of the markets showed to be weak form efficient. Mollik and Bepari (2011) attempted to measure the risk-return relationship in Dhaka Stock exchange. Their study found pretty straight, anticipated positive relationship between risk and return for both single security and portfolio. Still the less significant positive risk-return relationship for high risk portfolios might suggest existence of mispricing or market anomalies.

From the literature it is quite apparent that on the capital market of Bangladesh there is a lack of study particularly on risk and return distribution or normality test, though we know that this is a pre-requisite for so many statistical and financial models. Some researchers have also worked on normality test as a part of their research. Again for testing the normality of return basically researchers have commonly chosen Kolmogorov Smirnov test as a non-parametric test (Rahman and Hossain, 2006; Mobarek et al., 2008; and Kumar and Dhankar, 2011). But Razali and Wah (2011) compared among the Shapiro-Wilk test, Kolmogorov-Smirnov test, Lilliefors and Anderson-Darling test and found that irrespective of the distribution of observations Shapiro Wilk test is the most powerful test and Kolmogorov Smirnov is the

least powerful test, besides Lilliefors test always outperforms the Kolmogorov Smirnov test. So the present study has incorporated Kolmogorov-Smirnov test with Lilliefors correction and Shapiro Wilk test for conducting the research. We have also found that Kumar and Dhankar (2011) have used F-test or Analysis of Variance test to find out the distribution of risk. But F-test assumes the sample observations to be normally distributed, so in this research we have used Kruskal-Wallis test (a non-parametric test which can be compared with one way ANOVA test) along with F-test. Moreover the present study has completely concentrated on test of normality of risk and return of the capital market of Bangladesh.

3. Methodology and Data Sources

Returns calculated from the capital market indices are widely used as the proxies for the market return. Dhaka Stock Exchange (DSE) has three indices to represent the capital market of Bangladesh. In this study we have used the three indices of DSE to calculate the market return on a daily, weekly, monthly and annual basis. DSE General Index (DGEN) consists of A, B, G and N categories of listed shares of Dhaka Stock Exchange. In our study we have considered DGEN from January 2002 to December 2010. DSE20 Index consists of 20 blue chip shares listed in DSE. The sample period for DSE20 is January 2002-December 2010. DSE All Share Price Index (DSI) includes all the shares listed in DSE. The authority of DSE stopped calculating this index from 08 December 2003. The authority reintroduced this index on 28 March 2005. So there was a discontinuity in DSI index and finally here we have considered DSI from January 2006-December 2010 as the sample period.

Besides, we have also considered three sub-periods (2002-2004, 2005-2007, and 2008-2010) of DGEN and DSE20 to find out whether the samples have emerged from the same population. During the whole period 2002-2010 we see (Graph 1) the capital market of Bangladesh had an increasing trend. From 2002 to 2004 the market was quite flat and during 2005-2007 the market experienced some fluctuations. But during the period 2008 to 2010 the market really observed a tremendous growth. Basically that time the market was highly influenced by the IPO of Grameen Phone Ltd. (the largest mobile phone operator of Bangladesh). Daily market return jumped at 20.38% on 16 November 2009 after the debut of Grameen Phone share on Dhaka Stock Exchange, which also pulled the market index to a record high. The Financial Express, a popular financial newspaper of Bangladesh reported on 17 November 2009 in the following way:

'Shares of Grameen Phone (GP) climbed 2.5 times higher than its face value at the Dhaka Stock Exchange (DSE) Monday after the country's largest mobile phone operator made debut, sending the indices to a record high'.

In this study we have used natural logarithmic return for the ease and simplicity of use and calculated in the following way:

Return on index at time period t = ln (I_t / I_{t-1}), where I_t is the index price at time period t and I_{t-1} is the price of index at time period previous t. We have considered only the changes in stock price and overlooked any dividend payment.

We have used several parametric and non-parametric tests to determine whether the risk and return calculated from our samples are normally distributed. We have used Kolmogorov Smirnov (K-S test with Lilliefors Significance Correction) test and Shapiro Wilk test to find out whether the returns calculated from our sample data fit normal distribution. The significance of the test statistic will reject the assumption of normality in respective sample data (Pallant, 2005). One way ANOVA (Analysis of Variance or F-test) and Kruskal-Wallis (K-W) tests are applied on returns calculated from the three sub-periods' sample data to find out whether these have emerged from the same population. If these are found not to be emerged from the same population then we have concluded that risk is not normally distributed (Kumar and Dhankar, 2011). All the tests are assumed at 5% level of significance.

4. Major Findings

4.1 Risk and Return Distribution of Daily Return (2002-2010)

In this part basically we have three statistical tables presenting the facts related to normality of daily return of Dhaka Stock Exchange. If we have a look on Table 1 then we find that the index DGEN has a positive skewness whereas DSE20 index is negatively skewed. Kurtosis for both the indices is greater than zero. So

from the perspective of skewness and kurtosis we find a violation of normality. Again test statistics for K-S and Shapiro Wilk tests are significant which means the return distribution is not normal for the daily return within the sample period. This finding is also consistent with other findings where the day of the week effect on this market is evident.

From Table 2 we get the statistical summary of daily returns from 2002 to 2010 for three non-overlapping sub-periods- 2002-2004, 2005-2007 and 2008-2010. DGEN exhibits negative skewness in 2005-2007 period and positive skewness for the other two periods. Daily return from DSE20 index is negatively skewed for all the periods. Kurtosis is higher than zero for all the sub-periods, which is a symptom of non-normality. If there is higher kurtosis than normal, then more of the variability can be explained by the fewer observations' extreme differences from the mean. And we observe kurtosis for DGEN in 2008-2010 is abnormally high. The same is not observed in DSE20. So, the returns of the securities beyond DSE20 are held liable for this abnormality. Information from the market suggests, this has happened for the IPO of Grameen Phone Ltd. (the largest mobile phone operator in Bangladesh) within that sub-period. For both DGEN and DSE20 indices K-S and Shapiro Wilk test statistics are significant. So these show non-normality in daily return of each sub-period.

As we see that the Levene Statisitc in Table 3 is significant for both the indices, F-value will not be able to provide a correct decision about the sample. So we need to rely on Welch and Brown-Forsythe test statistic for the decision. And we find both the tests indicate that the three samples have emerged from the same population, hence the risk for the three sub-periods will not significantly differ from each other. By being not significant at 5% level of significance, Kruskal-Wallis (K-W in Table 2) test statistic supports the same finding.

4.2 Risk and Return Distribution of Weekly Return (2002-2010)

This part deals with the risk and return distribution of weekly return of Dhaka Stock Exchange. Table 4 shows some statistics of weekly return of DGEN and DSE20 during the period 2002-2010. DGEN shows higher weekly return than that of DSE20. Skewness and kurtosis are positive for both the indices, this denotes to non-normality. Kurtosis in weekly return has been reduced than that we observed in daily return (40.512). So it is quite apparent that due to any abnormally high daily return that situation emerged. But still K-S and Shapiro Wilk tests results are significant which tells us that weekly returns are not normally distributed.

From Table 5 we see that the K-S and Shapiro Wilk tests are not significant for DGEN in the sub-period 2005-2007 and for DSE20 in the sub-period 2008-2010, which denotes to normal distribution of return during the respective sub-period for the relevant index. As the Levene Statistic (Table 6) is not significant at 5% level, we can rely on the F-value. F-statistic and K-W value suggest that risk is normally distributed for both the indices during the sample period.

4.3 Risk and Return Distribution of Monthly Return (2002-2010)

Table 7 indicates the statistical summary of Monthly Return for the sample period 2002-2010 for DGEN and DSE20. Here the K-S and Shapiro Wilk Statistics are not significant for both of the indices. This signals that the monthly returns are not normally distributed. But if we look at the sub-periods then we find except for DSE20 in 2002-2004 sub-period, all the sub-periods of both the indices are normally distributed.

From the F-value and K-W statistic (Table 8) we find the sub-periods for both the indices have emerged from the same population, because we see the test results are not significant at 5% level of significance, which also tells about the normal distribution of risk during the sample period. We can rely on the F-value as Levene test statistic from Table 9 is not significant.

4.4 Risk and Return Distribution of Annual Return (2002-2010)

Table 10 presents the statistical summary of the annual returns of two indices for the sample period (2002-2010). DGEN index provides higher average return than the DSE20 index, though DGEN has a lower standard deviation. As the K-S and Shapiro Wilk test results are not significant at 5% level of significance, we can assume the annual returns of the capital market are normally distributed. But still as the number of observations is too low, we should not rely on these statistics.

4.5 Risk and Return Distribution of DSI (2006-2010)

Earlier in methodology part we mentioned that due to unavailability of data we could not include another stock market index DSI (All Share Price Index) of Dhaka Stock Exchange in our previous analysis. But in this part we are presenting it separately for the time period of 2006-2010. Table 11 presents that the skewness of daily and weekly returns are positive but monthly return is negative. Kurtosis of daily return is abnormally high which also supports the findings from daily return of DGEN for the period of 2008-2010. Shapiro Wilk test statistics are significant for all the daily, weekly and monthly returns. So returns are not normally distributed.

5. Conclusion

This study has been conducted to examine the risk and return distribution of the stock market of Bangladesh. This paper has come up with some important points to be noted. In most of the cases returns are found to be positively skewed, which denotes that most of the returns are concentrated on the left side of the mean with some extreme values to the right. We have also noticed on 16 November 2009 market return was 20.38% which is really abnormally high, and it happened due to the debut of Grameen Phone Ltd. shares to the market. The standard deviation overestimates the downside risk and shows a biased result due to this positive skewness. We have found kurtosis is too high for the indices DGEN and DSI which again tells us that more of the variability resulted from the extreme deviations of fewer observations from the mean. From the indices DGEN and DSI it has become evident that the daily, weekly and monthly returns are not normally distributed, which denies the random walk behaviour of stock price. This complies with the previous findings of some researchers who have found calendar anomalies like 'Saturday Effect', 'April Effect' and seasonality in monthly return series (Hossain, 2004; and Bepari and Mollik, 2009). Again we have observed risks have been distributed normally in all the cases but daily and weekly returns have not been normally distributed, so here we find an asymmetry between risk and return relationship. So investors may have the chance to earn abnormal return i.e., return without bearing sufficient risk. Hence the market is not efficient which also supports some past studies (Mollah et al., 2005; Rahman and Hossain, 2006; Mobarek et al., 2008; Mollik and Bepari, 2009; and Nisar and Hanif, 2011).

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Table 1. Daily Return (2002-2010)

Daily Return (2002-2010)						
Index	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk
DGEN	.10035	1.1815	2.043	40.512	.072*	.878*
DSE20	.06906	1.1495	-0.144	4.934	.068*	.945*
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance						

Table 2. Statistical Summary (Daily Return)

Statistical Summary (Daily Return)									
Index	Period	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk	F	K-W
DGEN	2002-2004	.1023	.83732	0.042	3.895	.068*	.950*	.843**	2.73**
	2005-2007	.0589	1.2515	-0.193	4.081	.055*	.960*		
	2008-2010	.1394	1.4255	3.784	56.631	.087*	.801*		
DSE20	2002-2004	.0833	.89790	-0.108	5.957	.077*	.926*	1.03**	3.44**
	2005-2007	.0195	1.2754	-0.211	4.394	.065*	.951*		
	2008-2010	.1019	1.2703	-0.061	3.754	.053*	.963*		
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance									

Table 3. Testing the Validity of ANOVA (Daily Return)

Testing the Validity of ANOVA (Daily Return)			
Index	Test of Homogeneity of Variances	Robust Tests of Equality of Means	
	Levene Statistic	Welch	Brown-Forsythe
DGEN	37.755*	.669**	.811**
DSE20	35.095*	.879**	1.001**
Note: * Significant at 5% level of significance; ** Not significant at 5% level of significance			

Table 4. Weekly Return (2002-2010)

Weekly Return (2002-2010)						
Index	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk
DGEN	.48880	2.6132	1.052	7.323	.062*	.941*
DSE20	.33671	2.7103	0.482	1.660	.057*	.975*
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance						

Table 5. Statistical Summary (Weekly Return)

Statistical Summary (Weekly Return)									
Index	Period	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk	F	K-W
DGEN	2002-2004	.54876	2.2959	0.618	2.424	.109*	.940*	.874**	1.07**
	2005-2007	.27000	2.5724	-0.101	1.163	.062**	.985**		
	2008-2010	.64662	2.9323	1.998	11.958	.088*	.883*		
DSE20	2002-2004	.44811	2.5676	0.828	2.038	.092*	.959*	1.032**	3.07**
	2005-2007	.08267	2.7801	0.419	2.610	.077*	.956*		
	2008-2010	.47845	2.7768	0.306	0.563	.069**	.985**		
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance									

Table 6. Testing the Validity of ANOVA (Weekly Return)

Testing the Validity of ANOVA (Weekly Return)			
Index	Test of Homogeneity of Variances	Robust Tests of Equality of Means	
	Levene Statistic	Welch	Brown-Forsythe
DGEN	2.348**	0.841**	0.874**
DSE20	0.685**	0.999**	1.032**
Note: * Significant at 5% level of significance; ** Not significant at 5% level of significance			

Table 7. Monthly Return (2002-2010)

Monthly Return (2002-2010)						
Index	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk
DGEN	2.2467	6.9290	0.182	1.743	.090*	.974*
DSE20	1.5971	7.1425	0.459	1.254	.107*	.972*
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance						

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Table 8. Statistical Summary (Monthly Return)

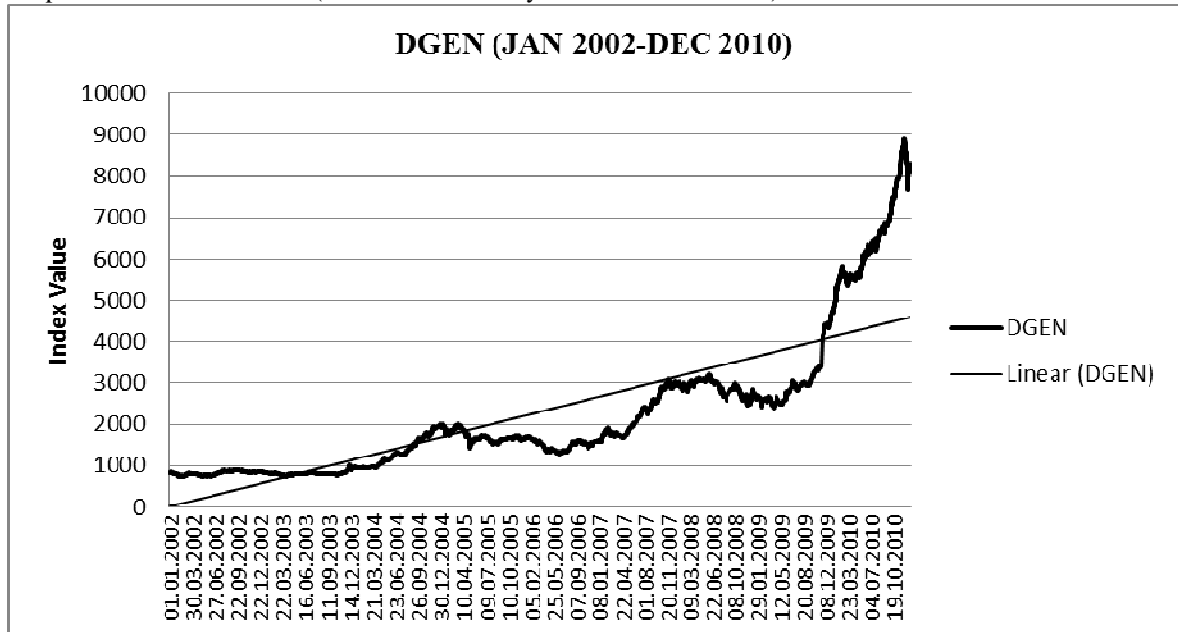| Statistical Summary (Monthly Return)									
Index	Period	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk	F	K-W
DGEN	2002-2004	2.7645	5.5627	0.621	-0.044	.145**	.958**	.636**	.88**
	2005-2007	1.1823	7.5129	-0.594	1.664	.140**	.949**		
	2008-2010	2.8077	7.5594	0.878	1.639	.116**	.951**		
DSE20	2002-2004	2.3679	6.1694	0.977	0.604	.174*	.923*	.786**	1.74**
	2005-2007	0.3920	7.9709	0.558	2.637	.146**	.944**		
	2008-2010	2.0528	7.1899	0.271	-0.010	.094**	.987**		
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance									

Table 9. Testing the Validity of ANOVA (Monthly Return)

Testing the Validity of ANOVA (Monthly Return)			
Index	Test of Homogeneity of Variances	Robust Tests of Equality of Means	
	Levene Statistic	Welch	Brown-Forsythe
DGEN	0.618**	0.592**	0.639**
DSE20	0.333**	0.723**	0.457**
Note: * Significant at 5% level of significance; ** Not significant at 5% level of significance			

Table 10. Annual Return (2002-2010)

Annual Return (2002-2010)						
Index	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk
DGEN	25.5111	34.7213	0.195	-2.110	.198**	.867**
DSE20	17.5554	35.0942	0.374	-1.411	.199**	.912**
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance						

Table 11. DSI Return (2006-2010)

DSI Return (2006-2010)						
Index	Mean Return %	Standard Deviation %	Skewness	Kurtosis	K-S[a]	Shapiro Wilk
Daily	.14180	1.3102	2.506	38.414	.061*	.875*
Weekly	.64306	2.7045	1.411	7.857	.053**	.928*
Monthly	2.0721	7.7413	-0.275	2.013	.094*	.959*
Note: [a]Lilliefors Significance Correction * Significant at 5% level of significance; ** Not significant at 5% level of significance						

Graph 1. DSE General Index (DGEN from January 2002-December 2010)