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The Monthly Effect of Stock Market Returns and the Global Financial Crisis: Evidence and Implications from Bahrain Bourse

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Abstract

This study examines the impact of the global financial crisis on the monthly effect of the stock market returns of Bahrain Bourse. The study used a sample of daily returns of Bahrain All Share Index from 1 January 2003 until 31 July 2011. The sample was divided into two sub periods. The first period represents the period before the global financial crisis and spans from 1 January 2003 to 30 November 2007. The second period is the crisis period and starts from 1 December 2007 until 31 July 2011. The study utilized the equality for means tests (F-test, Chi-square test, and Kruskal-Wallis test) and the equality for variance tests (Bartlett test, Levene test, and Brown-Forsythe test). The findings suggest that there are no significant differences with regard to the monthly effect of the daily returns of the Bahrain Bourse in the two studied periods.

Keywords: Bahrain Bourse, Monthly Effect, Stock Market Returns, Anomaly, Stock Market Efficiency, Financial Crisis, Equality for Means Tests, Equality for Variance Tests.
JEL Classification Codes: C12, C22, G14, G15

1. Introduction

The efficient market hypothesis is considered one of the most debated concepts in finance literatures. However, Fama is considered one of the most important researchers who set the foundation and discussed in depth the hypothesis of market efficiency. A market is said to be efficient if it responds immediately and accurately to all available information. On the other hand, the basis of the random walk hypothesis (RWH) was set first by Bachelier (1900). RWH asserts that stock price movements are unpredictable and it follows a random erratic behavior. Therefore, past stock price movements are of no use to predict future price movements. Also, Kendall (1953) is considered one of the earlier scholars who suggested that stock prices move randomly, and later, Fama (1965) concluded that price changes are random and past movements were of no use in predicting future movements. However, Fama (1970) attempted to formalize the theory and organize the growing empirical evidence. He presented the efficient market theory in a fair game model, contending that investors can be confident that a current market price fully reflects all available information about a security and the expected returns based upon this price is consistent with its risk. He also divided the efficient market hypothesis (EMH)

into three forms: the weak–form EMH, the semi-strong-form EMH, and the strong-form EMH. Despite considerable evidence supported the theory of market efficiency, there has been some instances where the EMH has been challenged. The empirical studies found results different from what was expected from an efficient market, contradicting specifically the semi-strong from of the EMH. These deviations from the normal behavior of the efficient market are called market anomalies. However, there is several market anomalies related to the calendar of the year such as the day of the week effect, the month of the year effect, the January effect, the holiday effects, etc. The empirical studies found that these anomalies have in common that they earned higher returns than would be expected in efficient market (Gitman, Joehnk, and Smart 2011, 326).

This study is different from other studies in several ways. Empirical studies that examined the monthly effect of the stock market returns for Bahrain Bourse are not abundant. Although, Bahrain is considered one of the most important emerging financial center in the world, and studying the behavior of its stock market would be a great benefits to investors. On the other hand, this study uses updated and most recent daily observations of Bahrain All Share Index for several years covering also the period of the global financial crises. Therefore, it investigates the impact of the global financial crisis on the monthly effect of the stock market returns for Bahrain stock market, and by using most statistical techniques that have been used in previous researches. In addition, it includes most recent previous studies that examined the month of the year effect on most financial markets around the world. Finally, the empirical tests results of this paper are checked with the findings of previous studies that were performed on some of the Middle Eastern stock markets.

This study is organized into seven sections as follows: Section 2 describes the Bahrain Bourse, while section 3 addresses the literature review. Data and research methodology are illustrated in section 4. Section 5 reports the empirical tests results. Finally, section 6 provides the concluding remarks.

2. The Bahrain Bourse

The Bahrain stock exchange was established in 1987 and commenced its operation in June of 1989 with 29 Bahraini listed shareholding companies. In recent years, the exchange invested in modernizing its operations by providing direct online trading services to its member brokers and expands listings and improved listed company information for exchange investors. In 2002, the Central Bank of Bahrain became the regulatory and supervisory authority for the exchange activities instead of the Ministry of Commerce. However, in 2010, Bahrain Bourse was established as a shareholding company replacing Bahrain Stock Exchange. Currently, Bahrain Bourse has 50 listed companies classified according to their activities and dominated by commercial banks and investments sectors. The Bahrain Bourse has three indices that track its performance, Bahrain All Share index, Dow Jones Bahrain Index, and Esterad Index. Bahrain All Share index is a capitalization-weighted index of all Bahraini public shareholding companies listed on Bahrain Stock Exchange. As Figure 1 shows, the Bahraini stock market performance experienced a rising trend during the years 2003-2007. However, in the year 2008, a sharp decline in the index took a place and continued this trend unit July 2011 as consequences of the global financial crises.

3. Literature Review

There are extensive studies that are performed on different financial markets regarding the month of the year effect and other market anomalies. This section sheds the light on previous literatures related to the month of the year effect.

Marrett and Worthington (2011) examined the month of the year effect in the Australian stock market. Their results show that returns are significantly higher in April, July and December combined with evidence of a small cap effect with systematically higher returns in January, August and December. Similarly, Brown et al., (1983) and Praetz (1973) found that average returns in Australia

stock market were higher in January, July and August. However, Al-Jarrah, Khamees and Qteishat (2011) investigated the turn of the month anomaly in Amman stock exchange (ASE). Their findings show the ASE does not significantly exhibit higher rates of returns at the beginning of the month than during the remaining days of the month. Similar results were obtained by Maghayereh (2003) who found no evidence of monthly seasonality and January effect in ASE returns. On the other hand, Ariss, Rezvanian and Mehdian (2011) tested the calendar anomalies in the Gulf Cooperation Council (GCC) stock markets. They found that returns are positive and significant on Wednesday. In addition, their results show a significant positive December effect. Also, Wyème and Olfa (2011) examined the month of the year effect for Tunis Stock Exchange. Their findings show evidence of the month of the year effect specifically in April. Al-Khazali, Koumanakos, and Pyun (2010) found a strong day effect and weak week and January effects in Athens stock exchange. On the other hand, Floros (2008) used ordinary least squares (OLS) and found no January effect in Athens stock exchange. Dudzinska-Baryla and Michalska (2010) tested the month of the year effect in the Polish stock exchange and found the presence of April and December effects.

Moving to Asia stock markets, Keong, Yat and Ling (2010) investigated the presence of the month of the year effect in eleven Asian countries: Hong Kong, India, Indonesia, Japan, Malaysia, Korea, Philippines, Singapore, Taiwan, China, and Thailand. Their finding exhibited a positive December effect, except for Hong Kong, Japan, Korea, and China. Also, few countries show a positive January, April, and May effect and only Indonesia exhibited negative August effect. Also, Parikh (2009) used the GARCH model and exponential GARCH to examine the month of the year effect in the Indian stock market. The findings confirm the presence of a significant December effect even after taking time varying volatility into account. Similarly, Kumari and Mahendra (2006) found that Indian stock market exhibited April effect and returns were significantly higher from other months. On the other hand, Giovanis (2009) examined the month of the year effect for fifty five stock markets using GARCH models. The results found a December effect in twenty stock markets followed by February effect in nine stock markets and January effect in seven stock markets and finally, April effects in six stock markets. These months provided positive and the highest returns.

Onyuma (2009) examined the day of the week and the month of the year effects in the Kenyan stock market. He found that the largest positive returns are produced Friday and January, while Monday provided the lowest negative returns. On the other hand, Alagidede and Panagiotidis (2009) showed that Friday effect and April effect are found to be significant in Ghana stock exchange. Similarly, Agathee (2008) examined the month of the year effect for the stock exchange of Mauritius (SEM) using regression analysis. His findings indicate that, except for the month of January, returns are not dependent on the months of the year. On the other hand, Bundoo (2008) found that SEM exhibited a positive and significant Wednesday, Friday and Monday (smaller in magnitude) effects. He also found a significant positive September effect and no January effect.

Similarly, Rezvanian, Turk and Mehdian (2008) analyzed the calendar anomalies in Chinese equity market. Their empirical results show the absence of Monday, day of the week, and January effects in all Chinese indices they studied, concluding that Chinese equity markets are efficient. Contrary results were obtained by Lingbo (2004) who empirically investigated the weekend effect, month of the year effect, and the week of the month effect in the Chinese equity fund market. The results show that average daily returns on Monday are higher, especially for open end funds than those of other days within the week. Also, the average monthly returns for closed ends funds reach the maximum and minimum in March and August respectively.

Also, Asteriou and Kovetsos (2006) utilized data from 1991 until 2003 for eight Central and Eastern European stock markets. Their findings show a strong significant January effect presence in the stock markets of Hungry, Poland, Romania and Slovakia. Similarly, Fountas and Segredakis (2002) examined the January effect in eighteen emerging stock markets. They found that returns in January were significantly higher in stock markets of Chile, Greece, Korea, Taiwan, and Turkey. Also, Choudhry (2001) examined the month of the year effect and January effect in the pre-WWI stock

returns for Germany, the UK and the US utilizing a non-linear GARCH model. His results show evidence of the January effect and the month of the year effect on the UK and the US returns. On the other hand, the German returns exhibited the month of the year effect and no January effect. Lakonishok and Smidt (1988) found evidence of anomalies related to returns around the turn of the week, the turn of the month and the turn of the year and holidays in the Dow Jones Industrial Average. On the other hand, the weekend effect only found in nine countries. In addition, many countries exhibited large December returns. Also, Gultekin and Gultekin (1983) used parametric and non parametric tests for his sample and found seasonality presence in most industrialized countries. They also found that average returns in January were higher than those during the rest of the year. Berges, McConnell and Schlarbaum (1983) examined the turn of the year effect in Canada stock market covering the period from 1951 to 1980. The results show that January returns in Canada were higher than other months even after introducing taxes on capital gains. Also, Arsad and Coutts (1997) used a large sample of sixty years and found that London international stock exchange exhibited weekend, January, and holiday effects. Menyah (1999) also found that returns in January are higher in London stock exchange. On the other hand, Rozeff and Kinney (1976) investigated the monthly effect of returns on the New York stock exchange using a sample covering the period from 1904 until 1974. Their findings indicate that returns in January were higher than any other month, except for the period from 1929 to 1940. They also found that July, November, and December produced the highest returns and February and June provide the lowest returns.

4. Data and Research Methodology

4.1. Description of the Data

This study used a set of data consist of daily returns collected from Bahrain Bourse website (www.bahrainbourse.com.bh) and Gulf Base website (www.gulfbase.org). The daily closing values of the Bahrain stock index were used. The sample covers the period from 1 January 2003 until the end of July 2011. The first sub period (before crisis) starts from 1 January 2003 until the end of November 2007. The second period (crisis period) begins from 1 December 2007 until July 2011.

The daily compound rate of return for the Bahrain stock market index is calculated as follows:

$$R_t = \ln\left[\frac{P_t}{P_{t-1}}\right] .$$

Where: R_t is the daily percentage return on day t. P_t and P_{t-1} are closing values of the stock index on days t and t-1 respectively.

4.2. Research Methodology

Traditionally, empirical researchers tested the calendar effect utilizing four methods. The first type of studies restricts itself on calculating returns means and homogeneity of the variances, using t-test and f-test or analysis of variance practice. The second type of studies uses regression analysis with daily dummy variables, and testing the hypothesis using t-statistic and Chi square. The third type of studies starts testing the normality of the data using Kolmogorove-smirnove test D statistic. The analysis will be carried on either by t and F-tests or ANOVA if the series are distributed normally, and if not, then non-parametric tests will be used. The fourth type of studies employs the GARCH family techniques. The justification of using this method is based on the conclusion reached from the values of Kurtosis and Skewness or what the distribution shows visually.[1] One problem when testing the equality of two or more samples is to decide whether sample differences in central tendency reflect true differences in

[1] For more elaborate description of methodologies used in this type of analysis see: Talat Ulussever, Ibrahim Guran Yumusak, and Muhsin Kar, 2011. The Day of the Week Effect in the Saudi Stock Exchange: A non-linear GARCH Analysis, Journal of Economic and Social Studies, 1(1), 9-23.

parent populations. The analysis of variance (ANOVA) is the most powerful tool for testing hypotheses in such a case when the assumptions of normality, equal variance and no serial correlation in the errors are met. Violation of any assumption would affect those tests, leading to a wrong decision in testing the hypotheses (Cochran, 1947; Thavatchai and Taejaroenkul, 2004).

Following recent literatures, the analyses in this study make use of the two types of tests. The first test utilizes equality of means tests, which includes F-test, Kruskal-Wallis test, and χ^2 tests. The second test for the homogeneity of variance is conducted with the aid of Bartlett, Levene, and Brown-Forsythe tests.

4.2.1. Equality for Means Tests

4.2.1.1. F-Test

The F-test evaluates the statistical significance of the observed difference between means of monthly returns at a specific probability level. The estimate of F-ratio based on the within-groups variability known as Mean Square Within, and the estimate based on the between-group variability is called Mean Square Between (Groebner et al., 2008).

The formula for F-ratio calculation is:

$$F = \frac{MS_B}{MS_W} \quad (1).$$

is between mean sum squares and MS_w is within mean sum squares and calculated as the following:

$$MS_B = \frac{SS_B}{k-1}.$$

And

$$MS_w = \frac{SS_B}{N_T - k}.$$

Where:

SS_w = sum of squares within samples

SS_B = sum of squares between samples

k = number of populations

N_T = sum of the sample sizes from all populations

The null and the alternative hypotheses are:

H₀: $\mu_{\text{January}} = \mu_{\text{February}} = \ldots\ldots\ldots = \mu_{\text{December}}$

Ha: $\mu_{\text{January}} \neq \mu_{\text{February}} \neq \ldots\ldots\ldots \neq \mu_{\text{December}}$

4.2.1.2. Kruskal-Wallis Test

The Kruskal-Wallis test is a non parametric test that is used with an independent data, developed by Kruskal and Wallis (1952). The test is used as a substitute for the parametric one-way ANOVA, when the assumptions of that test are seriously violated (Lind, Marchal, and Wathen, 2007). This test is used in order to compare three or more unpaired groups to determine if the samples have come from different populations. If a significant difference is found in medians across different samples.The Kruskal-Wallis test does not assume population normality or homogeneity of variance. However, it is assumed that the shape of the distribution is equal for all groups, thus, a weaker version of homogeneity of variances is still necessary.

The formula for H statistic can be written as:

$$H = \left[\frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} \right] - 3(N+1) \quad (2).$$

Where:

k = Number of populations

n_i = size of the sample from the i^{th} population

N =Sum of the sample sizes from all populations

R_i = Sum of ranks in the sample from i^{th} population

The null and alternative hypotheses for the purpose of this study are:

H_0: $MD_{January} = MD_{February} = \ldots\ldots\ldots = MD_{December}$

Ha: $MD_{January} \neq MD_{February} \neq \ldots\ldots\ldots \neq MD_{December}$

4.2.1.3. Chi-square (χ^2) Test

The χ^2 test is used in order to test if the standard deviation of a population is equal to a specified value.

The null and alternative hypotheses for equality the χ^2 test is defined as:

H_0: the population medians are equal

H_a: the population medians differ

4.2.2. Equality for Variance Tests

Following recent literatures, this study employs three statistics for testing the homogeneity of the variance of the monthly returns. These tests are: Bartlett test, Levene test, and Brown-forsythe test. A brief description of these tests is illustrated next.

4.2.2.1. The Bartlett's Test

The Bartlett test statistic is used to test for equality of variances (homogeneity) across groups against the alternative that variances are unequal for at least two groups. However, Bartlett test is sensitive to departure from normality. Moreover, Bartlett test is the best test for homogeneity of variances since it is not affected by sample size.

The test statistic is:

$$2 = 2.3026\left(\frac{q}{c}\right) \tag{3}$$

Where:

$$q = (N-k)\log_{10}S_p^2 - \sum_i^k (n_i - 1)\log_{10}S_i^2 \ .$$

$$C = 1 + \left(\frac{1}{3(k-1)}\left[\sum_{i=1}^{k}(n_i-1)^{-1} - (N-k)^{-1}\right]\right) \ .$$

$$S_p^2 = \frac{\sum_{i=1}^{k}(n_i-1)S_i^2}{N-k} .$$

Where:

2.3026 is a constant value

n_i = sample size of the i^{th} group .

S_i^2 = sample variance of the i^{th} group .

N = overall sample size .

S_p^2 = pooled variance .

The Bartlett test is defined as:

$H_0 : \sigma_{January} = \sigma_{February} = \ldots\ldots\ldots = \sigma_{December}$.

$H_a : \sigma_{January} \neq \sigma_{February} \neq \ldots\ldots\ldots \neq \sigma_{December}$.

4.2.2.2. Levene's Test

The Levene's F-Test for Equality of Variances, which is the most commonly used statistic, is used to test the assumption of homogeneity of variance. One advantage of this test is that it does not require normality of the data. Levene's test, unlike Bartlett's test, is robust when the normal assumption is violated. Moreover, Levene's test is applicable for both equal and small sample sizes.[2]

The null and alternatives for Levene's test are:

$$\boldsymbol{H}_0 : \sigma_{January} = \sigma_{February} = \ldots\ldots\ldots = \sigma_{December} .$$

$$\boldsymbol{H}_a : \sigma_{January} \neq \sigma_{February} \neq \ldots\ldots\ldots \neq \sigma_{December} .$$

Let Y is a variable with sample of size N divided into k sub-groups, where ni is the sample size of the ith subgroup. Levene's test statistic is defined as:

$$W = \frac{(N-k)\sum_{i=1}^{k} N_i(\bar{Z}_{i.} - \bar{Z}..)^2}{(k-1)\sum_{i=1}^{k}\sum_{j=1}^{N_i}(Z_{ij} - \bar{Z}_{i.})^2} \quad (4).$$

Where $\boldsymbol{Z_{ij}}$ is defined as:

$Z_{ij} = | Y_{ij} - \bar{Y}_i |$.

Where:

$\bar{Y}_i$ can be the mean, median, or the 10% trimmed mean of the i^{th} subgroup.

4.2.2.3. Brown and Forsythe Test

According to Brown and Forsythe (1974), if populations have the same standard deviation, then the average deviation from the center of each population should be the same. In particular, the average of the $|y_i$-median$(y)|$ should be equal for each population. This test can be used when the error variance consistently increases or decreases as a function of y. The test still works even if the normality assumption of the ε_i is violated. More formally:

$$Z_{ij}^{BF} = \left| y_{ij} - m_i \right| \quad (5).$$

Where m_i is the median of the i^{th} group. Then using ANOVA to test that the means of this quantity are the same for all of the populations. The hypotheses to be tested are:

$\mathbf{H_0}$: $\sigma_{\text{January}} = \sigma_{\text{February}} = \ldots\ldots\ldots = \sigma_{\text{December}}$

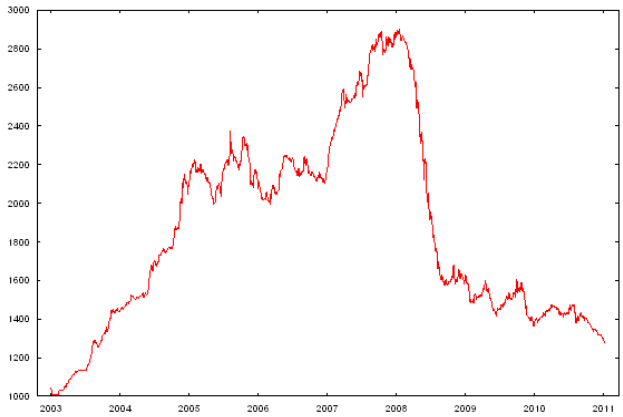
$\mathbf{Ha}$: $\sigma_{\text{January}} \neq \sigma_{\text{February}} \neq \ldots\ldots\ldots \neq \sigma_{\text{December}}$

5. The Empirical Tests Results

As mentioned earlier, the main objective of this study is to determine whether the Bahrain stock market exhibits a month of the year effect. Furthermore, the analysis will concentrate on the changing direction from a strong bull market to sever bear market situation that took place after the start of the global financial crises. Therefore, a descriptive statistics by month of the year for the two sub-periods as well as for the whole period will be conducted.

[2] What is meant by robust is: If a statistical procedure is little affected by violating an assumption, the procedure is said to be robust with respect to that assumption.

Figure 1: Bahrain Stock Index Jan 2003- July 2011



In order to visually observe the stock index movement during the period under consideration a line chart is represented. As it can be seen from Figure 1, the market has witnessed a noticeable increase up to the year 2006 then fluctuated during 2006 and 2007. Then it moved up for a short period, and declined sharply from 2008 until the end of July, 2011. Many think that the sharp decline is an influence of the global financial crisis, especially the Bahrain economy is an open economy. The crisis effect was severing for all GCC countries to which the Kingdom of Bahrain is a member with.

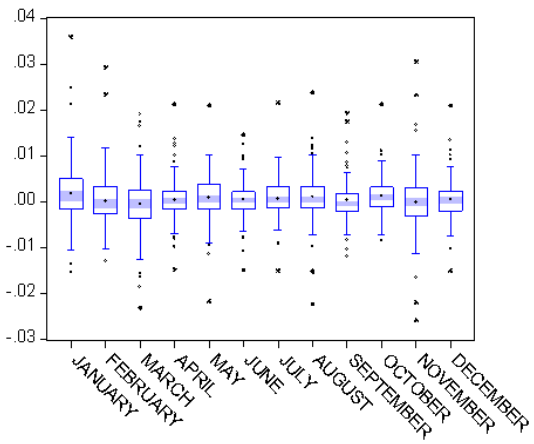
Table 1: Pre-Crisis Period Returns vs. Return during the Crisis Period

	Mean	**Standard Deviation**
Returns on Pre Crisis Period	7.50728	0.27056
Returns on Crisis Period	7.45874	0.26762
Differences of Mean Returns	0.04854	
p-value	0.00005	

It is clear from the figures in Table 1 a significant difference between the mean monthly returns of the two periods at 0.1% significant level. In addition, we note that the standard deviation of pre crisis period returns (0.271) is higher than the standard deviation during the crisis period.

Kurtosis indicates the extent to which, for a given standard deviation, observations cluster around a central point. If observations within a distribution cluster more than those in the normal distribution, the distribution is called leptokurtic. If observations cluster less than in the normal distribution, the distribution is termed platokurtic. Values of Kurtoses equal to 3 indicate that the distribution is exactly normal.

Figure 2: Box-Plots of the monthly return Jan. 2003 to Nov. 2007



From Tables 2 and 3 and Figures 2 and 3 the Kurtoses for the monthly returns for both sub periods are leptokurtic, although it is higher in its magnitude in the first sub period. Skewness of the monthly distribution varies in its signs and its volumes. However, from the values of both statistics as well as the value of Jarque-Bera indicate that all the monthly return distributions are not normal in the first sub period, while only 4 of the 12 distributions in the crisis sub period are not normally distributed.

Table 2*:* Descriptive Statistics for the Monthly Return for Pre Crisis Period

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Mean	0.00273	0.00025	-0.00093	0.000768	0.00015	0.000324	0.00036	0.00171	0.000552	0.001405	0.00015	0.000598
Median	0.00163	-0.00037	-0.00042	0.000323	0.00042	0.000453	0.000477	0.0007	-0.000306	0.001398	0.000193	0.00044
Maximum	0.03613	0.02943	0.019151	0.021326	0.01026	0.012643	0.009272	0.0239	0.019509	0.021427	0.030712	0.021017
Minimum	-0.01051	-0.01292	-0.02313	-0.01473	-0.02172	-0.01497	-0.01497	-0.01518	-0.011885	-0.008441	-0.021976	-0.01502
Std. Dev.	0.007	0.006682	0.006555	0.005153	0.00508	0.003859	0.003937	0.00554	0.005851	0.004578	0.007142	0.00489
Skewness	1.8283	1.43328	-0.36122	0.713364	-0.9197	-0.26917	-0.68703	0.80829	0.780257	1.016459	0.938818	0.828065
Kurtosis	9.58651	7.727413	5.693546	6.590069	6.48654	6.400262	5.12773	6.16094	4.340913	6.573661	8.36802	7.359889
Jarque-Bera	184.447	99.3382	25.2756	48.50347	50.503	38.51766	20.8497	40.9657	13.75806	54.93736	105.1088	70.69203
Probability	0	0	0.000003	0	0	0	0.00003	0	0.001029	0	0	0

Table 2 and 3 also report the standard deviations, as well as the maximum and minimum values for each monthly index. In the first sub period November has the highest standard deviation of 0.007, and June has the lowest standard deviation of 0.004. In the crisis, the month of November has the highest standard deviation while the month of June has the lowest variation.

Table 3: Descriptive Statistics for the Monthly Returns for Crisis Period

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Mean	0.00151	0.00101	-0.00077	0.0006	-0.00161	-0.0003	-0.00022	-0.00019	-0.00172	-0.00182	-0.00377	-0.00081
Median	0.00144	0.00146	-0.00085	0.00083	-0.00097	-0.00011	-0.00035	0.00012	-0.00145	0.00031	-0.00142	-0.00025
Maximum	0.01277	0.01544	0.01068	0.01996	0.01192	0.007578	0.01503	0.01404	0.01126	0.02622	0.01419	0.01681
Minimum	-0.0101	-0.0094	-0.02188	-0.0233	-0.01877	-0.00935	-0.01371	-0.00834	-0.02329	-0.03719	-0.03394	-0.02217
Std. Dev.	0.0045	0.006	0.005207	0.00882	0.00683	0.003991	0.00443	0.00477	0.00754	0.01222	0.01027	0.008016
Skewness	0.09543	0.36064	-1.26309	-0.518	-0.16307	-0.37385	0.25902	0.34493	-0.97014	-0.60255	-0.8921	-0.59407
Kurtosis	3.39186	2.52007	8.419115	3.7387	2.94194	3.038637	6.88674	3.59992	4.27169	4.42191	3.97238	3.816675
Jarque-Bera	0.31664	1.25096	59.58067	2.69812	0.18289	0.934263	25.6253	1.39301	8.96979	5.79013	6.88144	3.464406
Probability	0.85358	0.535	0	0.25948	0.91261	0.626798	3E-06	0.49832	0.01128	0.0553	0.03204	0.176894

Figure 3: Box-Plot of the Monthly Returns for Crisis Period

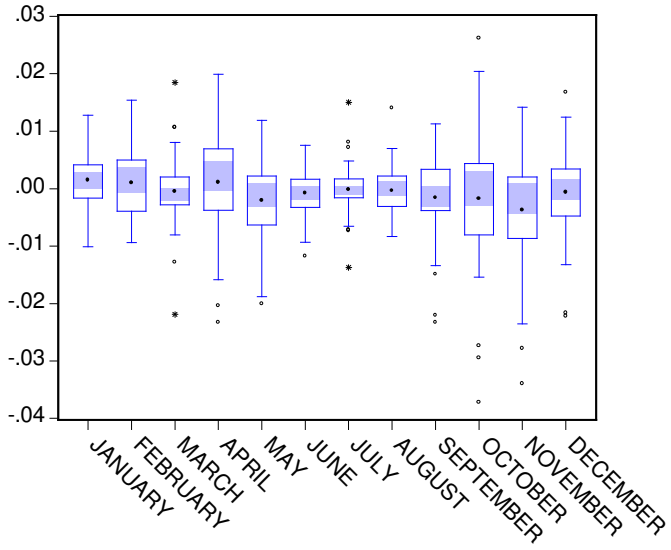


Table 4: demonstrates the results of the different tests for the first period, January 2003 to November 2007. All the testes are carried out using Eviews7.

Table 4: Mean, Median, and Variance Equality for the Pre Crisis Period

	Mean	**Median**		**Variance**		
	F-test	**MDχ2**	**K-W**	**Bartlett**	**Levene**	**Brown-Forythe**
Statistics	2.1046	14.051	19.502	72.0357	2.3300	2.155
p-value	0.1985	0.2302	0.0527	0.0000	0.0079	0.0149

The values of mean and median differences tests (F-test, Chi-square test, and the Kruskal-Wallis test) are all insignificant at the 5% significant level. The results do not permit rejecting the null hypotheses of equal means or medians during the pre crisis period. Results of testing the variance homogeneity give contradictory results. Bartlett and Levene tests are both significant at the 1% confidence level. However, the Brown-Forsythe is not significant even at the 10% confidence level. Accordingly, the month of the year effect seems to exist in the variance of the monthly returns rather than in the central tendency location measures.

Table 5: Mean, Median, and Variance Equality for the crisis period

	Mean	**Median**		**Variance**		
	F-test	**MDχ2**	**K-W**	**Bartlett**	**Levene**	**Brown-Forsythe**
Statistics	1.7415	10.200	2.860	113.26	6.158	5.298
P-value	0.0616	0.512	0.722	0.0000	0.0000	0.0000

The results of the two central tendency and homogeneity tests for the crises period are presented in Table 5. The figures are not differing substantially from those of the pre crisis period. The exception is the result of the Brown-Foresythe which it turned out to be significant at the 1% significant level.

Apparently, there are no significant differences regarding the monthly effect of the daily returns of Bahrain bourse in the two studied periods.

6. Conclusion

This study investigated the impact of the global financial crisis on the monthly effect of returns of Bahrain stock market. The study employed daily returns of Bahrain All Share Index from 1 January 2003 to 31 July 2011. The sample was tested by using the equality for means tests (F-test, Chi-square test, and Kruskal-Wallis test) and the equality for variance tests (Bartlett test, Levene test, and Brown-Forsythe test). The results showed that there are no significant differences of the monthly effect for daily returns of the Bahrain stock market before the occurrence of the global financial crisis and during the period of the financial crisis. In general, the findings of this study are consistent with the findings of Al-Jarrah, Khamees and Qteishat (2011) and Maghayereh (2003); and inconsistent with results of Ariss, Rezvanian and Mehdian (2011) and Wyème and Olfa (2011).

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