Middle-East Journal of Scientific Research 18 (11): 1625-1631, 2013
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2013.18.11.12463

The Impact of Investors' Information Search Behavior on Bangladesh Stock Markets

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Abstract: Well informed investors can handle risk more efficiently as it enables them to reduce uncertainty in investing stock markets. Rational investors are likely to get analytical information in advance while investing and other participants would then follow them, which will ultimately lead to efficient pricing of securities. The paper investigates the impact of information investors sought for on stock returns of Bangladesh capital market and found that investors' information search behavior to specific information event has little or almost no impact of stock market of Bangladesh which results a low degree or weak form of market efficiency.

Key words: Stock Market · Dividend Announcement · Market Efficiency.

INTRODUCTION

Access to information plays a crucial role in investment decision making in stock market. Investors seek to achieve expected returns "by decreasing the level of associated uncertainty through information search" [1]. Digital information on financial measures and seeking advice are two usual means in information searching [2, 3]. The complexity of the ever-changing financial markets and their evolving products, however, creates a new need for professional advice to identify and obtain accurate information required for making sound financial decisions [4]. Investors, who are rational, especially institutional ones, are expected to consider full financial and operation aspects and the growth prospects of stocks being taken into account in making investment decision. They are also expected to be independent of market noise and bias. Now, if such investors were really rational, they would get analytical information in advance and use that while investing. Other participants would then follow the informed investors, resulting in efficient pricing of market instruments [5].

The capital market in which security prices adjust rapidly to the arrival of all relevant new information and, therefore, the current prices of security reflect all current and upcoming information about the security due to which making economic profit is almost impossible is called efficient capital market [6]. Market efficiency is a core concept of financial investment because this concept postulates that investors will assimilate all relevant information into prices in making their buy and sell decisions. According to this view, an efficient capital market is one where prices of financial asset accurately reflect all information and quickly adjust to new information [7]. If markets are sufficiently competitive and therefore efficient, then the economic theory states that the investor cannot earn abnormal profit from their investment strategies [8]. Based on information events financial analysts talk about three different types or forms of market efficiency but the forms basically stands to describe how fast relevant information are reflected in security prices to estimate its fundamental values. The forms are i) weak form efficiency in which current price reflects the information contained in all past prices and technical analysis is of no use, ii) semi-strong form efficiency asserts that current price reflects all publicly available information and fundamental analysis is out of use, finally iii) Strong Form Efficiency for which current price reflects all information, public as well as private and insiders' information become useless. The paper aims to examine the impact of information search behavior of investors on capital market and thereby identify the degree of efficiency of the capital market of Bangladesh taking the specific information event 'dividend announcement' into consideration.

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A Brief History of Stock Market in Bangladesh: Capital market concepts started in USA at Wall Street in 1653. It came to South Asia in 1890. The capital market of Bangladesh is the third largest in the South Asia and one of the smallest in Asia. The Bangladesh capital market operations in this part of the country started in mid fifties with the establishment of East Pakistan Stock Exchange Association in 1954, which started trading in 1956. Initially it was a mutual organization (cooperative body) which was corporatized in recent activity of the Dhaka Stock Exchange (DSE) in term of turn over in the name of Dacca Stock Exchange Ltd. During those early periods until 1971, all trades in the exchange were conducted using trading data collected over telephone from Karachi Stock Exchange. After independence of Bangladesh, the operations of the stock exchange remained suspended until August 1976.

During 1976 there were only 9 listed companies with total paid up capital of Tk. 0.138 billion and market capitalization of Tk. 0.147 billion which was 0.138 percent of GDP [9]. The actual growth of the stock exchange in Bangladesh started from 1983, when the market capitalization was Tk.812 million. With the liberalizations of policies in the 1990's the stock market gradually started to prosper.

Securities and Exchange Commission (SEC) was established on 8 June 1993 through Enactment of the Securities and Exchange Commission Act, 1993. The objectives of the SEC are to develop the securities markets and to frame necessary rules and regulations of capital markets. One of the prime responsibilities of the Commission is to protect the interest of the investors. The Commission consists of a chairman and four full time members who are appointed by the government for a period of three years as per law and terms of their service is determined by the government. The Chairman is the chief executive officer of the Commission.

Dhaka Stock Exchange is the main stock exchange of Bangladesh. Dhaka stock exchange is the first stock exchange of the country. Dhaka Stock Exchange (DSE) is a public limited company. It is formed and managed under Company Act 1994, Security and Exchange Commission Act 1993, Security and Exchange Commission Regulation 1994 and Security and Exchange Commission (Inside trading) Regulation 1994. The board of directors consisting of 24 members directs the activities of DSE. Out of them, 12 directors are elected by direct votes of DSE members and other 12 directors are nominated by the elected members from non-DSE members upon approval of the Commission. At present, there are 238 members in DSE of which 22 members are registered by the Commission for conducting securities business. DSE has expanded its on-line trading network to many district towns like Gazipur, Narayanganj, Comilla, Feni, Habiganj, Maulvibazar, Mymensingh, Chittagong, Khulna, Sylhet, Kushtia, Barisal, Rajshahi and Bogra including the divisional towns.

Chittagong Stock Exchange is a Stock Exchange located in the port city of Chittagong in southeastern Bangladesh. The Chittagong Stock Exchange (CSE) began its journey in 10th October of 1995 from Chittagong City through the cry-out trading system with the promise to create a state-of-the art bourse in the country. The board of directors consisting of 24 members directs the activities of CSE. Out of them, 12 directors are elected by direct votes of CSE members and other 12 directors are nominated by the elected members from non-CSE members upon approval of the Commission. Now there are 135 members in CSE of which 120 members are registered by the Commission for conducting securities business. The CSE is a self-regulated not for profit organization like DSE and formation of the Council, numbers of Council member and the mechanism of appointments of councilors are to DSE.CSE is administered under the Chittagong Stock Exchange (Board and Administration) Regulation 2000. CSE offers buying, selling and dealing in share securities, bonds, debentures, government papers and any other instruments trough brokers and dealers. It is also involved in disseminating information to investors by publishing monthly portfolio and other necessary publications. The exchange is also involved in research and development activities pertaining to capital market.

On April 29, 2013 the Parliament of Bangladesh passed the Demutualization Bill-2013 to bring more transparency in the country's two stock exchanges through segregating the owners from day to day business of the stock exchanges. Until today, the owners and managements of the Dhaka Stock Exchange (DSE) and the Chittagong Stock Exchange (CSE) enjoy the right to trade the security issues. This system creates conflict of interest as the members of the stock exchanges have ownership as well as trading rights. But demutualization would separate the management from the owners of the bourses and curtail the excessive control enjoyed by brokers over stock markets.

Literature Review: The empirical literatures on the weak form of efficiency of Bangladesh stock market are few and their findings are conflicting. Mobarek and Keasey 2000

[10] examined the daily return series of DSE general index for the period of 1988 to 1997 using parametric and non –parametric tests. They concluded DSE return series do not follow a random walk and hence, the market is not efficient in weak form. Rahman *et al*. 2004 [11] applied unit root test on the monthly return series of DSE for the period of 31/01/1990 – 31/09/2003 and found support for unit root in the DSE return series, suggesting existence of weak-form of efficiency in the DSE. Islam and Khaled and Islam 2005 [12] applied heteroscedasticity-robust Box-Pierce test to DSE daily and monthly index. Their findings suggest that typical rejection of weak form market efficiency by the usual autocorrelation tests may be reversed by a heteroscedasticity-robust test.

Rahman and Hossain 2006 [13] applied both nonparametric tests (Kolmogrov-Smirnov goodness of fit test and run test) and parametric-tests (Auto-correlation coefficient test and ARIMA (0, 1, 0) for testing random walk model in the daily return series of DSE and found no evidence of weak-form efficiency. Over all the empirical evidences on the weak- form efficiency in the Bangladesh stock market (DSE and CSE) return series are inconclusive. In respect of weak form efficiency of Bangladesh stock market some researchers have done several works but no one applied the even study methodology and random walk methodology simultaneously for two stock exchanges (DSE and CSE). Differential findings of different studies may be attributed to the sample period for which the data have been used and for different time horizons of the returns. However, since stock market behaviour may change over time, this study provides new evidence using different data sets for different (i.e., current) time periods.

MATERIALS AND METHODS

Methodology of the Study: There are several approaches to examine the impact of investors' information search behavior on capital market and it basically depends on the investment scheme to be tested. In testing market efficiency with special reference to a change in particular information like dividend announcement, event study methodology is widely used by different researchers. Traditionally, event study methodology is used to evaluate the reaction of the market to certain corporate events. These studies which are specific in nature are designed to measure market efficiency at certain points in time and only in conjunction with specific events. The information events can be market-wide, such as macroeconomic announcement or firm–specific, such as earning or dividend announcements [6, 14].

As the paper considers the investors response to specific information event 'dividend announcement', randomness of return can be assumed. Study of the stock returns generating process has long been dominated by interest in its random properties. Theory of random walk in stock prices involves two hypotheses: The successive price change is independent and the price change conforms to some probability distribution [15]. The simplest and strongest version of random walk hypothesis is based on independently and identically distributed (IID) increment where the dynamics of stock prices are given by the following equation [16].

$$R_t = \delta + R_{t-1} + \varepsilon_t$$

Where, R_t is price of the financial asset observed at time t, is the expected price change or a random walk with drift, ε_t is independently and identically distributed with mean 0 and variance σ^2.The independence of the increment (ε_t) implies that the random walk is not only fair game, but also in much stronger sense then the martingale.

Hypothesis to Be Tested: It is commonly observed that arrival of new information attract speculators and thus makes stock market volatile. The opposite view is also found from a group of investors who believe that it spreads out investor's choice and thus lead to lower stock price volatility. Based on these views following hypotheses can be considered for testing the impact of information search behavior of potential and prevailing investors on capital market.

H_0: Investors information search behavior has no influence over stock prices

H_a: Investors information search behavior has significant influence over stock prices

Where H_0 and H_a stand for null hypothesis and alternative hypothesis respectively.

Sources of Data: All relevant data are collected from CSE and DSE publications. The CSE and DSE publish daily stock prices indices (such as CSE publication: all share price index, CSE 30, CSCX; DSE publication: all share price index, DSE20) to the public investors etc home and abroad. The daily all share price index on CSE (CASPI) and DSE (DASPI) are collected from the data stream. The present study covers for a period of five years, i.e. January 2007 to December 2012.The sample includes a total 1341 daily and 68 monthly observations for the entire sample period. The empirical analysis of this

study uses daily data of closing prices for the all share price index (ASPI) on indicated sample period. Monthly all share prices index has been generated by making an average from the all share prices index considering the trading day on that month dated from January 2007 to December 2012.

RESULTS AND DISCUSSIONS

Now we move to random walk methodology. One of the basic assumptions of random walk model is that the distribution of the return series should be normal. In order to test the distribution of the return series, the descriptive statistics of the log of the market returns are calculated and presented in Table 1.

The table confirms that the frequency distribution of the return series is not normal. The skewness coefficient in less than of unity, generally taken to be fairly extreme [17]. In a Guassian distribution, one would expect these data to have a kurtosis coefficient of 2.995, 2.913, 2.995 and 2.913 for CDR. CMR, DDR and DMR respectively[1]. Kurtosis generally either much higher or lower indicates extreme leptokurtic or extreme platykurtic [19]. Our evidence of the value of (25.455, 16.580 and 8.460) falls under the extreme leptokurtic distribution. Similarly the distributions of DMR are platykurtic. Generally, values for skewness zero and kurtosis value 3 represents that the observed distribution is perfectly normally distributed. So skewness and leptokurtic frequency distribution of stock return series on the DSE indicates that the distribution is not normal. In other words, the non-normal frequency distributions of the stock return series deviate from the prior condition of random walk model.

To confirm the distribution pattern of the stock return series, Kolmogrov Smirnov Goodness of Fitness test is used, which provides further evidence whether the distribution confirms to a normal distribution or not. Kolmogrov Smirnov Goodness of fit test (K-S test) is a non-parametric test and is used to determine how well a random sample of data fits a particular distribution (uniform, normal and Poisson). The one sample K-S test compares the cumulative distribution function for a variable with a uniform or normal distribution and test whether the distributions are homogeneous. We use both normal and uniform parameters to test the distribution.

Results from the Table 2, (K-S test) shows a 0.0000 probability for the Z, clearly indicates that the frequency distribution of the daily price indices of Dhaka Stock Exchange and Chittagong Stock Exchange does not fit by normal distribution.

Table 3 shows that the number of run is greater than 20 in all the cases states that the series return are not following the assumption independent relationship of random walk model. Therefore, we can reject the null hypothesis that the return series on the DSE and CSE follows random walk. The significant two-tailed with an absolute Z values greater than 1.96 suggest non-randomness because of too few observed numbers of runs than expected. Moreover all the p-value are significantly less than 0.005, therefore we reject the null hypothesis and accept the alternative hypothesis. The series are not random. Thus DSE and CSE are not weak form efficient.

The Augmented Dickey-Fuller test is used to test the null hypothesis of a unit root, as a unit root is a necessary condition for random walk. The result of Augmented Dickey-Fuller test for unit root for ASPI of DSE and CSE are presented in Table 10. Augmented Dickey-Fuller test was performed including intercept, intercept and trend for the whole sample period 2007-2012.

According to the Table 4 the unit root test indicates that CSE and DSE indexes are stationary. Since all p-value of the two market indexes are significantly smaller than the 5% level of significance. So evidence suggests that the returns series in both markets are stationary in the 5% level of significance. Moreover the ADF test suggests accepted the null hypothesis for all index levels, thereby implying that all of price index examined is stationary. The result therefore indicates that there is no evidence of random walk in all of the index series of DSE and CSE. Thus from the analysis it can be said that the returns of both the stock exchange do not follow random walk model, which implies DSE and CSE is not efficient in weak form. Historical information cannot be fully reflected in current price. Investor can obtain excess value through analyzing historical information.

Figure 1 to 4 summarize the the results of ACF test. Figure 1 and 2 show the autocorrelation function (ACF) and partial autocorrelation function (PACF) (up to lag 20) for the DSE daily and monthly stock return respectively that covers the sample period. Figure 3 and 4 shows the autocorrelation function (ACF) and partial autocorrelation function (PACF) (up to lag 20) for the CSE daily and monthly stock return respectively that covers the sample period. The plot of the Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) of the series can be used to test whether the series is stationary or not.

According to above figures, at the column labeled AC, which is the sample autocorrelation function and the first diagram on the left, labeled autocorrelation.

[1]Kendall 1943 [18] calculated the expected normal kurtosis equal to 3(n-1/n+1), where, n= sample size

Table 1: Descriptive statistics of the returns

	CDR	CMR	DDR	DMR
Mean	0.000938	0.007534	0.000744	0.014325
Median	0.001009	0.017943	0.001001	0.009472
Maximum	0.130707	0.143054	0.192168	0.152905
Minimum	-0.077644	-0.683699	-0.091258	-0.161190
Std. Dev.	0.016576	0.108406	0.018559	0.069878
Skewness	0.086913	-3.885455	0.844518	-0.267315
Kurtosis	8.460159	25.45575	16.58180	2.694075
Jarque-Bera	1667.508	1599.836	10466.40	1.075021
Probability	0.000000	0.000000	0.000000	0.584201
Sum	1.257757	0.512290	0.997253	0.974115
Sum Sq. Dev.	0.368183	0.787381	0.461544	0.327155
Observations	1341	68	1341	68

CDR=Daily market returns on CSE CMR= Monthly market returns on CSE

DDR= Daily market returns on DSE DMR= Monthly market returns on DSE

Table 2: Kolmogrov Smirnov goodness of fit test

Variable	Number of observations	Absolute	Positive	Negative	K-S Z	Z- Tailed P
CDR	1341	.079	.062	-.079	2.904	.000
DDR	1341	.088	.088	-.085	3.227	.000

Table 3: Results of run test

Particulars of the variables	Total numbers of runs	Z	Asymp. Sig. (2-tailed)
Daily market returns on CSE	593	-4.289	.000
Monthly market returns on CSE	20	-3.665	.000
Daily market returns on DSE	600	-3.906	.000
Monthly market returns on DSE	22	-3.091	.001

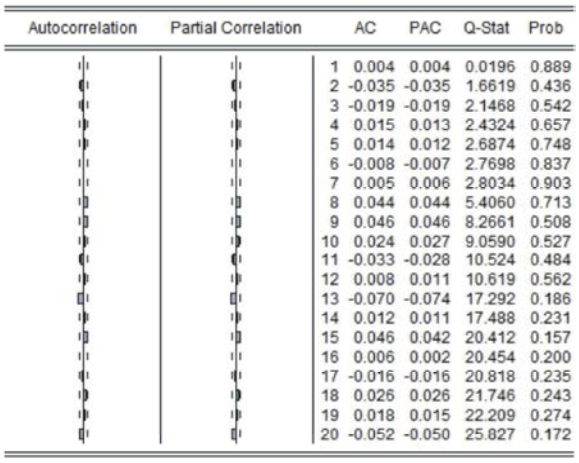
Note: Statistics are computed according to SPSS program specifications.[2] [20]

Table 4: Results of unit root test

Variable	Null Hypothesis (H_0)	P-Value	Critical Value 5%	Decision	
Daily market returns on CSE	Constant, No trend	A(1)=0,T-TEST	0.0000	0.05	H_0 accepted
	Constant, trend	A(1)=0,T-TEST	0.0000	0.05	H_0 accepted
Monthly market returns on CSE	Constant, No trend	A(1)=0, T-TEST	0.0390	0.05	H_0 accepted
	Constant, trend	A(1)=0, T-TEST	0.0211	0.05	H_0 accepted
Daily market returns on DSE	Constant, No trend	A(1)=0, T-TEST	0.0000	0.05	H_0 accepted
	Constant, trend	A(1)=0, T-TEST	0.0000	0.05	H_0 accepted
Monthly market returns on DSE	Constant, No trend	A(1)=0, T-TEST	0.0001	0.05	H_0 accepted
	Constant, trend	A(1)=0, T-TEST	0.0003	0.05	H_0 accepted

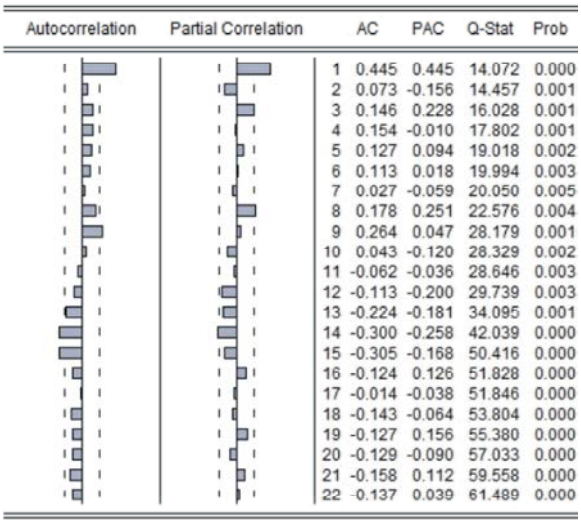
The solid vertical line in the diagram represents the zero axis, observations above the line are positive value and those below the line are negative values. The correlation coefficient starts at a high value and decline quickly toward zero as the length ends. As it is very clear from this diagram that the autocorrelations at various lags hover around zero. Those are the picture of a correlogram of a stationary time series. If the ACF and PACF lie between the lower and the upper confidence limit, then the series is stationary. From the ACF test for Daily/Monthly market returns of Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE), it is evident that the return series are stationary. Thus from the empirical analysis it is pertinent that the returns of both the stock exchange do not follow random walk model, which implies that in DSE and CSE, current price does not reflect the information contained in event like dividend announcement.

[2]As the table value does not represent the expected number of runs, we calculate the values following the formula [21]; 2(n+1) / 3; where, n= number of observations; and the results shows that there is a significant difference between the observed number of runs and expected number of runs.



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.004	0.004	0.0196	0.889
		2	-0.035	-0.035	1.6619	0.436
		3	-0.019	-0.019	2.1468	0.542
		4	0.015	0.013	2.4324	0.657
		5	0.014	0.012	2.6874	0.748
		6	-0.008	-0.007	2.7698	0.837
		7	0.005	0.006	2.8034	0.903
		8	0.044	0.044	5.4060	0.713
		9	0.046	0.046	8.2661	0.508
		10	0.024	0.027	9.0590	0.527
		11	-0.033	-0.028	10.524	0.484
		12	0.008	0.011	10.619	0.562
		13	-0.070	-0.074	17.292	0.186
		14	0.012	0.011	17.488	0.231
		15	0.046	0.042	20.412	0.157
		16	0.006	0.002	20.454	0.200
		17	-0.016	-0.016	20.818	0.235
		18	0.026	0.026	21.746	0.243
		19	0.018	0.015	22.209	0.274
		20	-0.052	-0.050	25.827	0.172

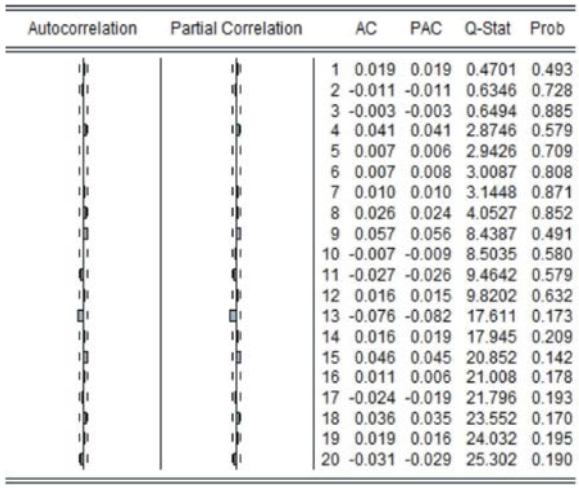
Fig. 1: ACF and PACF of the daily stock return of DSE



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.445	0.445	14.072	0.000
		2	0.073	-0.156	14.457	0.001
		3	0.146	0.228	16.028	0.001
		4	0.154	-0.010	17.802	0.001
		5	0.127	0.094	19.018	0.002
		6	0.113	0.018	19.994	0.003
		7	0.027	-0.059	20.050	0.005
		8	0.178	0.251	22.576	0.004
		9	0.264	0.047	28.179	0.001
		10	0.043	-0.120	28.329	0.002
		11	-0.062	-0.036	28.646	0.003
		12	-0.113	-0.200	29.739	0.003
		13	-0.224	-0.181	34.095	0.001
		14	-0.300	-0.258	42.039	0.000
		15	-0.305	-0.168	50.416	0.000
		16	-0.124	0.126	51.828	0.000
		17	-0.014	-0.038	51.846	0.000
		18	-0.143	-0.064	53.804	0.000
		19	-0.127	0.156	55.380	0.000
		20	-0.129	-0.090	57.033	0.000
		21	-0.158	0.112	59.558	0.000
		22	-0.137	0.039	61.489	0.000

Fig. 2: ACF and PACF of the monthly stock return of DSE

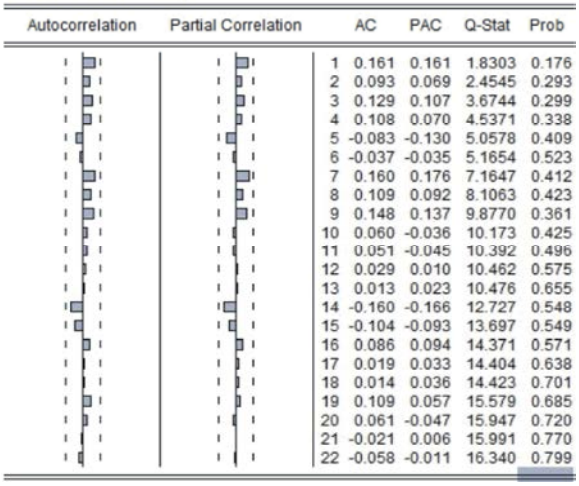
Date: 07/10/12 Time: 18:47
Sample: 1 1341
Included observations: 1341



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.019	0.019	0.4701	0.493
		2	-0.011	-0.011	0.6346	0.728
		3	-0.003	-0.003	0.6494	0.885
		4	0.041	0.041	2.8746	0.579
		5	0.007	0.006	2.9426	0.709
		6	0.007	0.008	3.0087	0.808
		7	0.010	0.010	3.1448	0.871
		8	0.026	0.024	4.0527	0.852
		9	0.057	0.056	8.4387	0.491
		10	-0.007	-0.009	8.5035	0.580
		11	-0.027	-0.026	9.4642	0.579
		12	0.016	0.015	9.8202	0.632
		13	-0.076	-0.082	17.611	0.173
		14	0.016	0.019	17.945	0.209
		15	0.046	0.045	20.852	0.142
		16	0.011	0.006	21.008	0.178
		17	-0.024	-0.019	21.796	0.193
		18	0.036	0.035	23.552	0.170
		19	0.019	0.016	24.032	0.195
		20	-0.031	-0.029	25.302	0.190

Fig. 3: ACF and PACF of the daily stock return of CSE

Date: 11/10/12 Time: 15:29
Sample: 1 1341
Included observations: 68



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.161	0.161	1.8303	0.176
		2	0.093	0.069	2.4545	0.293
		3	0.129	0.107	3.6744	0.299
		4	0.108	0.070	4.5371	0.338
		5	-0.083	-0.130	5.0578	0.409
		6	-0.037	-0.035	5.1654	0.523
		7	0.160	0.176	7.1647	0.412
		8	0.109	0.092	8.1063	0.423
		9	0.148	0.137	9.8770	0.361
		10	0.060	-0.036	10.173	0.425
		11	0.051	-0.045	10.392	0.496
		12	0.029	0.010	10.462	0.575
		13	0.013	0.023	10.476	0.655
		14	-0.160	-0.166	12.727	0.548
		15	-0.104	-0.093	13.697	0.549
		16	0.086	0.094	14.371	0.571
		17	0.019	0.033	14.404	0.638
		18	0.014	0.036	14.423	0.701
		19	0.109	0.057	15.579	0.685
		20	0.061	-0.047	15.947	0.720
		21	-0.021	0.006	15.991	0.770
		22	-0.058	-0.011	16.340	0.799

Fig 4: ACF and PACF of the monthly stock return of CSE

CONCLUSION

It is evident from the study that investors' information search behavior to specific information event has little or almost no impact of stock market of Bangladesh which results a low degree or weak form of market efficiency. This is partly due to the fact that rational investor behavior is ignored by other participants, resulting in irrational behavior in the overall market. Or perhaps, the size and participation of rational investors is not large enough to have an effect on irrational investors. It can also be attributed to a poorly regulated environment, lack of quality and timely disclosures and the type and sophistication of both retail and institutional investors. Such behavior turns into a pattern that deters market efficiency.

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