EMERGENT MARKETS AND RANDOM WALK HYPOTHESIS – EVIDENCE FROM PAKISTAN

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ABSTRACT

This is the study to test the random walk hypothesis in Karachi stock market, with the objective of finding possibilities of abnormal returns for investors. Random walk hypothesis is consistent with the efficient market hypothesis that's why efficiency of Karachi stock exchange is measured using variables i-e share price (of the companies which are integral part of KSE 100 index) and KSE 100 index. Event study approach was used and correlation between these two variables was measured before and after the event i-e financial reports of selected companies. Four years data, starting from 2011, was selected in the short run of five days i-e day before presentation of financial reports, presentation day and the next three days. Positive reports were selected only because this study is in perspective of investor who is seeking opportunities for abnormal return. It is a kind of quantitative study and different statistical tests like Jarque-Bera test, correlation and paired sample t-test were used to find out meaningful information from the data. It was concluded, on the basis of results that Karachi stock exchange is not efficient and random walk hypothesis does not exist. So Karachi stock exchange is a good place to invest for the investors who are interested in abnormal returns.

Keywords: emergent Markets, random walk hypothesis, abnormal returns, Market efficiency.

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1. Introduction

Investor is always of the interest to gain abnormal profit through his investment. Abnormal return means returns which are above the normal returns in the stock market. Karachi stock exchange is one of the largest emergent markets in the south Asian countries and progressing day by day, particularly in the current government which have very aggressive approach to attract local and foreign investment. Study basically investigates presence of random walk hypothesis in Karachi stock exchange. Random walk hypothesis is a characteristic of efficient stock market so we worked on the evidence of weak form of efficiency in Karachi stock exchange. Abnormal gains are not possible in efficient market and Inefficiency is the only condition which allows investors to approach abnormal gains. So this study is a guideline for such investors.

Information which is reflected by the companies reports contain dividends declared, future prospects, detail of company's assets and liabilities, future contracts, long term plans etc. This information gives an idea, in the scenario of government policies and competitive environment, about the future earnings and stability. Stronger and profit oriented is the company, more demanding would be its shares and accordingly prices will rise up. But all it depends upon Karachi stock exchange that how quick it absorbs the effects of these reports. It takes some time, and then definitely provides opportunity for the banking sector investors to approach to abnormal returns.

Here only positive reports are being selected for analysis because these reports are important in investors' perspectives who want to purchase shares of banking sector companies. Positive reports provide opportunity of abnormal returns of such investors. So first we have to find out whether Karachi stock exchange is efficient in semi strong level or not, then we will be able to conclude that abnormal returns for investors is available or not?

Study carries top 60 companies of Karachi stock exchange on the basis of their liquidity and capitalization. KSE 100 index is formulated on the basis of top 100 companies which are evaluated after every six months and some companies may be included or excluded on the basis of liquidity and capitalization. So we selected the only those companies which remain part of KSE 100 index throughout the selected time period of four years. Here we focused the short term impacts and analysis is for the five days surrounding the day on which company reports are

officially announced. Both, KSE 100 and share values of 60 companies are collected in the same days and compared statistically to find out any possible relation and strength of relation.

2. Literature Review

Abnormal return for investors of banking sector is directly linked with efficiency of Karachi stock exchange. This efficiency has numerously been studied by the researchers. Shahid and Akbar (2009) used the events of daily, weekly and monthly calendar effects and evaluated the response of Karachi stock exchange against these events. He used KSE 100 index as the indicator of Karachi stock exchange. Data was collected from 1991 to 2006. One-factor ANOVA was used to analyze the data. Results revealed to the conclusion day 4 & 5 have effects, third week of the month has bit effects. Monthly effects were not found. Farid & Ashraf (1995) worked on volatility of Karachi stock exchange using closing share prices of main companies. 10 companies were selected randomly from 100 companies and Data was collected from Jan to Jun 1994. Spearman's rank correlation coefficient. Results showed that volatility of karachi stock market is quite high and ranged from 26 to 51 percent per annum. Ali & Mustafa (2001) tested semi strong form of efficiency of Karachi stock exchange to find out whether publicly announced information affect stock returns and trading volume or not? He used news from news papers i-e "Business Recorder" and "Dawn" and correlated with daily stock return and trading volume. Data was collected during the time period of July 01, 1998 to Dec 31, 2000. Statistical tests like Correlation and Regression were used. They finally concluded that news are negatively correlated with stock market activity. This result was found to be significant in case of trading volume but insignificant in case of stock returns.

Stock exchange efficiency is not only a burning issue for researchers in Pakistan but also a valuable consideration world wide. Particularly there is a massive work done on emergent stock markets of the world. Asma Mubarak and professor keavin keasey (2012) measured the efficiency of Dhaka stock exchange, an example of emerging market, to find out the possibility of abnormal returns. He used daily prices of listed companies during the time period of ten years. Statistical non parametric tests i-e Kolmogrove-Smirnov, run test and parametric tests (Auto-correlation, Regression, AMIRA). Results rejected the presence of weak form of efficiency in the Dhaka stock exchange. Sunil (1996) conducted the research on an emergent market i-e Indian stock market and measured its weak form of efficiency with respect to day of the weak effect. He

selected the emergent market because of their expanding prospects. He selected the time period of eight years starting from 1987. The results were not in the favor of weak form of efficiency and hence providing opportunities for abnormal returns. Raja and Clement (2009) investigated efficiency of Indian stock exchange was evaluated with respect to IT industry. So based on these studies we decided to find out efficiency of Karachi stock exchange with respect to banking sector. Muhammad, Barqi and Kenta (2013) evaluated another emergent market of Malaysia in terms of its reaction against dividend announcements. They used even study approach for the said analysis. Companies were categorized as government linked companies and non government linked companies and there impacts were studied separately. They finally reached at the results that Malaysian stock exchange response positively against dividend announcements and negatively when dividend is reduced. Alex Edmans (2009) tried to find out correlation of block holders with market efficiency and found a positive correlation between these variables with different pace. Peng poi (2012) also conducted a study to find a relation between dividend announcements and effects on the prices of shares of corresponding companies. He selected the time period ranging from 2004 to 2008 and data was collected from Kuala Lumpur stock exchange. Market was analysed in three dimensions i-e when dividend decreases, when dividend increases and when dividend remains same. Results proved the market to be inefficient hence provides opportunity of abnormal returns. Nishat, Eric & Herve (2008) evaluated the link between legal insider trading and market efficiency. They used data of 2110 companies and collected 59,244 insider trades. This whole data belonged to time period of 1995 to 1999. He concluded that in the presence of insider trading, there was no strong response in terms of abnormal returns. Martin, Francis and Sun (1996) worked on Chinese stock exchange to evaluate semi strong form of efficiency. Chaina has established two stock exchanges where two different types of shares are floating. These shares has been named as "A" and "B". Stock exchanges were giving two different behaviors for two types of shares. Study concluded stock exchange to be efficient with respect to "A" type shares and inefficient with respect to "B" shares.

Different stock exchanges were not only studied time to time but also compared with each other. Jamshed and Inayat (2006) compared Karachi stock exchange with Bombay stock exchange with respect to volatility. Daily closing values of the indices were used for the period from 1/1/1993 to 12/29/1995, and from 1/1/2000 to 3/31/2003 for the BSE to cover the two periods during the

period of change. Data for the analysis comprised of daily closing indices for the time period of 1993 to 1995 and from 2000 to 2003. They used statistical tests like skewness, kurtosis, Jarque-Berau and one tail t-tests were used. Results concluded Karachi stock exchange to be more volatile than that of Bombay stock exchange. Thomas and Brian (2006) examined the efficiency of seven emerging markets selected from MENA Middle-eastern North African stock markets. They measured efficiency of stock exchanges with respect to market development, corporate governance and economic liberalization. Multinomial ordered logistic regression was used to analyze the data. Results highlighted heterogeneous levels of efficiency in the selected markets.

Throughout this literature review we found the stock exchanges have been analyzed with respect to efficiency using different variables. But particularly company reports of the companies which are part of selected index, has not been utilized as the stimuli which impacts the stock exchange. So we selected these companies here and their quarterly and final financial reports were considered as events which are influencing the Karachi stock exchange.

3. Research Methodology

In this study we selected top sixty companies from the KSE 100 index companies, with respect to their liquidity and capitalization. The time period selected was comprised of four years starting from Jan 2011. All these companies were cumulatively more than 30% of the total capitalization of Karachi stock exchange and more than 80% of the total capitalization value companies included in KSE 100 index. Response of the Karachi stock exchange is measured by KSE 100 index which is the more ancient, prominent and frequently used index of Karachi stock exchange. Four years time period was selected to avoid the anomalies which may occur in one, two or three years and may divert the results. Data for both variables, share price of selected companies and KSE 100 index is taken for the surrounding days of presentation of quarterly and annual financial reports. These days may be referred as d_{-1}, d_0, d_1, d_2 and d_3. During the time period of four years, nine hundred and sixty reports were taken (60 x 4 x 4) and out of these, only positive reports were selected. Positive reports were found to be 500. Positive reports were selected to find out possibility of abnormal returns for the investor who want to purchase shares. Negative reports in this perspective are useless and therefore not selected. Some reports were presented on holidays therefore, in this study, we considered next working day as day_{01}. Mostly

the information was gathered from companies' financial reports, their websites and Karachi stock exchange official web site.

Following diagram sketches the whole process of methodology.
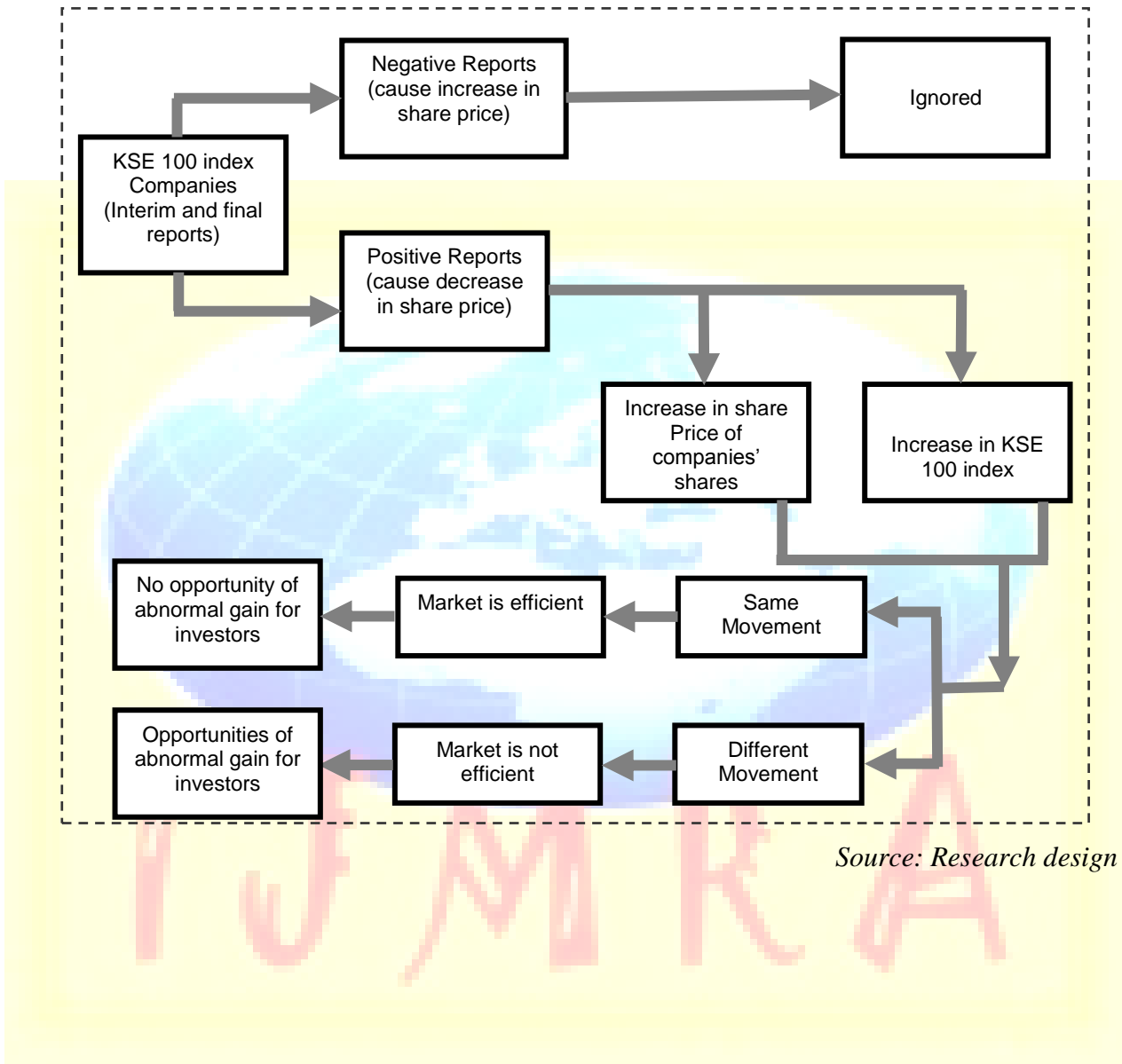
Source: Research design

Data collection process can be summarized in the following table.

Items	Description	Selection
Companies	Top 60 companies selected from KSE 100 index companies based on their liquidity and capitalization.	60 shares of selected twenty companies
Financial Reports	Quarterly and Financial reports of selected companies for the selected time period of four years	Twelve financial reports of each company during the four years time period
Total number of reports	Total reports concerning the time period of four years i-e 1st Jan 2011 to 31st Dec 2014.	960 reports
Number of positive reports	The reports which caused increase in share prices on day 0	500 reports out of 960 reports.

Event study approach was used in this study. It is a common approach and is numerously used by researchers to find out efficiency of Karachi stock exchange against different events. The events most commonly used for such studies include acquisitions, mergers etc. In this study we selected the event of presentation of quarterly and annual financial reports of selected companies. The effects of these events were observed on the presentation day and following three days. The day before the presentation day was also considered as a reference, to find out positive reports. Statistical test Jarque-Berau was used to find out normality of data then both variables, shares value and KSE 100 index, were compared before and after the event. For this comparison correlation and paired sample t-test was used.

Hypothesis tested in this study are;

H_0: Share price mean movement (μ_1) is same as KSE 100 index mean movement (μ_2) in the selected three days time period.

H_1: Share price mean movement (μ_1) is same as KSE 100 index mean movement (μ_2) in the selected three days time period.

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4. Data analysis and discussion

4.1 Day 1 Analysis

Day 1 is the first day after presentation of financial reports day. First of all normality of data is supposed to be calculated as it guides for rest of statistical treatment and generalization of results. In this study Jarque-Berau test was used to find out normality of data. This test analyzes the data with respect to skewness and kurtosis. In case of first variable i-e share price the values of skewness and kurtosis were to be calculated as 0.304 and 0.077 respectively. And in case of variables the same values were calculated to be -0.131 and 0.397 respectively. In the same calculation we got the value of standard error which is 0.205 for skewness and 0.302 for kurtosis. As per statistical rules, the maximum boundaries for skewness and kurtosis can be defined by doubling the standard error and putting the positive and negative sign. The value with positive sign would be the one side boundary and value with negative sign would be the second boundary. The skewness and kurtosis values, if lie within these boundaries then data will be considered as normal. For example double of the skewness standard error would be (0.205 x 2) 0.410. So +0.410 and -0.410 would be the two extreme boundaries of normal data. Here the kurtosis values of both variables are 0.304 and -0.131 respectively and are within the range of normality. So data for both variables is normal with respect to skewness. Similarly, in case of kurtosis, the two extreme boundaries of normality range are (0.302 x 2= 0.604) +0.604 and -0.604. Here again the kurtosis values of both variables are 0.077 and 0.397 and both lie well within given limits. So as a conclusion data is declared as normal and not exceeding significantly the normality limits.

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Table 1: Descriptive Statistics

		Statistic	Std. Error
Share Price	Mean	.15272	.13702
	Median	.00000	
	Variance	5.598	
	Std. Deviation	2.3897	
	Skewness	.304	.205
	Kurtosis	.077	.302
KSE 100 Index	Mean	-.07695	.10183
	Median	.09687	
	Variance	3.079	
	Std. Deviation	1.76110	
	Skewness	-.131	.205
	Kurtosis	.397	.302

Moving forward in analysis, after calculating normality of data, different statistical tools i-e mean, standard deviation and correlation was calculated. Mean values of both the variables i-e share price and KSE 100 index are 0.15196 and -0.07690. These values have a mutual difference of 0.22886. In case of standard deviation, both variables have their respective values as 2.38895 and 1.76087, while the difference between these two values is 0.62808. The correlation value between these two variables is 0.604.

Table 2 : Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Share Price	.15196	500	2.38895	.13707
	KSE 100 Index	-.07690	500	1.76087	.10186

Paired Sample Correlations			
	N	Correlation	Sig.
Pair 1 Share Price & KSE 30 Index	500	0.604	.000

After these calculation then we used paired sample t-test to compare the mean of both variables, before and after the event of financial reports. SPSS was used for this calculation and t value calculated to be 2.096. This value is greater than tabulated value for the same population. Significance value in this case was as 0.346.

Table 3: Paired Samples Test

	Paired Differences				
	95% Confidence Interval of the Difference		T	df	Sig.(2-tailed)
	Lower	Upper			
Pair 1 Share Price - KSE 100 Index	.00894	.44101	2.096	499	0.346

In this case we have mean values for both variables which are looking to be away from each other with significance value. The difference is indicating that share price is moving upward with more speed than that of KSE-100 index. With respect to standard deviation, again we observed both variables expanded with different levels and expansion of share price is looking to be more than KSE 100 index. In case of correlation, both the variables are positively correlated which means both the variables are moving with same direction. From all this calculation we get a

foggy picture of relation between these two variables. Share price and KSE 100 index are moving in the same direction but their pace and expansion ratio is different. However the clearer picture of relation can be found by calculating the t value.

T value calculated from the paired sample t-test during the first day. It was declared greater than the corresponding tabulated t value. In this calculation the significance level is 0.346 which means results carry almost 66% confidence value. It means null hypothesis can be rejected with the same confidence value which is not the required level of confidence. With this confidence level we cannot generalize our results. So on first day analysis we are not in the position to reject the null hypothesis with the required confidence level of 95%.

4.2 Day 2 Analysis

Day 2 is the next day to Day 1. Again first normality is tested by Jarque-Berau test. For share price, value of skewness and kurtosis are calculated to be 0.291 and 0.104 respectively. In case of KSE 100 index same values are -0.096 and 0.291 respectively. Standard errors for both variables in this calculation are 0.195 and 0.298 respectively. Applying the same rule, normal range for skewness is +0.390 to -0.390 and for kurtosis is +0.694 to -694. On day 2 values for skewness and kurtosis lie well within limit which prove normality of data.

Table 4: Descriptive Statistics

		Statistic	Std. Error
Share Price	Mean	.15294	.13682
	Median	.00000	
	Variance	5.606	
	Std. Deviation	2.3902	
	Skewness	.291	.195
	Kurtosis	.104	.298
KSE 100 Index	Mean	-.07705	.10202
	Median	.09711	
	Variance	3.108	
	Std. Deviation	1.76110	
	Skewness	-.096	.195
	Kurtosis	.295	.298

After proving data to be normal, further statistical tools are applied. Mean values of both variables are calculated as 0.152 and -0.077. Standard deviation values are 2.389 and 1.761 respectively and the difference between these values is as 0.628. Correlation between these variables is 0.589.

Table 5 : Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Share Price	.15207	500	2.38901	.13687
	KSE 100 Index	-.07714	500	1.76105	.10203

Paired Sample Correlations			
	N	Correlation	Sig.
Pair 1 Share Price & KSE 100 Index	500	0.589	.000

After above calculation, paired sample t-test is used to compare mean of these variables. t value on the 2nd day is calculated to be 1.864. Significance value for this test is 0.407.

Table 6: Paired Samples Test

	Paired Differences		T	df	Sig.(2-tailed)
	95% Confidence Interval of the Difference				
	Lower	Upper			
Pair 1 Share Price - KSE 100 Index	.00905	.44082	1.864	499	0.407

Both the variables, on Day 2, looking to be away from each other significantly with respect to their means. Difference is reflecting that share price is moving with more pace than that of KSE-100 index. Standard deviation is reflecting that share price value is more expanded than that of KSE-100 index. Correlation value between these values is 0.589 which is an indication that variables have a positive correlation and moving in the same direction. All these calculations are indicating roughly that both variables are moving in the same direction but with different pace. Clearer view is observed through t value.

t value calculated on the 2nd day to be 1.864 which is greater than the corresponding tabulated value. However again the problem is relevant to significance value which is again very high than what is required. Significance value in this case is 0.407 which means the null hypothesis can be rejected with 60% confidence level which is very low than the required level of 95%. With this confidence level the results cannot be generalized.

4.3 Day 3 Analysis

Day 3 is the next day to Day 2. Again first normality is tested by Jarque-Berau test. For share price, value of skewness and kurtosis are calculated to be 0.304 and 0.201 respectively. In case of KSE 100 index same values are -0.107 and 0.306 respectively. Standard errors for both variables in this calculation are 0.201 and 0.309 respectively. Applying the statistical rule, normal range for skewness is +0.402 to -0.402 and for kurtosis is +0.618 to -618. On day 3 values for skewness and kurtosis lie well within limit which prove normality of data.

Table 7: Descriptive Statistics

		Statistic	Std. Error
Share Price	Mean	.15303	.13711
	Median	.00000	
	Variance	5.548	
	Std. Deviation	2.3865	
	Skewness	.304	.201
	Kurtosis	.104	.309
KSE 100 Index	Mean	-.07683	.10202
	Median	.09678	
	Variance	3.082	
	Std. Deviation	1.76067	
	Skewness	-.107	.201

		Statistic	Std. Error
Share Price	Mean	.15303	.13711
	Median	.00000	
	Variance	5.548	
	Std. Deviation	2.3865	
	Skewness	.304	.201
	Kurtosis	.104	.309
KSE 100 Index	Mean	-.07683	.10202
	Median	.09678	
	Variance	3.082	
	Std. Deviation	1.76067	
	Skewness	-.107	.201
	Kurtosis	.306	.309

After proving data to be normal, further statistical tools are applied. Mean values of both variables are calculated as 0.151 and -0.0769. Standard deviation values are 2.388 and 1.760 respectively and the difference between these values is as 0.628. Correlation between these variables is 0.621.

Table 8 : Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Share Price	.15196	500	2.38867	.13706
	KSE 100 Index	-.07697	500	1.76081	.10092
Paired Sample Correlations					
		N	Correlation	Sig.	

Table 8 : Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Share Price	.15196	500	2.38867	.13706
Pair 1 Share Price & KSE 100 Index		500	0.621	.000

After above calculation, paired sample t-test is used to compare mean of these variables. t value on the 3rd day is calculated to be 1.918. Significance value for this test is 0.387.

Table 9: Paired Samples Test

	Paired Differences		T	df	Sig.(2-tailed)
	95% Confidence Interval of the Difference				
	Lower	Upper			
Pair 1 Share Price - KSE 100 Index	.00892	.44113	1.918	499	0.387

Means of both variables again have a significance difference between their values. This difference is the evidence that both variables are not moving with the same speed and share price movement is more than KSE 100 index. In case of standard deviation, share price expansion is more than that of KSE 100 index. Correlation is showing positive correlation which means variables are moving in the same direction. T value on the third day is 1.918 and it is greater than the corresponding tabulated value. Significance level in this calculation is 0.387 which is again quite below than that of required value. With significance value we can reject the null hypothesis with 61% confidence and hence with such a low level results cannot be generalized.

4.4 Day 1 -3 Analysis

Now we cumulatively analyze the data from day 1 to day 3. Data for all the three days relevant to positive reports was collected and same statistical test are applied. Skewness and kurtosis values appeared as 0.368 and 0.285 for share price while -0.214 and 0.285 values for KSE 100 index. Standard error for both variables are 0.270 for skewness and 0.386 for kurtosis. Standard errors are reflecting that data is significantly normal.

Table 10: Descriptive Statistics

		Statistic	Std. Error
Share Price	Mean	.15628	.13864
	Median	.00000	
	Variance	5.689	
	Std. Deviation	2.3428	
	Skewness	.368	.270
	Kurtosis	.285	.386
KSE 100 Index	Mean	-.07768	.10458
	Median	.09745	
	Variance	3.152	
	Std. Deviation	1.76147	
	Skewness	-.214	.270
	Kurtosis	.285	.386

After proving data to be normal, further statistical tools are applied. Mean values of both variables are calculated as 0.151 and -0.0769. Standard deviation values are 2.388 and 1.760 respectively and the difference between these values is as 0.628. Correlation between these variables is 0.621. Correlation between these variables is 0.671.

Table 11 : Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Share Price	.15268	1500	2.38687	.13785
	KSE 100 Index	-.07795	1500	1.76248	.10173

Paired Sample Correlations				
		N	Correlation	Sig.
Pair 1	Share Price & KSE 100 Index	1500	0.671	.000

T value in the paired sample t-test for all three days calculated to be 2.186 and corresponding significance value is 0.041.

Table 12 : Paired Samples Test

	Paired Differences		T	df	Sig.(2-tailed)
	95% Confidence Interval of the Difference				
	Lower	Upper			
Pair 1 Share Price - KSE 100 Index	.00824	.44358	2.186	1499	0.041

Means again have almost the same patterns as in the analysis of individual days. Difference is again giving evidence that variables are not moving with the same speed. Speed of share price is looking to be more than KSE 100 index. As far as standard deviation is concerned, expansion in case of share price is more than KSE 100 index. Correlation between these values is positive and indicating that variables are moving in the same direction. T value also has same pattern as in case of individual days. However the important thing in this case is the significance level. Significance level in this calculation is 0.041 which means that result have a confidence level of 96%. So this level is above the required level of 95%. So null hypothesis in this case can be rejected with 96% confidence and results can be generalized.

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In brief explanation we can say that Karachi stock exchange is not able to absorb instantly the positive impacts of financial reports from banking sector companies. While slow absorption leads to the situation called inefficiency. So this inefficiency provides opportunities for investors to get abnormal gains by purchasing shares of these companies. Inefficiency declared in Karachi stock exchange is not strange and has numerously declared by various researchers in the past. Not only the Karachi stock exchange, but other stock exchanges also have been examined time to time and mostly found to be in efficient in semi strong level. There are only few examples of efficient stock exchanges in the world.

5.　Conclusion

This is the work done regarding the data of four years and in the short term effects limiting to the surrounding days of event only. Both variables i-e share price and KSE 100 index are measured before and after the event of presentation of financial reports. The relation was initially evaluated by their means, standard deviation and correlation. Then clear picture of relation was obtained by using paired sample t-test. Results of statistical analysis showed that although both the variables have a positive correlation but share price is moving upward with more pace than that of KSE 100 index. This difference leads us to the conclusion that Karachi stock exchange is not efficient in semi strong level as it is not able to absorb the effects of event in the prescribed period of three days. Effects prolong more than three days and are absorbed slowly. So from these results we can easily reject the null hypothesis which says that Karachi stock exchange is efficient in the semi strong level and equally alternative one can be accepted with the confidence level of more than 95% as shown by cumulative analysis. In this condition possibility for investors arise to gain the abnormal returns if they purchase the shares when the positive reports of these companies are presented.

This is the study relevant to positive reports only. Same analysis can be done on the basis of negative reports with the same or different time period. This study evaluated the short term effects to avoid the anomalies. However analysis can be done to see how prolong these effects remain unabsorbed. Additionally other performance indicators of Karachi stock exchange like KSE 30 index, KMI may also be used for the same kind of analysis. So this behavior of Karachi

stock exchange may attract the investors which not only provide them the facility of extra profits but also fulfill the government objective to attract the foreign investment.

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