*Burhan Ali Shah**
*Ghulam Shabbir Khan Niazi***
*Waseem Akram****

Impact of Non-Financial Factors on Stock Exchange Performance (An Empirical Analysis of KSE-100 Index)

ABSTRACT

This study examined the impact of non-financial factors including terrorism, political instability & natural disasters on Karachi stock exchange-100 index performance. Terrorism was measured in terms of bombing, target killing & kid-napping while strikes & judiciary decisions were taken as political instability. Natural disasters were observed in forms of floods & earthquakes. Time series data on daily basis from KSE-100 index was gathered covering period from 2005 to 2014. OLS method was applied to investigate the impact of non-financial factors on stock exchange performance. It was observed that earthquakes and judiciary decisions had significant negative effect onKSE-100 index while floods, kidnapping and strikes had negative but insignificant effect on KSE-100 index. However KSE-100 index did not react to bombing or target killing at even 10 % level of significance but the stock market reaction was more significant to judiciary decisions as compare to other events.

Keywords: *KSE-100 index, terrorism, political instability, natural disasters, multi-linear regression analysis.*

* Assistant Professor, Quaid-i-Azam School of Management Sciences, Quaid-i-Azam University, Islamabad, Pakistan.
* Professor, Quaid-i-Azam School of Management Sciences, Quaid-i-Azam University, Islamabad, Pakistan.
* Scholar, Quaid-i-Azam School of Management Sciences, Quaid-i-Azam University, Islamabad, Pakistan.

Introduction

Karachi Stock Exchange (KSE)[1], formed on September 18, 1948 with initial capital of Rs. 37 Million, remained the main center of activity with 75 to 80 percent of trading volume of the country. The KSE facilitates people to buy and own shares of listed companies and deals in both variable and fixed income securities (Javid, 2007). It is the second oldest stock exchange in South Asia (Bashir et al. 2011). At one time, it was declared the "Best Performing Stock Exchange of the World for the year 2002" (Gulf News 2008; Bilal et al., 2012) and at other time, it was ranked among the top stock markets in Asia (The Express Tribune, 2014, Jan.01).

Performance of the Stock exchange serves as a barometer for the health of the economy (Twu, 2005; Petros, 2012). A good performance of stock market is a strong indicator of healthy economy (Haroon & Shah, 2013). A healthy stock market supports rational and effective distribution of scarce capital to its maximum value users (Wesley & Lumumba, 2012). The stock exchange helps rally domestic savings for investments and makes long term investments liquid by facilitating transfer of securities between shareholders playing economic growth and development (Lee, 1998).

However, the performance of the stock exchange is sensitive to various financial and non-financial factors including inflation rate, interest rates, exchange rates (Pakistan Economic Survey, 2014-15) new technologies, insider trading, market sentiments, Islamic values (Rehman, 2013). Any negative news or event drastically affects the stock market performance (Khan & Taimur, 2015). Similarly, KSE is very sensitive in nature and affected by different incidents in the country (Haroon & Shah, 2013) including As an emerging market, the share prices quickly respond to events like terrorist attacks, political risk, natural disasters, as well as to earnings reports, product releases, trade shows, bonus issues and dividend announcements (Wesley & Lumumba, 2012).

Terrorism has a direct and indirect influence on the business activities of the people, economy as well as on the stock exchange trading volume (Aurangzeb and Delaware, 2012). Further terrorist attacks negatively affect the psychology of investors, consumption power, political environment, economic wealth, business deals with foreign investors, and the stock market (Wesley & Lumumba, 2012). Similarly political instability has been a major factor affecting the investment environment of the country (Alesina et al. 1996). Investors usually hesitate to invest in Pakistani markets due to

[1] All the three stock exchanges including Karachi stock exchange, Lahore stock exchange and Islamabad stock exchange were merged in to Pakistan Stock Exchange (PSX) w.e.f January 11, 2016

higher political risk (Aqeeluddin, 2010). For example strikes, dharnas and premature elections create uncertainty about the consistency of present government policies. (Ali, Hashmi & Hassan, 2013).Sometimes judiciary actions also affect the stock exchange performance (Top Ten Reviews, 2014).

Unfortunately, calamities also occur every year in Pakistan. Earthquake of 2005 resulted in a huge number of deaths, casualties and loss of billions of rupees (EERI Special Earthquake Report, 2006). Incidents of floods seriously hit the economy of Pakistan almost every year for the last 5 years (2010 to 2014).Earlier, the flood of 2007 resulted in huge loss to the economy of the country (Pakistan situation report, 2014).

Problem Statement

It is observed that increased terrorist attacks, political risk and natural disasters are key factors affecting Pakistan's economy for the last several years (Top Ten Reviews, 2014; Pakistan Situation Report, 2014),resultantly creating fear in the mind of investors with negative impact on the stock market performance. Political instability affects stock exchange investment as well as FDI (Ali et al., 2013). Terrorism affects the whole world but Pakistan is affected more as compare to developed countries (Aurangzeb and dilawer, 2012). Similarly natural disasters adversely affect the stock exchange performance (Hood et al., 2013). Brounen et al., (2010) demonstrate that stock markets react differentially to each factor.

Therefore, the study under review intends to investigate the impact of the three non-financial factors including terrorism, political instability and natural disasters, on KSE-100 index performance. The terrorism is observed in terms of bombing, target killing and kid-napping (Aurangzeb and Delaware, 2012) for the purpose of this study. Strikes and judiciary decisions are considered as dimensions of political instability. Similarly natural disasters are observed in terms of two dimensions including floods & earthquakes. Further the study investigates the impact of non-financial factors on KSE-100 index performance over a period of 10 years (from 2005 to 2014).

Significance of Study

Studying the effect of the non-financial factors on emerging stock markets like Pakistan is very imperative as more and more local and overseas investors participate in these markets. In this study three non-financial factors are identified as independent variables affecting stock market performance. All the three variables have been examined by various researchers but independently. Some of the research studies examined the

relationship between terrorism and the behavior of the stock markets (Aurangzeb and Delaware, 2012; Arin, Ciferri and Spacnolo 2008; Chen and Siembs, 2004; Eldor and Melnick, 2004; and Karolyi and Martell, 2006). Similarly the relationship between political instability and stock market performance was examined by Ali et al. (2013), and Asteriou and Siriopoulos (2000), and effect of natural disasters on stock market performance was investigated by Wang and kutan (2013) and Hood et al. (2013). However, in the current study, all the three variables are combined together in one model in order to observe their effect on stock market performance. Further, this study includes judiciary decision, a new dimension of political instability, unique to Pakistani situation and is still not examined in research, making this research more novel. Practically the findings of this study may prove helpful in facilitating well-versed decision making by institutional and individual investors, policy makers, government agencies and other stakeholders.

Scope of Study

This study examines the effect of terrorism, political instability and natural disasters on the KSE-100 index, confining the scope of the study to Pakistani stock markets.

Review of Literature & Theoretical Framework

A brief review of previous research relevant to the current study is presented below.

Terrorism

Terrorism is deliberate action to create fear and disquiet among people (Qaiser et al., 2012). It is the "systematic use of violence to terrorize governments or societies", in order to achieve a certain goal(Michael, 2007; Brauner and Galey, 2003). Pakistan became the front-line state in Afghanistan, first against the Soviet Union in 1979, and then against Taliban in 2001. Consequently terrorism hit Pakistan severely (Rabbi, 2012) and spread in the region (Hali, 2010). Subsequently the Lal masjid attack in 2007 and the murder of Benazir in the same year, further deteriorated the law and order situation greatly disturbing the financial markets of Pakistan (Iqbal &Lodhi, 2014).

The stock markets react adversely to the terrorist activities (Baumert et al., 2013). Various researchers (Frijns, Rad and Indriawan, 2012; Bilal et al. 2012; and Qaiser et al. 2012) observed that terrorism has significant negative impact on KSE 100 index. Terrorist activities including bombing, target killing

and hostage taking negative lyaffect KSE performance (Aurangzeb and dilawer, 2012). However, it depends on the size and location of the attack. The attacks in Federally Administered Tribal Areas (FATA) have positive impact while attacks in cities like Karachi, Lahore, and Peshawar have negative impact on KSE. Further attacks with gaps between two attacks have larger negative impact on KSE as compare to frequent regular attacks (Aslam and Kang, 2012). Kollias et al. (2011) found that suicide attacks affect the stock markets more and for a longer period as compare to other terrorist activities like assassination and kid-napping. Asteriou and Siriopoulos (2000) observe that assassination and terror create mass violence directly affecting investment activities.

The adverse effect of terrorism is not specific to KSE, rather it seems a universal phenomenon. Kollias et al. (2013) found terrorist activities adversely affecting the American S&P 500, the European DAX, CAC40 and FTSE100, indices. Ramiah et al. (2010) also found significant negative returns and increase in systematic risk in Australian market after 9/11 bombing attacks. Fathi & Shahraki, (2011) found terrorism having significant adverse impact on Tehran stock market. Similarly the negative impact of terrorism is not specific to stock exchange but it also adversely affects commodity and bonds market (Chesney et al., 2011). Bombing attacks were found having permanent adverse effect on stock & foreign exchange markets in Israel (Eldor and Melnick, 2004). Graham and Ramiah (2012) investigated the impact of different terrorist attacks including September, 11 on Japanese market and argued that in Japanese market 50% of industries were negatively affected even after 5 days of 9/11.

The impact of terrorism on different markets varies. Arin, Ceferri & Spagnolo, (2008) examine six different countries (Indonesia, Israel, Spain, Thailand, Turkey and UK) and demonstrate that stock markets react stronger in emerging markets as compare to developed markets. Guidolin and Ferrara (2005) found that terrorist activities affect internal stock markets more adversely as compared to international markets. Gul et al., (2010) found the impact of terrorism is comparatively more severe on KIBOR than on stock market.

Summarizing the literature on terrorism the following three hypotheses are formulated for the purpose of this study.

H1: There is significant negative impact of bombing on KSE-100 index
H2: There is significant negative impact of target killing on KSE-100 index
H3: There is significant negative impact of kid-napping on KSE-100 index

Political Instability

Pakistan is continuously facing political instability causing decrease in investment in the country (Memon et al. 2015), closing of business firms, shifting of businesses to neighboring countries and declining long term investment (Ali et al., 2013).A strong relationship is observed between political risk and stock market returns (Diamonte et al. 1996; Erb et al. 1996; Brooks et al. 1997; Perotti & Oijen 2001). Political uncertainty significantly affects stock market volatility (Chau et al., 2014). Frijns et al. (2012) found that crisis with certain characteristics reduces the level of stock market integration. A significant negative impact of political risk is demonstrated on stock market (Harlow, 1993; Erb et al., 1996), particularly in developing markets as compared to developed markets (Diamonte et al., 1996). Asteriou and Price (2001) observed a negative relationship between political instability and economic growth. Asteriou and Siriopoulos (2000) found that strikes affect the labor costs as well as company profits and elections create uncertainty about government future policies. These factors alter the investment decisions and ultimately stock markets react negatively to such activities. Amihud and Wohl (2004)disclosed that as the probability of Saddam Husain's fall increased in Iraq, stock markets started reacting adversely.

Chen and bin (2001) revealed that November 8, 1994 elections in Florida had negative impact on stock returns of gaming firms. Durnev (2010) conducted a study to find out the real impact of political uncertainty (elections) on stock market prices found that during election years 40% less investment occurs as compare to non-election years due to a great deal of uncertainty among investors at the time of elections in USA (Lobo, 1999). Greer et al. (1980) found that stock market reacts adversely in the short and long duration strikes.

Political instability is measured in terms of strikes and judiciary decision, a element particular to the context of Pakistan. Hence the following two hypotheses (H_4 and H_5) are developed for the purpose of this study.

H4: There is significant negative impact of strikes on KSE-100 index

H5: There is significant negative impact of judiciary decisions on KSE-100 index

Natural Disasters

Natural disaster are uncontrollable events in which a society suffers severely distracting all or some of the essential functions of the society (Fritz, 1961). Natural disasters also have significant negative impact on stock markets (Brounen and Derwall, 2010). Kusumastuti et al., (2014) investigated the relationship between natural disasters and stock market index of Indonesia and found that natural disasters such as earthquakes, tsunami and volcano eruptions created great disturbances damaging many facets of life of the

populace in the affected areas. Wang and kutan (2013) found significant impact of natural disasters on stock markets in Japan and US. Hood et al., (2013) found great adverse effect of the Japan's 2011 earthquake on Tokyo stock exchange trading volume even after one week of the occurrence of the earthquake. Noy and Vu (2010) revealed negative relationship between natural disasters and economy in Vietnam.

Natural disasters effect on stock exchange performance is different from country to country. Developing countries react more as compare to developed countries (Fomby et al., 2013). For example ASEAN stock markets reacted more to occurrence of big shocks and New Zealand market did react slightly to shocks from time to time but Australia's stock market remains stable during shocks (Chan and Liu, 2002). Worthington and Valadkhani (2004) investigated the impact of natural disasters on Australian equity markets and observed that bushfires, cyclones and earthquakes had more effect as compared to storms and floods.

Ayala (2002) disclosed that natural catastrophes affects developing countries more due to two reasons, first is the geographical location, second reason is the historical development of these poor countries, where the economic, social, political and cultural conditions are highly vulnerable to natural disasters. Various disasters affect the economy of Pakistan in different ways. Earthquakes affect more severely urbanized country, cyclones affect economy with major share of arable land, and floods damage the more populous country more severely (UNDP, 2004). However, Pakistani stock markets were found resilient to the earthquake of Oct 08, 2005, with negative impact on some sectors but positive impact on cement and steel (Javid, 2007).

Natural disasters were observed in form of floods and earthquakes for the purpose of this study and the following two hypotheses (H_6 and H_7) are derived from the relevant literature reviewed above.

H6: There is significant negative impact of floods on KSE-100 index

H7: There is significant negative impact of earthquakes on KSE-100 index

Theoretical Framework

The following figure represents the theoretical framework developed on the basis of literature review, showing the relationship between the variables of the study.

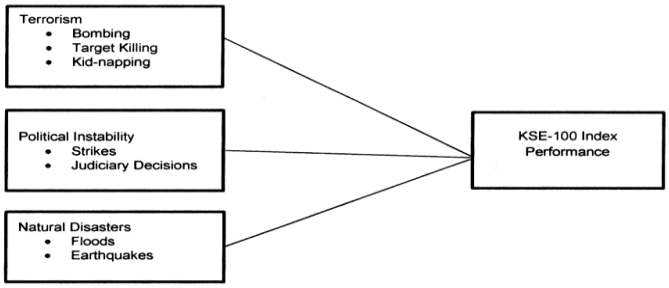

Figure 1: *Theoretical Framework*

Research Methodology

The purpose of this study is hypothesis testing examining the impact of non-financial factors including terrorism, political instability and natural disasters on Karachi stock exchange-100 index performance. For this purpose, time series data on daily basis (Qaiser et al., 2012) over a period of ten years, from 2005-2014, were collected. During this period 212 bombings, 115 target killings and 52 kid-napping occurred, collectively defining terrorism for the purpose of this study. Similarly for measuring political instability a total of 120 strikes and 12 judiciary decisions are observed during the ten year period. For natural disasters 209 floods and 19 earthquakes are taken into account.

The data were collected from Global Terrorism Database (GTD), National Disaster Management Authority (NDMA), Newspapers and Articles. Stock market index volume was collected from Karachi Stock Exchange website. The identified variables were defined as dummy variables in the following manner.

Bombing — If bomb blast happened = 1; if not happen then = 0

Target killing — If target killing happened = 1; if not happen then = 0

Kid-napping) — If kid-napping happened = 1; if not happen then = 0

Strikes — If strikes happened = 1; if not happen then = 0

Judiciary decisions — If judiciary decisions happened = 1; if not happen then = 0

Floods — If flood happened = 1; if not happen then = 0

Ordinary Least Square (OLS) regression was used to explain the reaction of stock market's index to different events using time series data over a period of 2005 to 2014 of KSE-100 index(Chen et al., 2005; Aurangzeb and Dilawer, 2012; Qaiser et al., 2012).The following regression model is developed for the purpose of this study.

$$\text{Log (index)} = \alpha + \beta_1 BM_1 + \beta_2 TK_2 + \beta_3 KD_3 + \beta_4 ST_4 + \beta_5 JD_5 + \beta_6 FLD_6 + \beta_7 EQ_7 + \mu_i$$

Where
Index=Karachi stock exchange-100 index
α=Constant term
β=Risk associated with each variable
BM=Bomb blast
TK=Target killing
KD=Kid-napping
ST=Strikes
JD=Judiciary Decisions
FLD=Floods

EQ=Earthquakes
μi=Error term

Data Analysis and Discussion

Table 4.1 shows the regression results.

Table 4.1: Regression Results

Dependent Variable: INDEX
Method: Least Squares
Date: 09/29/16 Time: 15:54
Sample: 1/03/2005 12/31/2014
Included observations: 2470

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.26787	3.566185	4.000879	0.0001
BOMBING	7.611572	7.369251	1.032883	0.3018
EARTHQUAKES	-125.9457	37.72845	-3.338216	0.0009
FLOODS	-14.33945	11.80951	-1.214229	0.2248
JUDICIARY_DECISION	-130.9056	46.98903	-2.785875	0.0054
KIDNAPPING	-2.521440	6.945176	-0.363049	0.7166
STRIKES	-33.22091	15.25637	-2.177511	0.0295
TARGET_KLLING	4.519915	9.106775	0.496324	0.6197

R-squared	0.010359	Mean dependent var	10.64745
Adjusted R-squared	0.007545	S.D. dependent var	162.9438
S.E. of regression	162.3279	Akaike info criterion	13.02035
Sum squared resid	64874574	Schwarz criterion	13.03917
Log likelihood	-16072.13	Hannan-Quinn criter.	13.02719
F-statistic	3.681477	Durbin-Watson stat	1.682798
Prob (F-statistic)	0.000579		

Before applying the OLS method, all the necessary assumptions were checked and found satisfied. The Durbin Watson stat value of 1.683 confirms non-existence of auto correlation (Ayyangar, 2007). Similarly no multicollinearity is observed on the basis of correlation between any two variables/dimensions. P value of F statistic shows the overall significance of the regression confirming a linear relationship between dependent and independent variables at 0.05 level of significance. The value of adjusted R square shows that the independent variables collectively influence only 0.75% variation in dependent variable. It is observed that only earthquakes and judiciary decisions had a significant impact on KSE-100 index. Rest of all

dimensions of the three variables including bombing, target killing, kidnapping, strikes and floods had an insignificant impact on the stock exchange performance. Therefore only H_5 and H_7 are accepted and all other hypotheses (H_1, H_2, H_3, H_4, and H_6) are not accepted.

The findings appear to be in contradiction with previous research observing negative impact of terrorism (Aurangzeb and dilawer, 2012) and strikes on stock market performance but was similar to Worthington and Valadkhani (2004) confirming significant negative impact of earthquakes on stock market performance. However, the current study added the judiciary decision as a new dimension of political instability was unique in the context of Pakistan and is found having a significant negative impact on KSE-100 index. With the inclusion of this new dimension, the current study acquires a renewed importance.

Conclusion and Recommendations

The study concludes that KSE-100 index was not affected significantly by terrorist activities including bombing, target killing, and kidnapping, leading to the rejection of H_1, $H_2$and H_3. Similarly strike, one of the dimensions of political instability was not found significantly influencing the KSE-100 index resulting in rejection of H_4 but judiciary decision, the other dimension proved a significant factor affecting the stock market. Therefore, H_5 was accepted. The results of floods and earthquakes representing the natural disasters were also found different. Floods did not prove a significant factor affecting the KSE-100 index rejecting H_6. However, the other dimension of natural disaster, earthquakes was found significantly affecting the stock market performance and hence H_7 was accepted.

Though the overall impact of the three non-financial factors (terrorism, political instability and natural disasters) on stock market appeared minimal but each one of them is extremely detrimental to the healthy working of economic environment and financial markets' performance. The evolution of a stable political environment, strong security system and well equipped natural disaster system may prove helpful in developing healthy financial markets including a resilient stock market fully responsive to demand and supply forces.

Limitations of the Study and Future Research

This research was conducted in Pakistan with different nature of activities of terrorism, natural disasters& political instability confining the generalizability of the findings of this study to other countries of the world. Certain other non-financial factors including climatic conditions, social norms, Islamic

values, sports sentiments, and technological advancement (Rehman, 2013) may affect the performance of the stock market but are not covered in this study leaving scope for future research in this important field of study.

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