

Systematic Risk and Socio-Political Factors: The Case of Pakistan Stock Exchange

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Abstract

The study aims to investigate the casual effect of Socio-Political factors on Systematic risk in Pakistan Stock Exchange. For this purpose, the study used 250 Non-Financial companies monthly rolling Beta (36 months window) data as well as Socio-Political factors like Assassination, Terrorism, Riots and General Strikes from 2001-2010 by using 23,349 observations. Assassination was further divided into two dimensions i.e. Assassination and Assassination through drone attack. Terrorism was divided into three sub dimensions i.e. Guerilla Attacks on Military, Police, Paramilitary and Intelligence, Terrorism (Terrorism attack on General mass) and Military Paramilitary or Police Attack on non-state combatants. The study used stepwise regression to identify the variables affecting the systematic risk. With exception to Riots, number of events instead of number of persons killed found to be statistically significant proxies to measure the effect of Socio-Political factors on systematic risk. General strike has no effect on systematic risk.

Keywords: Systematic risk, Socio-Political factors, Terrorism

Introduction

The last decade evident, Predominant Macroeconomic, Global, Catastrophic and Socio-Political factors affect the capital market up to a large extent. Different researches¹ have been conducted on the concern of investors to minimize the investor exposure toward risk (Julio & Yook, 2012). The risk generated through Socio-Political factors is a major contributor among the aforementioned predominant factors. Political events are the key driving forces behind the economic performance up to a large extent (Chan & Wei, 1996). Capital markets across the regions are very much sensitive to the economic growth. A small anomaly in economic growth has devastating impact on the stock markets. Consequently, increases investors expose toward high volatility in stock prices.

Political events are one of the key factors in the determining the return of a stock. Good political events have usually positive effect shaped stability and negative events create huge panic among investors. Thus, investor becomes more vulnerable to systematic risk due to Socio-Political instability. Various studies like Miya (2007);

Simon (1982), Beaulieu, Cosset, and Essaddam (2006) further strengthen the argument through empirical support.

Particular, Pakistan had seriously confronted a huge Socio-Political events, which included military takeover, Political demonstration, and terrorism activities paralyzing the whole economy in general and stock exchange in particular (Siddiqui, 2012). Therefore, the above discussion has pitched a need for an in-depth inquiry of Socio-Political factors on Pakistan stock exchange in order to minimize the risk (Alesina & Perotti, 1996). The study creates a unique differentiation by using three proxies i.e. Guerilla Attacks on Military, Police, Paramilitary and Intelligence, Terrorism like Premeditated, politically motivated violence perpetrated against non-combatant targets by sub-national groups and Military, Paramilitary or Police Attack on non-state combatants. Besides, the study also divided the Assassination into two components i.e. Assassination and Drone Attack Assassination. Moreover, the study used two proxies for Riots and in same way two proxies were used for the General Strike. All these proxies were further categorized in two groups i.e. Number of Events and Number of Killed for the in-depth analysis over systematic risk (Rolling Beta (36 months Window)). The study is arranged in such a way that chapter 01 is introduction. Literature review is chapter 02 then chapter 03 describes the methodology. Chapter 04 is analysis and chapter 05 is conclusion.

¹Merwea and Smit (2015); Brüggelambert (2004); İközlerli and Ülkü (2014); Kongprajya, 2010; Aktas, Bayar, and Oncu (2006); Amihud and Wohl (2004); Angelovska (2011); Arzu (2011); Chan and Wei (1996); Chena, Huab, and Stuetz (2006); Javed and Ahmed (1999); Zach (2003); Manzoor (2013); Nguyen and Enomoto (2009); Sohail and Zakir (2011); Hui, Yi, Chyn, Gnoh, and Mun (2014)

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2. Literature Review

Political instability has long standing history of adverse effect on economic growth. The economic down turns as result of the political instability triggered uncertainty in stock market. Consequently, increase investor exposure. Political events are key driving forces behind the stock market volatility. Kim and Mei (2001) measure the impact of various political announcement stock return and level of uncertainty due these announcements. They assessed political events for 1989 to 1993 and their impact on Hong Kong hang sang index. The result revealed that those events have a significant impact on the returns and volatility. In similar fashion, Zach (2003) observed high volatility in stock market during an ongoing political events.

Political instability can be measured by two approaches, the first one emphasize on executive instability, while the second option is based on social unrest and political violence (Alesina & Perotti, 1996). The first approach measures political instability as a propensity to observe government changes. The change can constitutional or unconstitutional. The basic assumption behind this approach is that change in leadership is associated with uncertainty regarding policy making like fiscal policy and monetary policy (Cukierman, Edwards, & Tabellini, 1989; Londregan & Poole, 1990). Further, Malik, Hussain, and Ahmed (2009) analyzed the impact of president Musharraf resignation on Pakistan stock market. The study reveals a significant influence over capital market. Likewise, Mahmood *et al.*, (2014) argued that imminent threat of Political events can't be ignored.

Moreover, Bilal, Talib, Haq, Khan, and Islam (2012); Hanan *et al.*, (2012) studied the impact of macroeconomic factors, terrorism and catastrophes on the performance of Pakistan stock exchange (KSE-100 index). Sohail and Zakir (2011) investigated the impact of macroeconomic variables on KSE-100 index both in short and long run. The results revealed that there is a positive influence of inflation, GDP and exchange rate on the index while money supply had an adverse effect on the stock return. Similarly, Sohail and Hussain (2009) examined the long and short run term effect of variables like consumer price index, exchange rate and money supply on LSE-25 index. The study's finding depicted that CPI had a negative impact on stock return while exchange rate and money supply had intense positive effect in the long run while out of all the variables CPI is the greatest cause of uncertainty in the market. In same fashion, Subhani, Osman, and Gul (2010) support the negative impact of consumer price index on capital market.

Furthermore, Hussain, Lal, and Mubin (2009) revealed that exchange rate and exchange reserves significantly contribute to the Stock market volatility. In addition, gross fixed capital directly, while whole sale price index inversely affects stock prices. Likewise, Önder and Mugan (2006) argued that political and economic factors cause the fluctuation in the returns and also affect the trading volume. Therefore, international investor should consider all this information's before investing into the emerging markets because these stock markets are reactive to such events and factors. In contradiction to the previous findings the Akbar, Ali, and Khan (2012) suggested the positive impact of money supply on trading volume and inverse effect of interest rate on stock returns.

Besides, Bilal *et al.* (2012) studied that incremental changes in stock market due to change in terrorism activities like bomb blast, assassinations and Macroeconomics factors for sample period of 2005 to 2010. The results revealed that terrorism affect the stock market. While the study found a significant impact of macroeconomics variable like interest rate and insignificant impact of inflation on stock market.

In addition, foreign policy grabbed is considered a crucial of the politics, which determined the political capacity of a leader that is why Manzoor (2013) investigated the Pak-US relationship effect on KSE-100 index for period of 2006 to 2011. The study took most critical events like 1st drone attack, president Zardari visit to United States, incident of Raymond Davis and Hillary Clinton visit to Pakistan. The study found a significant impact of Pak-US relationship on stock market movement.

Akin, Tan and Gannon (2002) inspects how political events cause instability and uncertainty in the stock market. Different types of tests were done to check the volatility and result of the study suggest that stock market do respond to the political events depending upon the nature of the events, if the events is according to the expectation of the investor it will increase the efficiency of the market while if the event is against the investor's expectation then there will be an adverse effect on the stock market.

In addition, Vuchelen (2003) examines the efficiency of the Brussels stock market in response to the various news. News regarding the future economic policies and those policies in the study is predicted by different political events like general election, formation of new governments, composition patterns of the government (single party majority, collateral). It was further observed in the study government compositions that the sensitivity of the news of this event also depends upon the electoral system which varies from country to country.

Further, Siokis and Kapopoulos (2007) also examined that whether fluctuation in the stock prices of Athens

stock exchange depends upon the intensity of political atmosphere, focusing on assessing the effect of election on the financial market during the period of 1988 to 2004. The result from the study confirmed the fact from other studies that there is an impact of political scenarios on stock performance. Similarly, Robbani and Anantharaman (2002) conducted a study to check the influence of such events on the stock indexes of Pakistan, India, Sri Lanka and Indonesia as these are the developing markets. It was empirical from the results that political events have a long term effect on the stock prices. Further observed that these markets are very reactive to such events and negative political environment had a more significant impact on the markets.

Sometime stock market also responds to the criminal activities. Laverde, Varua, and Garces-Ozanne (2009) inspected the impact of crime and political instability on Colombian stock market during the period of 2001 to 2006. The study revealed Crime has minor influence on the stock market while political instability has a significant negative impact on stock returns. Further Kutan and Perez (2002) used Colombian stock market to investigate the effect of crime and political events. Bogota and Medellin stock market was analyzed and it was empirically found that such events affect the stock returns and performance of the markets and further observed that Bogota market is more reactive to political uncertainty. Likewise, Chen, Shun, and Chen (2005) also performed a research to determine the impact of political events on the stock performance by studying the Taiwan stock exchange. The study reveals that there is rather unsteady movement in the prices during those events and volatility in the market is observed during specific events. Moreover, Döpke and Pierdzioch (2004) examined the connection between the financial market performance and political system in Germany. He found that the dissimilar in the U.S, financial markets returns were greater during liberal as compare to the conservative governments (Mahmood *et al.*, 2014; Nguthi, 2013).

However, various other factors like financial crises and natural disaster, Ramadan impact over the stock is on inevitable. Like Ali and Afzal (2012) investigate the impact of 2007-08 global financial crisis on the stock markets of Pakistan and India as this crisis was one of the biggest in the history. They observed that this crisis induced more negative impact then positive and increased the instability. While this affect was more significant on Indian stock market, Javed (2007) examined the impact of October 8 earthquake on the activities of Karachi stock exchange. Stock price of sixty firms were analyzed in response to that unforeseen jolt. The result of the study suggests that the earthquake has both progressive and adverse effect on different firms depending upon their nature. Husain (1998) tried to explore that is there any

Ramadan effect on the performance on stock market. The result indicates as people have less time in the month of Ramadan it affects the volatility of the stock market but doesn't have a significant effect on the mean returns.

Methodology

The study measure the Socio-Political index using 15 proxies. The study measure Assassination through proxies like Count Assassination (CASSAS_(t)), Count Assassination Drone Attack (CASSASDA_(t)), Killed Assassination (KILLASSAS_(t)), Killed Assassination Drone Attack (KILLASSASDA_(t)). Moreover, the study used six proxies for terrorism measurement i.e. Count Guerilla Attacks on Military, Police, Paramilitary and Intelligence (CGAONMILMP_(t)), Count Terrorism (CTERROR_(t)), Count Military, Paramilitary or Police Attack on non-state combatants (CMILPMP_(t)), Killed Guerilla Attacks on Military, Police, Paramilitary and Intelligence (KILLGAONMILMP_(t)), Killed Terrorism

(KILLTERROR_(t)), Killed Military, Paramilitary or Police Attack on non-state combatants (KILLMILPMP_(t)), likewise, RIOTS is measure through Riots no of Events (RIOTNOEVENTS_(t)). In similiary way, the study used two poxies like General Strike No of Events (GSNOEVENTS_(t)), General Strike No of Killed (GSNOKILL_(t)) for General Strike and Total No of person Killed (TOTALNOPKILL_(t)) is use overall instability. Systematic risk calculated through CAPM by William F. Sharpe (1964).

Operationalization of Systematic risk

According to the capital asset pricing literature, the CAPM beta combines covariance and volatility, measuring the sensitivity of asset returns to market returns in addition to the correlated relative volatility. The CAPM beta is denoted by β_i^{CAPM} , which uses the following formula Recommended by William F. Sharpe (1964):

$$\beta_i^{CAPM} = \frac{Cov[(R_{it} - R_{ft}) \cdot (R_{Mt} - R_{ft})]}{Var[R_{Mt} - R_{ft}]} \dots \dots \dots (1)$$

Where R_{it} and R_{Mt} are the returns of security i and market portfolio at time t , respectively, and R_{ft} is the risk-free rate. Therefore, $(R_{it} - R_{ft})$ can be regarded as the abnormal return of security i and $(R_{Mt} - R_{ft})$ as the excess return of the market portfolio.

$$\beta_i = \frac{Cov[(R_{it} - R_{ft}) \cdot (R_{Mt} - R_{ft})]}{Var[R_{Mt} - R_{ft}]} \dots \dots \dots (3)$$

This study used Beta of taking 36 months rolling window using the equation (3)

Socio-Political Factors

S.N	Assassination (Count Events-Killed)		
1	Count Assassination	CASSAS _(t)	No of Assassinations events either political or high Govt officials per month
2	Count Assassination Drone Attack	CASSASDA _(t)	No of Drone Attack Assassinations events per month
3	Killed Assassination	KILLASSAS _(t)	No of people killed in assassinations events per month
4	Killed Assassination Drone Attack	KILLASSASDA _(t)	No of people killed in Drone attack Assassination per month
Terrorism (Count Events-Killed)			
5	Count Guerilla Attacks on Military, Police, Paramilitary and Intelligence	CGAONMILMP _(t)	Guerilla Attacks on Military, Police, Paramilitary and Intelligence number of events per month
6	Count Terrorism	CTERROR _(t)	Terrorism like Premeditated, politically motivated violence perpetrated against noncombatant targets No of events per month
7	Count Military, Paramilitary or Police Attack on non-state combatants	CMILPMP _(t)	Military, Paramilitary or Police Attack on non-state combatants no of events per month
8	Killed Guerilla Attacks on Military, Police, Paramilitary and Intelligence	KillGAONMILMP _(t)	Guerilla Attacks on Military, Police, Paramilitary and Intelligence number of Killed per month
9	Killed Terrorism	KILLTERROR _(t)	Terrorism like Premeditated, politically motivated violence perpetrated against noncombatant targets No of Killed per month
10	Killed Military, Paramilitary or Police Attack on non-state combatants	KILLMILPMP _(t)	Military, Paramilitary or Police Attack on non-state combatants no of Killed per month
Riot(Killed-Events)			
11	Riots no of Events	RIOTNOEVENTS _(t)	Total No of Riots Events per month
12	Riots no of Killed	RIOTNOKILL _(t)	Total No of people killed in Riots Events per month
General Strike(Killed-Events)			
13	General Strike No of Events	GSNOEVENTS _(t)	Total No of General Strike Events per month
14	General Strike No of Killed	GSNOKILL _(t)	Total No of people killed in General Strike Events per month
Total No of Person (Current Values-Lag Values)			
15	Total No of person Killed	TOTALNOPKILL _(t)	Total No of person killed irrespective of the events

Econometric Models for initial Screening:

$$\beta_{it} = \beta_o + \beta^1_i CASSAS_{(t)} + \beta^1_i CASSASDA_{(t)} + \varepsilon_{it} \dots\dots\dots (01)$$

$$\beta_{it} = \beta_o + \beta^1_i + \beta^1_i CASSAS_{(t-1)} + \beta^2_i CASSASDA_{(t-1)} + \varepsilon_{it} \dots\dots\dots (02)$$

$$\beta_{it} = \beta_o + \beta^1_i KILLASSAS_{(t)} + \beta^2_i KILLASSASDA_{(t)} + \varepsilon_{it} \dots\dots\dots (03)$$

$$\beta_{it} = \beta_o + \beta^1_i KILLASSAS_{(t-1)} + \beta^2_i KILLASSASDA_{(t-1)} + \varepsilon_{it} \dots\dots\dots (04)$$

$$\beta_{it} = \beta_o + \beta^1_i CGAONMILMP_{(t)} + \beta^2_i CTERROR_{(t)} + \beta^3_i CMILPMP_{(t)} + \varepsilon_{it} \dots\dots\dots (05)$$

$$\beta_{it} = \beta_o + \beta^1_i CGAONMILMP_{(t-1)} + \beta^2_i CTERROR_{(t-1)} + \beta^3_i CMILPMP_{(t-1)} + \varepsilon_{it} \dots\dots\dots (06)$$

$$\beta_{it} = \beta_o + \beta^1_i KILLGAONMILMP_{(t)} + \beta^2_i KILLTERROR_{(t)} + \beta^3_i KILLMILPMP_{(t)} + \varepsilon_{it} \dots\dots\dots (07)$$

$$\beta_{it} = \beta_o + \beta^1_i KILLGAONMILMP_{(t-1)} + \beta^2_i KILLTERROR_{(t-1)} + \beta^3_i KILLMILPMP_{(t-1)} + \varepsilon_{it} \dots\dots\dots (08)$$

$$\beta_{it} = \beta_o + \beta^1_i RIOTNOEVENTS_{(t)} + \varepsilon_{it} \dots\dots\dots (09)$$

$$\beta_{it} = \beta_o + \beta^1_i RIOTNOKILL_{(t)} + \varepsilon_{it} \dots\dots\dots (10)$$

$$\beta_{it} = \beta_o + \beta^1_i RIOTNOEVENTS_{(t-1)} + \beta^2_i RIOTNOKILL_{(t-1)} + \varepsilon_{it} \dots\dots\dots (11)$$

$$\beta_{it} = \beta_o + \beta^1_i GSNOEVENTS_{(t)} + \varepsilon_{it} \dots\dots\dots (12)$$

$$\beta_{it} = \beta_o + \beta^1_i GSNOKILL_{(t)} + \varepsilon_{it} \dots\dots\dots (13)$$

$$\beta_{it} = \beta_o + \beta^1_i GSNOEVENTS_{(t-1)} + \beta^2_i GSNOKILL_{(t-1)} + \varepsilon_{it} \dots\dots\dots (14)$$

$$\beta_{it} = \beta_o + \beta^1_i TOTALNOPKILL_{(t)} + \varepsilon_{it} \dots\dots\dots (15)$$

$$\beta_{it} = \beta_o + \beta^1_i TOTALNOPKILL_{(t-1)} + \varepsilon_{it} \dots\dots\dots (16)$$

Econometric Models for Final Screening :

$$\beta_{it} = \beta_1^1 CASSASDA_{(t-1)} + \beta_1^2 CTERROR_{(t-1)} + \beta_1^3 CMILPMP_{(t-1)} + \beta_1^4 TOTALNOPKILL_{(t)} + \beta_1^5 RIOTNOKILL_{(t)} + \beta_1^6 KILLASSASDA_{(t-1)} + \varepsilon_{it} \dots (1)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CTERROR_{(t-1)} + \beta_1^2 CMILPMP_{(t-1)} + \beta_1^3 TOTALNOPKILL_{(t)} + \beta_1^4 RIOTNOKILL_{(t)} + \beta_1^5 KILLASSASDA_{(t-1)} + \varepsilon_{it} \dots (2)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CASSASDA_{(t-1)} + \beta_1^2 CTERROR_{(t-1)} + \beta_1^3 CMILPMP_{(t-1)} + \beta_1^4 RIOTNOKILL_{(t)} + \beta_1^5 TOTALNOPKILL_{(t-1)} + \varepsilon_{it} \dots (3)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CTERROR_{(t-1)} + \beta_1^2 CMILPMP_{(t-1)} + \beta_1^3 RIOTNOKILL_{(t)} + \beta_1^4 KILLASSASDA_{(t-1)} + \beta_1^5 TOTALNOPKILL_{(t-1)} + \varepsilon_{it} \dots (4)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CASSASDA_{(t-1)} + \beta_1^2 CTERROR_{(t-1)} + \beta_1^3 CMILPMP_{(t-1)} + \beta_1^4 TOTALNOPKILL_{(t)} + \beta_1^5 RIOTNOKILL_{(t)} + \beta_1^6 CASSAS_{(t-1)} + \varepsilon_{it} \dots (5)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CASSASDA_{(t-1)} + \beta_1^2 CTERROR_{(t-1)} + \beta_1^3 CMILPMP_{(t-1)} + \beta_1^4 RIOTNOKILL_{(t)} + \beta_1^5 TOTALNOPKILL_{(t-1)} + \beta_1^6 CASSAS_{(t-1)} + \varepsilon_{it} \dots (6)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CTERROR_{(t-1)} + \beta_1^2 CMILPMP_{(t-1)} + \beta_1^3 TOTALNOPKILL_{(t)} + \beta_1^4 RIOTNOKILL_{(t)} + \beta_1^5 KILLASSASDA_{(t-1)} + \beta_1^6 KILLASSAS_{(t-1)} + \varepsilon_{it} \dots (7)$$

$$\beta_{it} = \beta_0 + \beta_1^1 CTERROR_{(t-1)} + \beta_1^2 CMILPMP_{(t-1)} + \beta_1^3 RIOTNOKILL_{(t)} + \beta_1^4 KILLASSASDA_{(t-1)} + \beta_1^5 TOTALNOPKILL_{(t-1)} + \beta_1^6 KILLASSAS_{(t-1)} + \varepsilon_{it} \dots (8)$$

Results and Discussion

The study scrutinizes causal relationship between Socio-Political factors i.e. Assassination, terrorism, General strikes, Riots and systematic risk. The study measure each variable using various dimensions for example the study disintegrated Assassination into four dimensions like Count assassination(CASSAS) Count assassination drone attack(CASSASDA), Killed assassination(KILLASSAS) killed assassination drone attack (KILLASSASDA)

Further the Study used six proxies for terrorism like Count Guerilla Attacks on Military, Police, Paramilitary and Intelligence (CGAONMILMP), Count Terrorism (Terrorism attack on General mass) (CTERROR), Count Military Paramilitary or Police Attack on non-state combatants (CMILPMP), Killed Guerilla Attacks on Military, Police, Paramilitary and Intelligence (KillGAONMILMP), killed Terrorism (Terrorism attack on General mass) (KILLTERROR), killed Military Paramilitary or Police Attack on non-state combatants (KILLMILPMP).

Moreover, the study used two proxies for Riot i.e. Riots no of events (RIOTNOEVENTS) and Riot no of killed (RIOTNOKILL_(t)). Besides, the study use two proxies like General Strike no of events (GSNOEVENTS) and General Strike no of killed (GSNOKILL). Further, the study used Total No of killed (TOTALNOPKILL) per month irrespective of the event. In simple words, the study divided the all the proxies into four major categories Assassination, terrorism, General strikes, Riots.

For the analysis purpose, the study used total observations of 936,686. In the process of calculating months returns 892,376 observations were deleted. Further, the study deleted 3,153 observations by excluding firms that have months returns for less than 38 months. Further, firms with no major activity during the major part of the sample period were excluded. So, any firm that had more than 50 % of zeros as percentage of total observation of a specific firm in the dataset were excluded from the dataset. In this process 6,475

observations were deleted. In the final stage, the study calculated 23,349 rolling betas of 36 month window.

In order to extract the most suitable proxies for final estimation, the study conducted screening test by individually regressing each sub group proxies for time t and (t-1) on rolling Beta. Table 1 indicates that results of each group and sub group. The first group i.e. Assassinations four proxies CASSAS, CASSASDA, KILLASSAS, KILLASSASDA for Time t and (t-1). The results bases on T-statistics indicates that CASSAS_(t-1), CASSASDA_(t-1), KILLASSAS_(t-1), KILLASSASDA_(t-1) are better proxies than others. In second group i.e. Terrorism, the study regressed six proxies which include CGAONMILMP, CTERROR, CMILPMP, KILLGAONMILMP, KILLTERROR, KILLMILPMP by taking the current and lag values on rolling Beta. The results suggested Two proxies CTERROR_(t-1) and CMILPMP_(t-1) for better estimation. While 3rd group namely Riot consists of current and lag values of two proxies i.e. RIOTNOEVENTS and RIOTNOKILL. The regression results indicates that RIOTNOKILL_(t) is most suitable proxy. While Group 04 proxies related to General Strikes are GSNOEVENTS_(t) and GSNOKILL_(t). However, the study found no better proxy for General Strike. Moreover, the Study found TOTALNOPKILL_(t) and TOTALNOPKILL_(t-1) better proxies for final estimation.

In this whole screening process, the study extracted 9 Socio-Political proxies, which would measure Assassination, terrorism, Riot i.e. Count assassination drone attack(t-1), Count terrorism(t-1), Count military paramilitary or police(t-1), Total number of persons killed(t), Riot no of killed(t), killed assassination drone attack(t-1), total number of person skilled(t-1), Count assassination(t-1), killed assassination (t-1) for the final estimations. However, proxies related to General Strike were excluded due insignificant.

Table 1: Regression Estimation: DV = Rolling Beta (36 Months)

Variable	Coefficient (t)	Coefficient (t-1)	T-Statistics	R Square
Assassination (Count Events-Killed)				
CASSAS _(t)	0.0022257		1.31	0.0006
CASSASDA _(t)	-0.0590829		-3.73	
CASSAS _(t-1)		0.0023445¹	1.33	0.0007
CASSASDA _(t-1)		-0.0667766²	-3.97	
KILLASSAS _(t)	0.0011091		0.96	0.0006
KILLASSASDA _(t)	-0.0091041		-3.68	
KILLASSAS _(t-1)		0.0012527³	1.04	0.0007
KILLASSASDA _(t-1)		-0.0103065⁴	-4.04	
Terrorism (Count Events-Killed)				
CGAONMILMP _(t)	0.0002601		0.03	0.0006
CTERROR _(t)	0.0125558		2.22	
CMILPMP _(t)	-0.0197445		-3.87	
CGAONMILMP _(t-1)		-.0007984	-0.09	0.0009
CTERROR _(t-1)		0.0141381⁵	2.48	
CMILPMP _(t-1)		-0.023474⁶	-4.54	
KilIGAONMILMP _(t)	0.0008931		0.94	0.0003
KILLTERROR _(t)	-0.0004365		-0.6	
KILLMILPMP _(t)	-0.0007807		-2.4	
KilIGAONMILMP _(t-1)		.0006348	0.67	0.0003
KILLTERROR _(t-1)		-.0004531	-0.62	
KILLMILPMP _(t-1)		-.0007672	-2.35	
Riot(Killed-Events)				
RIOTNOEVENTS _(t)	-.0102018		1.34	0.000
RIOTNOKILL _(t)	0.0064492⁷		2.08	0.000
RIOTNOKILL _(t-1)		0.0100982	1.89	0.0001
RIOTNOEvent _(t-1)		-0.0005234	3.09	
General Strike(Killed-Events)				
GSNOEVENTS _(t)	0.0090065		1.31	0.000
GSNOKILL _(t)	-.0429293		-1.33	0.000
GSNOEVENTS _(t-1)		0.003501	0.6	0.0001
GSNOKILL _(t-1)		-0.0382958	-1.38	
Total No of Person (Current Values-Lag Values)				
TOTALNOPKILL _(t)	-0.0003549⁸		-2.47	0.0003
TOTALNOPKILL _(t-1)		-.0003535⁹	-2.46	0.0003
Count assassination drone attack _(t-1) = CASSASDA _(t-1) , Count terrorism _(t-1) = CTERROR _(t-1) , Count Military Paramilitary or Police Attack on non-state combatants _(t-1) = CMILPMP _(t-1) , Total number of persons killed _(t) = TOTALNOPKill _(t) , Riot no of killed _(t) = RIOTNOKill _(t) , killed assassination drone attack _(t-1) = KillASSASDA _(t-1) , total number of person skilled _(t-1) = TOTALNOPKill _(t-1) , Count assassination _(t-1) = CASSAS _(t-1) , killed assassination _(t-1) = KILLASSAS _(t-1)				

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
Beta(36 month rolling window)	23349	0.5946	1.5468	-5.7174	55.6738
CASSASDA _(t-1)	23349	0.1723	0.6763	0	5
CTERROR _(t-1)	23349	1.3869	3.0915	0	19
CMILPMP _(t-1)	23349	0.7697	2.7509	0	22
TOTALNOPKill _(t)	23349	32.4068	70.048	0	403
RIOTNOKILL _(t)	23349	1.6101	5.5029	0	42
KILLASSASDA _(t-1)	23349	1.1606	4.2837	0	25
TOTALNOPKill _(t-1)	23349	31.1953	69.4104	0	403
CASSAS _(t-1)	23349	3.6167	6.4104	0	25
KILLASSAS _(t-1)	23349	5.011	9.1784	0	39
Count assassination drone attack _(t-1) = CASSASDA _(t-1) , Count terrorism _(t-1) = CTERROR _(t-1) , Count Military Paramilitary or Police Attack on non-state combatants _(t-1) = CMILPMP _(t-1) , Total number of persons killed _(t) = TOTALNOPKill _(t) , Riot no of killed _(t) = RIOTNOKill _(t) , killed assassination drone attack _(t-1) = KillASSASDA _(t-1) , total number of person skilled _(t-1) = TOTALNOPKill _(t-1) , Count assassination _(t-1) = CASSAS _(t-1) , killed assassination _(t-1) = KILLASSAS _(t-1)					

Table 3: Correlation

	1	2	3	4	5	6	7	8	9	10
Beta(36 month rolling window)	1									
CASSASDA _(t-1)	-0.026	1								
CTERROR _(t-1)	-0.002	0.597	1							
CMILPMP _(t-1)	-0.023	0.826	0.695	1						
TOTALNOPKill _(t)	-0.016	-0.050	0.102	-0.009	1					
RIOTNOKILL _(t)	0.110	-0.080	0.615	-0.064	0.326	1				
KILLASSASDA _(t-1)	0.026	0.940	0.457	0.729	-0.840	-0.080	1			
TOTALNOPKill _(t-1)	-0.016	0.699	0.739	0.837	0.007	-0.040	0.679	1		
CASSAS _(t-1)	-0.001	0.370	0.795	0.415	0.007	0.152	0.329	0.663	1	
KILLASSAS _(t-1)	-0.002	0.356	0.784	0.374	0.105	0.161	0.319	0.646	0.948	1
Count assassination drone attack _(t-1) = CASSASDA _(t-1) , Count terrorism _(t-1) = CTERROR _(t-1) , Count Military Paramilitary or Police Attack on non-state combatants _(t-1) = CMILPMP _(t-1) , Total number of persons killed _(t) = TOTALNOPKill _(t) , Riot no of killed _(t) = RIOTNOKILL _(t) , killed assassination drone attack _(t-1) = KILLASSASDA _(t-1) , total number of person skilled _(t-1) = TOTALNOPKill _(t-1) , Count assassination _(t-1) = CASSAS _(t-1) , killed assassination _(t-1) = KILLASSAS _(t-1)										

Descriptive statistics

The table 2 shows the descriptive statistics of Rolling Beta (36 month Window) and shortlisted proxies for final estimation. The below results depict that Rolling Beta has a minimum mean value of 0.5946. TOTALNOPKill_(t) has highest mean value of 32.4068 while CASSASDA_(t-1) has minimum mean value of 0.1723. TOTALNOPKill_(t) has the more variation according to the Standard deviation value 70.048 while CASSASDA_(t-1) has the lowest Standard deviation i.e. 0.6763

Table 03 indicates the correlation table, which indicates that CASSASDA_(t-1), CTERROR_(t-1), CMILPMP_(t-1), TOTALNOPKill_(t) and TOTALNOPKill_(t-1) has negative relationship with endogenous variable. However, the correlation table depict a positive association of RIOTNOKILL_(t), KILLASSASDA_(t-1) with rolling Beta. Further, the study found no sign of Multicollinearity.

Regression Results

The study shortlisted 09 Socio-Political factors i.e. Count assassination drone attack (CASSASDA_(t-1)), Count terrorism (CTERROR_(t-1)), Count military paramilitary or police (CMILPMP_(t-1)), Total number of persons killed (TOTALNOPKill_(t)), Riot no of killed (RIOTNOKILL_(t)), killed assassination drone attack (KILLASSASDA_(t-1)), Total number of person killed (TOTALNOPKill_(t-1)), Count assassination (CASSAS_(t-1)), killed Assassination (KILLASSAS_(t-1)) for the final estimations.

The study used Count assassination drone attack (CASSASDA_(t-1)), Count terrorism (CTERROR_(t-1)), Count military paramilitary or police (CMILPMP_(t-1)), Total number of persons killed (TOTALNOPKill_(t)), Riot no of killed (RIOTNOKILL_(t)), killed assassination drone attack (KILLASSASDA_(t-1)), Total number of person killed (TOTALNOPKill_(t-1)), Count assassination (CASSAS_(t-1)), killed Assassination (KILLASSAS_(t-1)) in eight different models.

Further, the study used CASSASDA_(t-1) as a proxy for Assassination in Model 1, Model 2, Model 5, Model 6 respectively. The table 04 results indicate that CASSASDA_(t-1) have coefficient values of -0.0537, -0.0453,

-0.0519, -0.0447 in Model-1, Model-2, Model-5, Model-6 respectively. Which imply that drone attack mostly hit most wanted terrorists. Therefore, the investor feels more secure when hot hard core terrorists are being attacked through Drone attack.

In similar fashion, CTERROR_(t-1) and CMILPMP_(t-1) are used as proxy to capture the effect of Terrorism. The CTERROR_(t-1) statistically significant positive coefficient values of 0.0157, 0.0139, 0.0146, 0.0124, 0.0273, 0.0230, 0.0261, 0.0260 in Model-1, Model-2, Model-3, Model-4, Model-5, Model-6, Model-7 and model 08 respectively. This results implies that terrorism have strong impact of terrorism on market wide risk in Pakistan. However, the lag value suggested that information distribution among the investors is slow.

Moreover, CMILPMP_(t-1) have statistically significant negative relationship with rolling beta as it can observed from coefficients values -0.0134, -0.0148, -0.014, -0.0210, 0.0213, 0.029 except model 3. The results depicts that the attack Military, Paramilitary or Police on non-state combatant for example Pakistan Army and Police assault on the Lal Masjid. Such kinds of operations lead to Socio-Political stability and increases investor confidence over the Pakistan Stock exchange. Resultantly market wide risk decreases.

Further, Riot no of killed (RIOTNOKILL_(t)) have statistically significant positive coefficients values of 0.00395, 0.00404, 0.00458 and 0.0046 in Model-1, Model-2, Model-5, Model-7. While insignificant effect on in Model-3, Model-4, Model-6, Model-8. This suggested that investor get panic when they get the news related to RIOTS. Moreover, TOTALNOPKill_(t) have performed much better through the whole estimation and it has statistically significant negative coefficients of -0.00056, -0.0005, -0.0005, -0.0005. However, the study found TOTALNOPKill_(t-1) and KILLASSASDA_(t-1) statistically insignificant and considered to be weak proxies for the assassination.

In nutshell, the study concluded that Model-5 best combinations among others, which consists of CASSASDA_(t-1), CTERROR_(t-1), CMILPMP_(t-1), TOTALNOPKill_(t), RIOTNOKILL_(t), and CASSAS_(t-1) have statistically significant effect over the systematic risk.

Table 4: Regression Analysis: DV= Rolling Beta (36 Months Window)

VARIABLES	M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8
CASSASDA _(t-1)	-0.0537**		-0.0453*		-0.0519**	-0.0447*		
	0.0256		0.0256		0.0257	0.0238		
CTERROR _(t-1)	0.0157***	0.0139***	0.0146***	0.0124**	0.0273***	0.0230***	0.0261***	0.0260***
	0.0046	0.0046	0.0050	0.0051	0.0072	0.0073	-0.0076	0.0077
CMILPMP _(t-1)	-0.0134*	-0.0148**	-0.0120	-0.014**	-0.0173**	-0.0210**	-0.0213***	0.029***
	0.0070	0.0066	0.00811	0.0074	0.0072	0.0102	-0.0073	0.0098
TOTALNOPKill _(t)	-0.00056***	-0.0005***			-0.0005***		-0.0005***	
	0.0001	0.0001			0.00015		-0.0001	
RIOTNOKILL _(t)	0.0039**	0.0040**	0.0017	0.0018	0.0045**	0.0023	0.0046**	0.0027
	0.0019	0.0019	-0.0018	0.00188	0.002	-0.00191	0.0019	0.0019
KILLASSASDA _(t-1)		-0.0071**		-0.0058*			-0.0053	0.0004
		0.0035		0.0035			0.0035	0.0003
TOTALNOPKill _(t-1)			-0.0001	2.30E-05		0.0002		0.0005
			-0.0002	0.0003		0.00036		0.0003
CASSAS _(t-1)					-0.0057*	-0.0058		
					-0.0027	0.0034		
KILLASSAS _(t-1)							-0.0040**	-0.0057**
							0.0019	-0.0024
Constant	0.605***	0.608***	0.593***	0.594***	0.612***	0.596***	0.613***	0.597***
	-0.0121	0.0122	0.0118	-0.0119	0.0125	0.012	0.0124	0.012
Observations	23,165	23,165	23,165	23,165	23,165	23,165	23,165	23,165
R-squared	0.014	0.014	0.0011	0.011	0.016	0.001	0.016	0.001
Count assassination drone attack _(t-1) = CASSASDA _(t-1) , Count terrorism _(t-1) = CTERROR _(t-1) , Count Military Paramilitary or Police Attack on non-state combatants _(t-1) = CMILPMP _(t-1) , Total number of persons killed _(t) = TOTALNOPKill _(t) , Riot no of killed _(t) = RIOTNOKILL _(t) , killed assassination drone attack _(t-1) = KILLASSASDA _(t-1) , total number of person skilled _(t-1) = TOTALNOPKill _(t-1) , Count assassination _(t-1) = CASSAS _(t-1) , killed assassination _(t-1) = KILLASSAS _(t-1)								

Conclusion

The study investigates the impact of socio-Political factors on systemic risk. The study use Socio-Political factors like Assassination, Terrorism, General Strike and Riot. The study used 36 variables to find the most suitable proxies for the aforementioned variables in the first phase.

In second phase, the study shortlisted 09 Socio-Political factors i.e. Count assassination drone attack (CASSASDA_(t-1)), Count Terrorism (Terrorism attack on General mass) (CTERROR_(t-1)), Military Paramilitary or Police Attack on non-state combatants (CMILPMP_(t-1)), Total number of persons killed (TOTALNOPKill_(t)), Riot no of killed (RIOTNOKILL_(t)), killed assassination drone attack (KILLASSASDA_(t-1)) Total number of person killed (TOTALNOPKill_(t-1)), Count assassination (CASSAS_(t-1)), killed Assassination (KILLASSAS_(t-1)) Statistically significant effect over the systematic risk.

In nutshell, the study found statistical significant impact of 07 proxies i.e. Count assassination drone attack (CASSASDA_(t-1)), Count terrorism (CTERROR_(t-1)), Count military paramilitary or police (CMILPMP_(t-1)), Total number of persons killed (TOTALNOPKill_(t)), Riot no of killed (RIOTNOKILL_(t)), Count assassination (CASSAS_(t-1)), killed Assassination (KILLASSAS_(t-1)) on Systematic risk. However, the study found no significant impact of killed assassination drone attack (KILLASSASDA_(t-1)) Total number of person killed (TOTALNOPKill_(t-1)) after estimating 08 difference models. The study findings are in contrast to Drakos (2004) and robust with Ahmad and Shahzad (2014), Cam (2008) and Voth (2002).

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