Co-integration and Causal Relationship among South Asian and World Equity Markets; Impact of Political Uncertainty

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The current research study aims to analyze the relationship and spillover effect among equity markets of South Asian region (Pakistan, India and Sri Lanka) and World developed equity markets (UK and US) along with impact of political uncertainty on volatility of south Asian markets and world equity markets by taking daily time series data from July, 2000 to June, 2017. The current research employed Unrestricted VAR, Johansen Co-integration, Impulse Response Function, Variance Decomposition and VAR Grainger Causality tests. Overall results depicts that weaker correlation exist in all markets except for UK and US. Similarly, no long run co-integration is found, however, world developed markets granger cause themselves and other South Asian markets. Further, variation in all markets is almost due to their own innovation and innovation in other markets. However, KSE has no impact of other markets and major changes are due to its own innovation in short run. The study is a source of awareness for regional and international investors, bankers, fund managers, decision makers, researchers and academia towards making decisions in portfolio diversification and exploits investment opportunities.

Keywords: *Volatility spillover, Unrestricted VAR, co-integration, South Asian and developed Markets and Political Uncertainty.*

1.0 Introduction

The phenomenon of volatility spillover, short and long term relationship among international markets has become very important during last few decades. Both developed and developing countries equally raised the debate on impact of financial markets towards economic growth of a country. Financial markets integration is beneficial in terms of increase in foreign direct investment, economic growth, portfolio diversification which leads to higher returns and encourage the perfect competition in the market. There are number of interest groups associated with the equity markets such as investors, government and financial markets etc. Stock market is considered to be the backbone of any economy because it provides investment and trading opportunities (Bose et al., 2014).The upward and downward movement in price of a security in a specific time span is termed as volatility (Taylor, 2007). The variation in the price of an equity market index in a specific time span is termed as financial market volatility (Ambrosio, 2007). Variation in price of one equity market can be influenced from variation in price of other equity market, so when volatility of equity market of one country is affected by the volatility of other country's equity market, it is termed as volatility spillover (Kalemli-Ozcan *et al.* 2010). Equity market volatility is interconnected with the unstable economic condition that is normally major issues of emerging countries. Mollah and Mobarek (2009) revealed in their study that emerging markets are more volatile as they face unstable macroeconomic conditions. Caner and Onder, (2005) explained some factors that can influence financial markets volatility such as exchange rate, interest rate, inflation, dividend yield and international market index movement. Some researchers like Caner and Oder (2005), Abugri (2008) also considered money supply as an important factor that influences the financial market volatility. During last few decades, emerging markets of Asia have experienced extraordinary growth with higher volatility. So these markets are successful to gain attraction in local, regional and international dynamics. Such behavior towards returns and volatility spillovers has become a serious concern and needs to be investigated (Veronesi, 2002). Thus, the study objectives are to explore the effect of volatility spillover and long or short run relationship among South Asian regional stock markets and world developed equity markets. Emerging markets are generally facing political uncertainties. Political uncertainty or risk influences the movement and returns of equity markets (Adrian and Rosenberg, 2008; Lin and Wang, 2005). Investors need awareness about the factors and their influential power to impact the market behavior. This study measured the cross-country comparisons of spillover effect among emerging markets of South Asia and world developed equity markets. Study analyzed the markets of Pakistan, India, and Sri Lanka and also reported the results of mature and developed markets.

The results of the study have fruitful implications for researchers, academicians, investors and speculators. Risk-averse investors intend to minimize their risk with maximization of returns. So dynamics of volatility spillover among developed or developing countries could be a major concern for regional and global investors. On the other hand speculators objects in

short term to increase profits to detain the price difference among equity markets. South Asian countries and world equity markets have week relationship or no long run co-integration exits among them. Therefore, all the investors in general and global investors particularly should avail the opportunity to increase their return and reduce risk by diversifying portfolio. Similarly impulse response and variance decomposition recommended that almost all market are affected by their own shocks and there is no directional relationship among south Asian Countries. It means investment opportunities in these markets are high and investors should avail such opportunities. Investors are concerned with political uncertainties or elections period impact as there is more political instability in developing countries. This study provides guidelines for such investors, as there is no impact of elections event except Pakistan's elections on BSE, Sri Lanka on S&P and US on CSE and S&P.

2.0 Literature Review

South Asian stock markets are emerging markets which attract domestic and foreign investor. Emerging markets of Asia have experienced extraordinary growth with higher volatility during the past few years. So these markets are successful to gain attraction in local, regional and international dynamics. Such behavior towards returns and volatility spillovers has serious concerns and needs to be investigated (Veronesi, 2002). There are number of researches conducted on spillover effects (see for instance Turhan et al., 2012; Beirne et al., 2010; Choudhry, 2004) inspected the number of communication sources throughout the different regions and also endeavored to confine their consequences by using different models of ARCH GARCH family and VAR. The most important and relevant theory is Efficient Market Hypothesis which is proposed by Fama in 1969. This theory is related with the adjustment of securities price. An idea of information efficiency of equity market (EMH) based on recognition, the effect of information and information distinctiveness on the performance situation of equity market: profitability of fundamental assets and equity prices (Fama, 1970). The market information is based on the idea of precision and convenience of equity markets and underneath consciousness of assumptions of homogeneous prospect. Hypothetically it's far feasible to say that every new information in the market has pondered in circulating equity price via their relevant quotation relate by means of the variation in the demand & supply of the equity market (Fama, 1970). Fama explained three segments in this theory: weak form, semi-weak from and strong from of past price or information of the markets. In strong form, the past price and information of a security is freely available publically in market for investors. Open and free information creates perfect competition in the market. Due to perfect competition investors can neither gain unexpected return nor are they able to create monopolistic condition in market. In semi-weak form, past prices and information is not always freely available or influence on future earnings. Whereas in weak form of market, past information or prices are not freely available and don't influence the future earnings (Fama, 1969).Portfolio diversification is one of major issues of individual and intuitional investors that how they can manage and allocate their funds among different

available investment opportunities arise in market. This issue increases as investment go beyond the borders. Markowitz (1952, 1959) proposed the Modern Portfolio Theory (MPT) to resolve the issue of portfolio diversification. His objective was to find the optimal portfolio where investors gain maximum return with lesser risk. Markowitz designs the portfolio problem as mean variance spillover. According to Markowitz portfolio theory, investors should optimize their portfolio among assets as per their required rate of return and their risk tolerance policy. Tobin (1958) extends the Modern Portfolio theory and introduces "Efficient Frontier" and explained two parts are involved in portfolio selection which is: "first, the choice of a unique optimum combination of risky assets; and second, a separate choice concerning the allocation of funds between such a combination and a single riskless asset". Investor can choose and manage fund allocation among available opportunities in market according to his risk return preference from Efficient Frontier.

There is asymmetry of information pondering in every equity market or financial market, this concept of asymmetry of information makes predictions regarding investment prospect in that specific market (Bagehot, 1971). The logic behind this concept is that the members of the any specific equity market allow rationalizing their investment choices. Portfolio selections are seeking to apprehend the statistics indicators that arise in the equity market and its peripheral environment via supposed signaling system and signaling impacts to determine their moves. The utmost crucial signs for contributors of equity markets are unique information in a few scales associated with the destiny economic situations of any states. Ning et al. (2015) define volatility clustering as a phenomenon where: "*High volatility movements (represented by large fluctuations in returns) tend to be followed by high volatility movements (characterized by a period of relative turbulence in the market), while low volatility movements (indicated by small fluctuations in returns)tend to be followed by low volatility movements (characterized by a period of a relative tranquility in the market)*" (p.62).The idea about asymmetry of information of equity market members is based on the theory that equity markets individuals seize different news regarding the object of exchange trading. There is different news which has an impact on their selections and moves within the equity market (Aboody & Lev, 2000; Chae, 2005).

Many studies revealed the macroeconomic factors fluctuate by following the Political Business Cycle Theory (PBC) which is projected by Nordhaus (1975). PBC theory investigated the politically slanting models of enterprise cycles by using the principle factors that belong to public policy. It decides the volatility of oil price for import and export, environmental policy, modernization, labor force participation, and so on. Many studies suggested that empirical results related to PBC theory are main macroeconomic indicators like inflation, exchange rate; growth and money supply etc adjust proceeding to the elections period, period during the election year and the period after the elections (Drazen& Eslava,2010).The alternative of PBC theory is Partisan political enterprise cycle theory which explains the economic cycle in term of working relation of political parties and their coalition

for achieving the ideological targets. This theory indicates that in comparative electoral system of a specific country, there government is selected beneath a coalition of many parties; the ideological foundation of governing political party's celebration is an important aspect in figuring out the partisan targets of the government. If partisan politics has a space within the government, its philosophical shape influences the macroeconomic overall recital of the economic system inside the election duration.

2.1 Stock Markets Co-integration:

Financial market interconnection due to globalization has increased the co-integration among equity markets of the world. Generic definition of financial market co-integration by Lagoarde-Segot and Lucey, (2006, p.17), is that "all potential market participants with the same characteristics (i) face a single set of rules when they decide to deal with financial instruments, (ii) have equal access to these financial instruments, and(iii) are treated equally when they are active in the market (Baele et.al, 2004)". Due to increase in financial markets integration create arbitrage opportunities in different regions of world. Financial markets integration strengthens the stock market connectedness within intra-regional and inter-regional levels. Financial market integration is not a uniform procedure; it varies from time to time and also in different countries. There are numerous studies conducted on co-integration and interconnection among equity markets globally or regionally providing evidence with different methodologies. Dimic, Orlov and Piljak, (2015) studied the equity returns of 64 different emerging, developed and frontier countries to check the impact of political uncertainties and its subcomponents on equity returns. They used International country risk guide (ICRG) index to measure the political risk and for analysis they took annual data for the year 1990 to 2013, unbalanced data was used. The results revealed that influence of political uncertainty on said equity market returns increases while decrease in political risk, although this result was different for subcomponents. For example, there was negative significant impact on emerging and frontier countries but result was not significant in case of developed countries. Zhou, Zhang and Zhang (2012) studied volatility in returns of market and observed that volatility spillovers gives rise to shocks in market. The study examined spillover effect from Japan equity market to US, UK and other emerging economies equity markets. Abou-Zaid, (2011) and Singh et al. (2010) studied return and volatility spillover among 15 countries of 3 regions i.e. Europe, North America and Asia to capture the same day effect of return and volatility spillover. They used AR/VAR analysis to analyze the day effect. For empirical analysis, authors used close to close and open to open daily data for time period of Jan-2000 to Feb-2008. Authors found strong impact of those markets which open prior to the current markets. The results of the study capture the meteor shower effect. Al-Zeaud and Al-Shbiel, (2012) examined the directional volatility spillover effects among world stock markets and China equity market, and found significant positive influence of Chinese market on other world stock markets. They also examined the volatility spillover effect among the markets of Hong Kong, Taiwan and China and report that effects were

relatively more prominent than Western, and other Asian equity markets. This study explored that the US market had dominant volatility effect on other markets at the time of subprime mortgage crisis. Majdoub and Mansour (2014) studied the volatility spillover effect on Islamic VS conventional equity markets. They took US equity market and a sample of five Islamic developed markets, Indonesia, Turkey, Pakistan, Malaysia, and Qatar. They employed different analysis techniques such as BEKK, multivariate GARCH, DCC and CCC. The results suggested that return spillover is established in Islamic equity market instruments and volatility of Islamic countries more with US and European markets. Chkili, (2012) studied the effect of volatility spillover of emerging equity markets by employing BEKK-MGARCH model and reported occurrence of bi-directional shocks and volatility spillover in the aforementioned markets. The effect of volatility spillover of Indian equity market to selected equity markets of developing and emerging economies was analyzed by Mukherjee and Mishra in 2010.They employed GARCH technique and reported the results that a spillover affects among India and all markets except Sri Lanka is bidirectional. Some equity markets like Singapore, Hong Kong, Korea and Thailand are establish significantly influence flow of information to India. Few other researchers examined the volatility and return spillover effect among Asian countries (Hong Kong, India, Korea, Japan, Indonesia and China) and reports a spillover return in the markets is bidirectional:, India and Hong Kong, Korea and Japan, Hong Kong and Korea, Indonesia and China by using the GARCH-BEKK model (Corradi, Distaso and Fernandes, 2012; Joshi, 2011)

From Pakistan Abbas, Khan and Shah, (2013) studied the effect of volatility spillover among the developed markets and emerging Asian equity markets study took as sample UK, US, Singapore and Japan from develop and India, Pakistan, Sri Lanka and China from Asian Market and used bivariate EGARCH to observe volatility transmission. They reported results that volatility spillover found among countries that have economic links and transmission of volatility is also present between markets that are on poor terms. Another study conducted by Qayyum and Kemal (2006) to examine the effect of volatility spillover between the equity markets and exchange rate. They collected the weekly data of Karachi Stock Exchange (KSE) for analysis and reported that volatility transmission exists and also has strong affiliation between these markets in Pakistan. Jebran and Iqbal, (2016) explored the evidence of bidirectional volatility spillover among equity markets of China, Sri Lanka Pakistan and Hong Kong and foreign exchange market by employing EGARCH model. The results suggested that volatility is unidirectional i.e. form equity market to forex market of India.

Most recent study of Kocaarslan, Sari & Soytas, (2017) examined the long run and short run interdependence of Turkish and Russian equity markets with the most developed global equity markets (US, UK, Hong Kong, Singapore). They found positive responses among the equity markets to standardized short-term shocks. They explained significant risk transmissions from the developed equity markets to MSE except UK market.

2.3 Political Uncertainty and Stock Market Volatility:

The uncertain situation prevailing in an economy as a result of political events is referred as political uncertainty. Since the financial markets in developing countries are exposed to a large number of risks, therefore it becomes very difficult to ascertain the impact of political risk only. There is multiple arguments to define political risk or uncertainty by researchers. Political risk is an event such as election event that may affect the dynamics of market within a country (Simon, 1982). Brewer, (1983) associated political risk with the variety of risk attached with overseas business. Fitzpatrick, (1983) defined as political risk is focused on antagonistic administration activities that remains changing with the passage of time. In past studies political risk and asymmetry of information variables were modeled in multiple ways on the basis of information theory and its concepts.

An empirical analysis of Hibbs, (1977) revealed that socialist parties in European countries and the democratic party in the US put into effect economic regulations due to that unemployment reduces, excessive inflation and so on. Similarly, conservative parties in Europe and the Republican Party inside the United States use policies that result in excessive unemployment along with reduction in inflation. One model in this representation is the impact of election cycle on macroeconomic variables and economic growth. In this regard asymmetry of information, political enterprises and budget series are the major sources of election cycles, which bring about information flow that elected political leaders achieve in assessment of voters (Drazen, & Eslava, 2010; Vicente et al,2013). The primary concept is that political leaders have two ways thinking prospect: firstly, which they can use all through a long time frame to influence the effects of elections, and the second are opportunities to control the pertinent spheres of economic coverage, which they can make the most during election period through the usage of media or simulation of competent nation activities. Alt and Lassen, (2006) revealed in their study on election periods impact that best transparency of the budget of a country results in decrease stage of budget deficit in the election period. It is due to the fact that budget deficit may be very expensive for reselection of specific politicians or political party. Persson and Tabellini (2004) discovered proof of election cycles within the environment of fiscal devices, depending at the legal system of the specific region and the level of democracy. In existing literature, we have found two measures or standards about the impact of political risk or uncertainty, first movement of equity markets match with the political events. The political risk is measured using the proxy of dummy variable taking the value of one if political uncertainty exists and zero otherwise. Chau et al. (2014); Khan et al.(2017); Beaulieu, Cosset & Essaddam,(2006) compared political risk to price movement in equity markets. Researchers also analyze equity market response empirically as link of equity prices and political risk (see for instance Goodell &Vähämaa, 2013; Białkowski et al. 2008).There are number of studies that attached political uncertainty with higher volatility of equity markets. We found different explanations of political events in past literature observed by different researchers such as Kim & Mei, (2001) worked on political uncertainty as they

think and prove that it influences the firms overall profit ratios. Queret al. (2012); Holburnand Zelner (2010) studied the relationship between political factors and stock returns by using the event study method from the years 1989-1993. They found that political uncertainty has significant effect on equity returns. They also proved the increase in model explanatory power while adding more political variables. As in literature we found that some studies relate the political news or risk with the trading activities like (Chan, Chui & Kwok, 2001; Leblang & Mukherjee, 2005; Ranjbar and Manjunath, 2011). And some studies examined the relationship of political events with the exchange rate movements Wang and Lin (2009); Potrafke, (2018) they identified in determination of exchange rate there is vital role of constructive information of political events. Particularly in democratic political system currency market equilibrium is significantly affected especially uncertainty about the electoral outcomes (Siokis & Kapopoulos, 2003; Cermeño, Grier & Grier, 2010). Block, (2003) examined the probability of currency crises due to political uncertainty and political variable like election periods also affect the changes in exchange rate and as well as returns (Freeman, Hays & Stix, 2000; Hays, Freeman & Nesseth, 2003).

Lin and Wang (2005) examined the transition of power by one ruling party to other, they observed the response of the Japanese equity market Nikkei 225 while transition of political system in Japan by using Univariate Asymmetric GARCH model and took equity market volatility effect as an indicator for measuring the transition system from one ruling party to another. They analyzed response of equity market volatility and return influence on the political behavior in Japan. They followed the theory of 'organizational effectiveness' in their study and assumed that a prime minister is the in charge of any act done in the cabinet so market should response and reflect on the performance of given prime minister. They took the data for the time period 1979 to 2005 to analyze the ruling transition. They took the election periods of Japanese Congress which were 19 times during the sample taking, elected prime ministers, party membership for prime minister and their past and current cabinet members. In that study they used two dummy variables for analysis, one dummy (D1) for election days used dummy variable and took 1 for changeover of current government and 0 for otherwise, and in 2nd dummy (D2) 1 for the post-1987 crash and 0 for otherwise. They found equity market returns and volatility has insignificant relation with the political transition system from one ruling party to another but there is negative significant impact of 1987 crash on equity market returns and volatility at level 1% which increased at level 5%.Apparent from citation of above mentioned literature research found that there are so many studies conducted on effect of volatility spillover among different equity markets regionally and across the globe by employing variety of multiple methods and models. By sourcing this evidence, we seek to contribute to the pertinent research by comprehensively exploring the regional volatility spillover and portfolio diversification opportunities among South Asian Region i.e. India, Pakistan and Sri Lanka, for further betterment, the research study has considered developed markets such as S&P500 and FTSE. As political risk and uncertainty is phenomena of emerging markets, we explored the effect of spillover effect

during political uncertainty as well by creating dummy variable of election period of all selected countries. Based on the above mentioned discussion, the current study postulates the following hypotheses:

2.4 Hypotheses of the study

H1: Volatility of Pakistani Stock Market has a significant impact on volatility of stock markets of Sri Lanka and vice versa.

H2: Volatility of Pakistani Stock Market has a significant impact on volatility of stock markets of India and vice versa.

H3: There is significant impact of volatility of World markets (S&P 500& FTSE) on volatility of stock markets of South Asian Countries (Pakistan, India, and Sri Lanka).

H4: Political uncertainty has a significant impact on volatility spillover among South Asian (Pakistan, India, and Sri Lanka) Countries and world equity markets (S&P 500& FTSE).

3.0 Methodology:

The research study is based on the analysis of South Asian countries and world equity markets.We have taken three developing countries of South Asia (Pakistan, India, and Sri Lanka) and US and UK as representative of world equity markets. We used daily data for thetime period of 17 years (1st July, 2000 to 30th June, 2017).Monthly or weekly data is not used because equity markets in world generally trade on daily basis. Moreover, daily data captures and adjusts information more than weekly and monthly data (Jebran & Iqbal,2016).The analysis comprises of descriptive and inferential statistics. Vector Auto Regression (VAR) is used and to analyze the VAR model empirically. The major components of VAR are the impulse response analysis, variance decomposition, and Granger causality tests.

4.0 Research Results:

Table1.Result of Descriptive Statistics:

Descriptive Statistics					
Indices	**Mean**	**Median**	**Max.**	**Min.**	**S.D.**
RKSE	0.0008	0.0004	0.0851	-0.0774	0.0127
RFTSE	0.0000	0.0000	0.0938	-0.0927	0.0118
RSP	0.0001	0.0002	0.1096	-0.0947	0.0119
RCSE	0.0006	0.0000	0.1829	-0.1389	0.0111
RBSE	0.0004	0.0000	0.1599	-0.1181	0.0143

Table # 1 explains the descriptive statistics of all the indices under consideration. The average value of return of KSE 100 index (LKSE) is .00077 and .000414 mean and median respectively, Since mean is consider relatively good measure for average value, so the mean value ofKSE, FTSE, SP, CSE and BSE are 0.00077, .0000275, 0.000112, 0.000582 and 0.00042 respectively. To capture the variation in return series of all indices are measured by standard deviation mentioned above.

4.1 Correlation Analysis/ results:

Following Table No.2 reports the results of correlation among all studied indices. Correlation analysis depicts the direct relationship between two variables with sign and strength of relationship. In our study, returns of Indian market (RBSE) and Pakistani market (RKSE) has positive relationship which is 0.112021; this relationship is week as it closer to zero. Returns of Sri-Lankan market (RCSE) and KSE have positive relationship which is 0.023544; this relationship is week as it closer to zero. Similarly with BSE positive and weak relationship is observed to be .053025. Returns of UK market (RFTSE) and KSE have positive relationship which is 0.05433; this relationship is weak as it closer to zero, similarly with BSE and CSE positive and week and relationship which is 0.357862 and 0.037008 respectively. While returns of US markets (RSP) and KSE have positive relationship which is 0.016989; this relationship is weak as it closer to zero, similarly with BSE and FTSE positive and weak relationship which is 0.220742 and 0.542534 respectively. Negative and week correlation is found between US market and SriLankan market which is -0.01462. There is overall weak correlation among studied market that shows there arise investment opportunities for regional and global investors.

Table 2. Correlation Analysis

Correlation Analysis					
Indices	**RKSE**	**RBSE**	**RCSE**	**RFTSE**	**RSP**
RKSE	1				
RBSE	0.1120	1			
RCSE	0.0235	0.0530	1		
RFTSE	0.0543	0.3579	0.0370	1	
RSP	0.0170	0.2207	-0.0146	0.5425	1

4.2 Vector Autoregressive (VAR) Model Analysis:

Apply unit root test separately for each variable and results show both at level and first difference. All series are stationary on 1st difference I(1), so Unit root results depict that Co-integration test can be applied on this data. Furthermore, in selection of lag length criteria, AIC results depicted that 6 lag lengthsis suitable for this data. Trace and Max-Eig value determine 2nd model is best for our study as data become sequenced here.The results of

Johanson co-integration shows that no long term relationship exists between the series. However, the basic objective of the research is to check the spillover effect among equity markets of South Asian region (Pakistan, India and Sri Lanka) and World developed equity markets (UK and US) along with impact of political uncertainty on volatility of south Asian markets and world equity markets. So, VAR analysis has been carried out. The major measures to analyze the VAR model are variance decomposition and impulse response functions to test the dynamic behavior between KSE, CSE, BSE, FTSE and S&P. The Granger causality test is also executed to show the variable dynamics.

4.3 Variance Decomposition Analysis:

Table 3. Variance Decomposition of Karachi Stock Exchange (KSE)

Variance Decomposition of KSE					
Period	S.E.	KSE	CSE	FTSE	BSE	S&P
1	0.0125	100	0	0	0	0
2	0.0127	99.0670	0.0101	0.6651	0.0407	0.2170
3	0.0127	98.5447	0.0503	0.7232	0.1137	0.5682
4	0.0127	98.3388	0.0789	0.8719	0.1434	0.5669
5	0.0127	98.2978	0.0798	0.9041	0.1433	0.5750
6	0.0128	98.1821	0.0859	0.9274	0.2226	0.5820
7	0.0128	97.9838	0.1186	0.9578	0.2584	0.6814
8	0.0128	97.9767	0.1237	0.9593	0.2588	0.6815
9	0.0128	97.9733	0.1240	0.9593	0.2594	0.6840
10	0.0128	97.9727	0.1241	0.9593	0.2598	0.6841

In the short run impulse response or shocks account for 100% variation of fluctuation in KSE (own shock), not effect from CSE, FTSE, BSE and S&P but in 2nd day shock to KSE, CSE, FTSE, BSE and S&P can cause 99%, .01%, .6%, .04% and .021% respectively fluctuation in KSE. This contribution in fluctuation in KSE increases gradually to shock of CSE, FTSE, BSE and S&P while decrease to its own shock.

4.4 Impulse Response Function:

The below mentioned figure shows that the impulse response function draws outcome of a one standard deviation shock to endogenous variables one of the innovations on current and future values with selected lag length. In short run, KSE has positive significant effect of own shock and the shock of CSE, FTSE, BSE and S&P also has positive significant responded by KSE and remain positive till 10th day. CSE response in short run positively and significantly shocks of KSE, BSE, FTSE and S&P on day first and it remains positive for 10the day. In short run FTSE response is significantly positive of its own shock on day 1st and 2nd and it response negatively 3rd and 4th day then become positive on 5th day and late on till 10th day it effect positively. FTSE response the shocks of US significant positive from day 1st to 6thand

then become negative on 7thday and then become positive till 10thday but FTSE response the shocks significant positive of KSE, BSE and CSE in short run from day 1st to 10. Similarly BSE has positive significant response of its own shock on day fist and it turn into negative for 2nd to 4th day and then again positive for 5 to 7th day and after that it response positively till 10th day. BSE also has positive significant response of shocks from KSE and CSE and remain positive for 10th day. As concern the response of US market to shocks of other market is different. In short run US response significant positive to shocks of KSE, CSE and BSE from day first to ten but US response the shock from FTSE significant positive on day first and then negatively respond on 2nd and 3rd day which become positive on day 4th and 5th and then again negatively respond on 6th day and later it respond positively till 10th day. In regards of US response of its own chock is significant positive till day 10th except 2nd day the shocks response by US is negative.
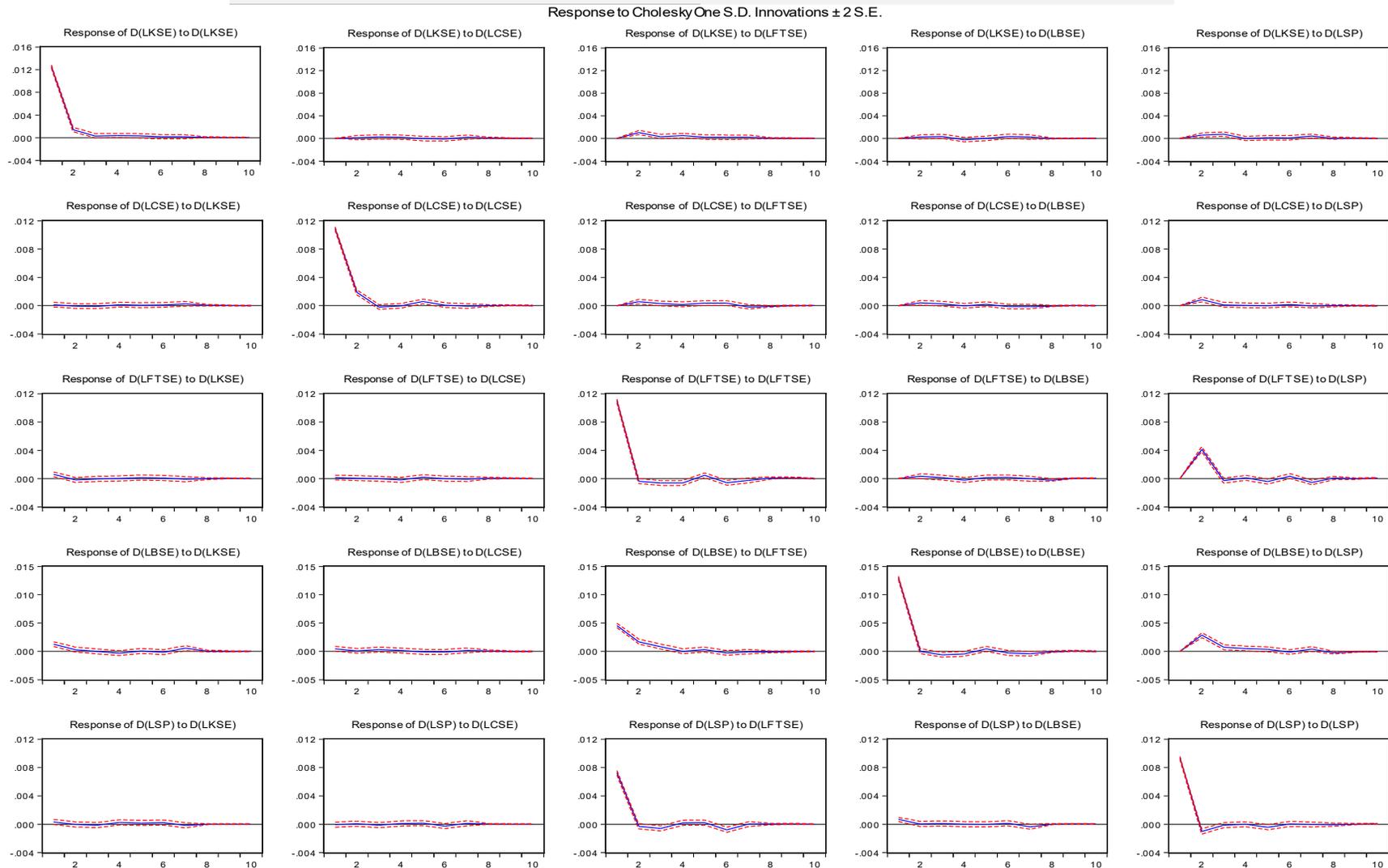
Figure 1 Impulse responses Function; Response of equity market with 6 lag length selected by AIC, dashed lines represents the 95% confidence interval for response of shocks from one market to other.

Table 4. VAR Granger Causality:

	VAR Granger Causality/Block Exogeneity Wald Tests				
	KSE	CSE	FTSE	BSE	S&P
Excluded	Chi-Sq	Chi-Sq	Chi-Sq	Chi-Sq	Chi-Sq
KSE	-	5.1610	3.058	8.708	6.508
CSE	6.5452	-	1.476	6.338	4.067
FTSE	14.77***	4.9142	-	6.538	25.99***
BSE	9.6672	9.5009	3.212	-	4.884
S&P	15.375***	30.043***	625.16***	200.22***	-

Note: all granger cause checked on 6 lags which is selected on AIC criteria, and *** shows significant at level 1%

Results of VAR Granger Causality depicts that CSE doesn't lead or granger cause the KSE, BSE, FTSE and S&P. Similarly BSE doesn't lead KSE, CSE and FTSE, and S&P. In the similar vein KSE does not lead or granger cause the CSE, BSE, FTSE and S&P while FTSE lead or granger cause the KSE and S&P, and S&P lead or granger cause the KSE, CSE, BSE and FTSE. In short, approximately all the emerging markets do not lead or granger cause the developed markets but developed markets lead or Grainger cause in emerging markets. It means that there is unidirectional relationship among emerging and developed markets.

4.5 Impact of Political uncertainty:

The changes in the volatility spillover of equity markets linked with the politically uncertainty or risk. As we mentioned above in literature that there are two major measures of political uncertainty one is by using different index like ICRG, (BERI), S&P Rating etc and the other is by using elections period dummy. Although indexes are strong measure than event dummy but these are annual or monthly basis but our data of studied variables is daily basis so we choose election period dummy to measure political uncertainty to check the impact of political uncertainty (election period) on the volatility spillover among South Asian countries and World equity markets. We use 1 for election period dummy for pre, post and event day (event window) and 0 for otherwise. Though we distinguish countries adopting parliamentary or presidential elections systems but we took all as combine because in our study we have only US having presidential election systems.

Table 5. Summary Election Events of Studied Variables

Election Events 2000 to 2017				
Country	Election Type	First election included	Last election included	No. of elections
Pakistan.	Parliamentary	10-Oct-02	11-May-13	3
India.	Parliamentary	20-Apr-04	7-Apr-14	3
Sri Lanka.	Parliamentary	10-Oct-00	17-Aug-15	5
US	Presidential	7-Nov-00	8-Nov-16	5
UK	Parliamentary	7-Jun-01	8-Jun-17	5

4.6 VAR with Dummy variable of Election events

Here we used VAR model with exogenous dummy variable of political uncertainty (election event) to observe the impact of political uncertainty (election events) on KSE, CSE, BSE, FTSE and S&P.

Table 6. Vector Auto-regression Estimates with dummy variables

	D(LKSE)	D(LCSE)	D(LFTSE)	D(LBSE)	D(LSP)
EKSE	0.0017	0.0006	-0.0013	-0.0022	-0.0004
	-0.0010	-0.0008	-0.0008	-0.0011	-0.0009
	[1.739]	[0.751]	[-1.574]	[-2.055]	[-0.42603]
ECSE	-0.0006	0.0007	-0.0005	-0.0013	-0.0015
	-0.0008	-0.0007	-0.0007	-0.0008	-0.0007
	[-0.738]	[1.039]	[-0.670]	[-1.529]	[-2.080]
EFTSE	-0.0012	0.0006	-0.0010	-0.0003	0.0001
	-0.0008	-0.0007	-0.0007	-0.0009	-0.0007
	[-1.553]	[0.841]	[-1.409]	[-0.349]	[0.139]
EBSE	0.0002	0.0012	0.0002	0.0013	0.0015
	-0.0009	-0.0007	-0.0007	-0.0009	-0.0008
	[0.278]	[1.695]	[0.240]	[1.375]	[1.841]
ESP	0.0004	-0.0019	0.0002	-0.0006	-0.0015
	-0.0008	-0.0007	-0.0007	-0.0009	-0.0007
	[0.460]	[-2.862]	[0.236]	[-0.697]	[-2.040]

Standard errors in ( )& t-statistics in [ ]

The aforementioned table depicts the results that KSE does not have significant impact of its own election events, similarly Pakistan election has insignificant impact on CSE, FTSE and S&P but significant impact on BSE. Sri Lankan election events have insignificant impact on Sri Lankan equity market, KSE, FTSE and on BSE but have significant impact on S&P. On the other hand, UK and India's elections events have no significant impact on their own equity markets as well as any other equity market i.e.US, Pakistan and Sri Lanka. US election events have significant impact on its own equity market and CSE but have insignificant impact on KSE, FTSE and BSE.

5.0 Discussion and Conclusion:

The main objective of this study is to examine the long run relationship and effect of volatility spillover among South Asian countries (Pakistan, India and Sri Lanka) and World developed equity markets (UK and US).We have also observed this volatility spillover impact during political uncertainty among these markets. In short run, unrestricted VAR depicted the results that KSE has its own effect of volatility spillover for 1st lag and no impact from BSE, CSE, FTSE and S&P. Similarly, CSE has only its own effect of volatility spillover for lag one and BSE has significant short run relationship for lag one and two but FTSE has significant relationship with UK and US equity markets whereas S&P (US market) has significant short run relationship with KSE, BSE, CSE and FTSE. To explore the response of shocks from one market to other market, we applied the Impulse Response Function test for 10 days; the result showed that all south Asian developing markets have significant positive response from their own shocks and less from shocks of other markets. However, UK market has significant positive response of shocks from its own as well as US market shocks. Likewise, US market has significant positive response to shocks from its own and from UK markets. Similar results are drawn by Variance Decomposition test which shows that the most of KSE variance is decomposed from its own innovations and other markets have effect on it on day first but later on very little effect is observed. In the similar vein, CSE the effect caused by its own market innovations on day first was observed to be high but later on very little effect from other markets. Moreover, it is evident from the results that variance in BSE returns is primarily due to its own innovation. UK and US markets are also effected by their own innovations and not due to other markets such as KSE and CSE. Variance decomposition of FTSE suggest that the changes are because of its own variance or due to change in US market but other markets have no or less effect. Similarly, US market variance decomposition was due to change in its own shocks and due to UK market.

These analyses do not estimate the direction and lead or follow relationship. In order to estimate the direction and granger cause, we have used VAR Granger Causality test. KSE, CSE and BSE do not lead or granger cause each other neither any unidirectional or bidirectional relationship

exist among these markets. FTSE granger causes KSE and S&P. Similarly, S&P granger cause KSE, BSE, CSE and FTSE. The results further suggest that FTSE and S&P has bidirectional relationship between them while unidirectional relationship is found with KSE, BSE and CSE. Similar results were explored by previous studies of co-movement of long term and short term among equity markets (see for instance Glezakos, et al. 2007; Hussain, et al. 2012).They examined the long run and short relationship among equity markets by using Impulse Response Function, Variance decomposition and granger causality test to analyze spillover between equity markets. Most of previous studies explored the effect of spillover and previous lags shocks independence by own markets and other markets. They also observed that weak correlation exists among developing countries and strong correlation among developed countries (Khurram, Hamid, & Hasan, 2017; Kocaarslan, Sari, & Soytas, 2017).

In the next step we examined the impact of political uncertainty on volatility spillover among KSE, BSE, CSE, FTSE and S&P equity markets. We used election periods dummy as proxy of political uncertainty and estimated the results in unrestricted VAR with exogenous variable of election periods dummy for all studied variables, 1 for election event and 0 for otherwise. Results depicted those elections in Pakistan doesn't have significant impact on KSE, CSE, FTSE and S&P but significant impact on BSE. Elections in India don't impact any of studied market while elections in Sri Lanka have significant impact on S&P and have insignificant impact on rest of equity markets. In the case of world equity markets FTSE's elections don't have significant impact on any of studied market while US's elections have significant impact on its own market and CSE as well.

Previous studies suggested the presence of both significant and insignificant impact on movement pattern of equity market return. As the findings of Leow & Celis, (2015) postulated that an election doesn't have positive significant impact on equity market. The study was conducted in the context of Malaysian stock market and Malaysia electoral factor and predicted that government or electoral factor might not be able to transform information about their objective. There also exists contrast studies, Floros (2008) examined elections period impact on Greece equity market and found that returns of Greece stock returns high and low volatility two months before elections, decrease returns and increase fluctuation in prior one month and explore impact on stock return during three months post elections period. Similar findings of impact of elections event on volatility of equity market studied by Altin, (2012); Ong et al., (2015) Iyengar, Iyengar, & Sampat, (2017).The results of the study have fruitful implications for researchers, academicians, investors and speculators. Risk-averse investors intend to minimize their risk with maximization of returns. So dynamics of volatility spillover among developed or developing countries could be a major concern for regional and global investors. On the other hand speculators objects in short term to increase profits to detain the price difference among equity

markets. South Asian countries and world equity markets have week relationship or no long run co-integration exits among them. Therefore, all the investors in general and global investors particularly should avail the opportunity to increase their return and reduce risk by diversifying portfolio. Similarly impulse response and variance decomposition recommended that almost all markets are affected by their own shocks and there is no directional relationship among south Asian Countries. It means investment opportunities in these markets are high and investors should avail such opportunities. Investors are concerned with political uncertainties or elections period impact as there is more political instability in developing countries. This study provides guidelines for such investors, as there is no impact of elections event except Pakistan's elections on BSE, Sri Lanka on S&P and US on CSE and S&P. In nut shell worldwide portfolio diversification is a fundamental concerned area of the global investors. Though, to establish well diversified portfolios investors are required to be aware of financial contagion. GFCI reports specify that in the new era, global finance centers may modify the temperament of international finance system. In this study, only three countries Pakistan, India and Sri Lanka and from world equity markets only UK and US are consider for analysis. In future, large set of countries from South and East Asian and World developed market can be considered. Further, we can estimate the co-movement of equity markets during bearish and bullish trend or before and after different crisis periods. We have taken political uncertainty as exogenous variable in this research, the future research studies may consider other macro-economic factors like exchange rate, oil and gold prices.

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