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Gold vs. PSX Sectors during Political Uncertainties: An Event Study Analysis

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Abstract Amplified uncertainties in economic, financial, and political environments across nations have created a dire need to search for safe investment options that could mitigate the losses faced by investors. Consequently, researchers and investment managers have started investigating alternative investment options like real assets to cope with such risks. Since Pakistan is among the most politically unstable economies, there is a dire need to investigate this conundrum and provide Pakistani investors with alternatives. Previous researches have widely reported gold to be this alternative as it provides a hedge and safe haven during various economic downturns. Therefore, the current study investigates whether gold could also diversify the risk of political uncertainties faced by different sectors of the Pakistan stock exchange (PSX). For this purpose, initially the impact of political uncertainty on PSX sectors and gold is investigated through event study analysis, by using economically political and socio-political events from Jan 2009 to Dec 2019. Then Pearson correlation and volatility modeling using event dummies are employed to unveil the diversification characteristics of gold. Gold holds diversification characteristics in case it exhibits zero, negative or insignificant correlations with PSX sectors. Findings suggest that gold is not influenced by political events while most of the PSX sectors are influenced by socio or economical political events. The results also show that gold acts as a hedge for all sectors i.e. indicating zero correlation, and acts as a safe haven for many sectors i.e., it indicates a negative correlations, and an insignificant relationship indicating the absence of co-movement. Therefore, the study concludes that Pakistani investors could consider gold as a diversifier for diversifying traditional investment portfolios.

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1 Introduction

Political events and their negative effects on economic activities have illuminated the need to investigate the role of different assets during political uncertainties (Taimur and Khan 2013). As a result, recent political factors are among the dominating ones to be investigated by researchers (Baker et al 2016; Goodell et al 2015; Goodell and Vähämaa 2013; Huang et al 2015; Jens 2017; Liu et al 2017; Vortelinos and Saha 2016). Researchers evaluate their impact on economic growth (Kelly et al 2016), financial markets, and financial instruments (Taimur and Khan 2013). On the other hand, commodities like precious metals have attracted investors because they're considered a safe option especially when coping with economic downturns. That's because these assets have a minimum correlation (Rasheed et al 2021)

Moreover, among other precious metals, gold has been widely reported as a hedge and is considered a safe haven during various economic and market uncertainties (Baur and McDermott 2010; Iqbal 2017). Contributing further, the current study investigates whether gold also acts as a diversifier amid political uncertainties against PSX sectors. Thus, this research addresses the following research questions; does political uncertainty influence PSX sectors returns? If yes, then, is gold a diversifier against such political uncertainties? Furthermore, to investigate the diversification potential of gold, the study identifies if gold exhibits any correlation with PSX sectors and whether or not it acts as a hedge and a safe haven during political uncertainties.

1.1 Political instability in Pakistan

Based on factors like transfer of government power, armed conflicts, violent demonstrations, social unrest, terrorism, international tensions, and regional and religious conflicts, Pakistan is ranked at 189th among 195 countries for political stability by World Bank. Although it is becoming an emerging market due to its economic development in recent years, it remains politically unstable. As a result, countries like Pakistan that belong to a (politically) unstable zone, require such investigations more critically because investors face political uncertainties more frequently which results in distress and creates doubts about future returns.

Current research contributes to literature because there is rare evidence about the impact of political uncertainty on individual PSX sectors. Moreover, no previous study outlines the impact on PSX under influence of political uncertainty, and the various alternative investment/s that could save investors. Furthermore, current research contributes significantly in financial economics literature because investments under uncertainty has been a focus of portfolio optimization and asset pricing. However, some important types of risks like the

risk of political uncertainties are still not widely addressed especially in developing countries. This study aims to fill this gap by providing a detailed and comprehensive analysis of political risk on sectors of Pakistan Stock Exchange and unveils the potential of gold as a diversifier in an environment of political uncertainty. The research also contributes to the knowledge of investors and investment managers/advisors to consider gold as an alternative investment option for their asset allocation strategy to cope with the risk of political uncertainty.

2 Literature review

Literature documents the impact of political uncertainties on stock returns (Kelly et al 2016; Pastor and Veronesi 2012; Taimur and Khan 2013) and also documents evidence for investigating the role of alternative investments like commodities (Iqbal 2017; Low et al 2016; Wu and Chiu 2017) to mitigate the risk of different kinds of uncertainties.

2.1 Political uncertainty and stock returns

Political uncertainty implies the lack of assuredness about the future outlook of governments' actions and policies (Baker et al 2016; Pastor and Veronesi 2012) and the likelihood of unanticipated political events that may affect the potential benefits of an investment (Osei-Assibey 2016). The impact of political uncertainty on asset prices, volatility and financial market movements have been documented by many empirical studies (Baker et al 2016; Jens 2017; Goodell et al 2015; Liu et al 2017; Huang et al 2015; Vortelinos and Saha 2016).

Pastor and Veronesi (2012) found stocks to be more volatile amid higher political uncertainty and argued that a risk premium is commanded by political uncertainty. Kelly et al (2016) found political uncertainty to be priced in equity option markets. Similarly, a significant drop in stock prices is documented by Liu et al (2017) during a political event, the Bo Scandal, in China. Using an event study methodology and calculating cumulative average abnormal returns (CAARs) for general as well as policy sensitive firms, a significant rise in return volatilities is found right after the event.

Political cycles are significantly associated with the movements of asset prices because governments spending policies change with the change of government, thereby resulting in significant influence on industries and their activities (Belo et al 2013). Jens (2017) documented an association of political uncertainty with firm investments. Using elections as exogenous variations of uncertainty, it is found that investments decline about 5-15 percent in firms depending on their exposure to political uncertainty because equity and debt issuances are delayed by firms before elections. Firms consider close election period closely associated with economic downturn leading to political uncertainty in the form of election results. Goodell et al (2015) stated that election predictions play an important role in predicting future returns from financial markets; therefore, prediction

markets are widely accepted as an information aggregation vehicle for such uncertainties. [Amihud and Wohl \(2004\)](#) indicated that political events are significantly influential for stock prices because markets expectations change with political news. Investors positive expectations positively influence stock prices, but varying expectations are reported for pre and post-event periods([Bernile et al 2016](#)).

2.2 Sectors' stocks

Different industries exhibit different reactions to varying economic ([Elyasiani et al 2011](#)) and market conditions([Arouri 2011](#)). Studies like [Arouri \(2011\)](#), [Choi and Hammoudeh \(2010\)](#), [Elyasiani et al \(2011\)](#),[Ramos and Veiga \(2011\)](#) studied the impact of economic variations like oil price changes on industrial stocks and reported varying influences across industries. Although fluctuating economic conditions significantly influence the overall stock market ([Choi and Hammoudeh 2010](#)), the extent and direction of influence is not same across industries ([He 2002](#)). [Griffin and Stulz \(2001\)](#) studied the impact of exchange rate fluctuations across industries and found that although industries are prone to exchange rate fluctuations, the extent of influence is not the same. [Choi and Hammoudeh \(2010\)](#) illustrate that industrial stocks respond not only to financial crises but also to geopolitical crises. The sensitivity of industrial stocks to geopolitical events causes industrial returns to fluctuate in response to such events. All these studies indicate that stock returns are sensitive for changes in economic and market conditions, but different stock portfolios indicate different sensitivities towards varying conditions([Griffin and Lemmon 2002](#)).

2.3 Gold as a diversifier

Over the last decade, trading in commodities as a substitute investment class in traditional portfolios has gained amplified significance, indicating commodities importance as individual investments as well as a diversifier in diversified portfolios ([Batten et al 2010](#)). Commodities are of interest for investors and investment managers because of their role in asset allocation decisions, which become more attractive during negative financial climate ([Andreasson et al 2016](#)). Commodities such as precious metals, gold and silver has gained amplified attention from investors ([Batten et al 2010](#)) due to positive returns of portfolios ([Creti et al 2013](#)).

Gold's function is not limited to be a hedge and a safe haven against inflation and other economic factors, rather it could be used as a portfolio diversifier in common stock portfolios([Low et al 2016](#)). Initially, gold company stocks are considered as diversifiers in portfolios; however, gold stocks have lost their diversification characteristics with the passage of time. Gold stocks do not offer diversification benefits like they did in 1970s, but gold bullion still has the characteristics of diversification. Therefore, gold bullion should be incorporated in

portfolios to reap diversification benefits (Białkowski et al 2015; Chua et al 1990).

Contradictory views prevail about the hedge and safe haven characteristics of gold during uncertainties. Agyei-Ampomah et al (2014) stated that although gold provides protection to investors during negative economic conditions, in other situations like losses in sovereign bonds, it underperformed as compared to other precious and industrial metals like palladium and copper. The safe haven and hedging characteristics of gold are not consistent during varying uncertain conditions. Bredin et al (2015) revealed that gold acts as a hedge for equity investors and its safe haven characteristics are further established during financial crises periods. Iqbal (2017) found gold as a hedge against inflation and exchange rate risk. On the other hand, Baruník et al (2016) also found the heterogeneity of correlations between stocks and gold during financial turbulence and periods of economic downturn, suggesting that these could be used in diversified portfolio only for comparatively shorter durations.

Choi and Hammoudeh (2010) found decreasing conditional correlations among commodities and stock returns, indicating that they have different sensitivities to geopolitical events and crises. The declining stock-commodity correlations indicate that crises and geopolitical events have opposite impact on stocks and commodities. Researchers and asset managers emphasize that diversification benefits can be enjoyed, and investment opportunities could be improved by investors through incorporating different volatility related assets in portfolios (Chen et al 2019). Öztekin and Öcal (2017) suggest that diversification benefits of portfolios could be enhanced through combining stocks and commodities in portfolios rather than merely investing in stocks. Therefore, inclusion of commodities results in more diversified portfolios that are more stable across time. Hence, the above discussion indicates that gold has been investigated during various economic and market downturns, but no study indicates its behavior during political uncertainties. As a result, our study contributes significantly to literature and investors knowledge.

3 Methodology

3.1 Data description and selected sample

The study uses daily share prices of firms listed on Pakistan Stock Exchange, daily prices of Gold bullion and history of political events of Pakistan. Daily closing share prices of listed firms is collected from official website of Pakistan Stock Exchange, which is then used to calculate equally weighted sectors returns, because equal-weighted are considered to have higher exposure to systematic risk factors (Plyakha et al 2021). Data for daily gold prices (Gold Bullion Pkr. per Tola) is obtained from Goldrates.pk, while data on political events of Pakistan is collected from BBC and ABC News. Time span of current study is from 1st January 2009 to 31st December 2019. As of December 2019, there were 35 sectors listed on Pakistan stock exchange, but current study incorporates 32 sectors due to the limitation of data availability of others sectors during this time period. The names of selected sectors, their abbreviations used in

this study, and details of included companies from each sector are presented in Appendix. Each variable contains 2719 values for daily data. Moreover, a total of 21 political events from January 2009 to December 2019 are selected.

Political uncertainty is measured through different approaches like policy uncertainty (Baker et al 2016), elections (Goodell et al 2015), political news (Amihud and Wohl 2004), political scandals (Liu et al 2017), political crises like riots, protests (Frijns et al 2012; Huang et al 2015) budget announcement (Edirisinghe 2017; Khan et al 2017). This study considers political announcements like budget announcements, political news and change in government—either through elections or an unanticipated change due to legal verdict—as a measure of political uncertainty. An overview of selected political events is reported in Table 1.

Table 1: List of Political Events in Pakistan

Date	Event
11-Jun-09	Budget Announcement
8-Apr-10	18th Amendment in Constitution.
19-Jun-10	Budget Announcement
4-Jan-11	Assassination of Governor of Punjab; Salman Taseer.
3-Jun-11	Budget Announcement
19-Jun-12	PM Yousaf Raza Gillanis Disqualification
11-May-13	General Elections
11-Jun-13	Budget Announcement
9-Sep-13	Presidential Elections: Mamnoon Hussain elected as president.
3-Jun-14	Budget Announcement
13-Aug-14	Long March and Sit-In by PTI and PAT
5-Jun-15	Budget Announcement
15-Jun-16	Budget Announcement
12-Jun-17	Budget Announcement
28-Jul-17	PM Mian Nawaz Sharifs Disqualification
6-Jul-18	Nawaz Sharif sentenced to Jail
25-Jul-18	General Elections
4-Sep-18	Presidential Elections
11-Jun-19	Budget Announcement
27-Oct-19	Azadi March; Moulana Fazl ur Rehman
17-Dec-19	Musharaf sentenced for death

Table 1 shows the political events selected based on previous relevant research; Jens (2017) pointed out that the impact of political uncertainty needs to be measured by political events such as elections, rather than a broader uncertainty index. Khan et al (2017) argued that budget announcement is part of the political event, because the government transformation has led to changes in budget policies that affect stock prices. Belo et al (2013) stated that due to the inherent uncertainty of government spending decisions related to fiscal and monetary policies, political uncertainty related to government spending policies has a significant impact on stock returns (Liu et al 2017). Goodell et al (2015) claimed that although political events such as elections are not unanticipated

events, frequent adjustments to investor expectations due to unexpected changes in future macroeconomic policies will lead to uncertainty and volatility in the stock market.

Tirtiroglu et al (2004) believes that political events can explain the volatility pattern of the stock market because investors take a wait and see attitude due to increased political uncertainty. This uncertainty is due to the fluctuations of public perception of upcoming political events before it actually happens. Based on all the above studies, the political events listed in Table 1 helps to capture the impact of political uncertainty in Pakistan. This table also indicates the list of selected 21 political events from January 2009 to December 2019 including two types of political events i.e. economically political events like budget announcements (9 events) (budget announcements for few years are skipped because these were overlapping with other events), and socio-political events like any political event having direct or indirect exposure to society (12 events).

3.2 Methodologies for empirical analysis

Appropriate methodologies play a significant role in fulfilling the purpose of study. Empirical analysis of current study starts from the calculation of assets (sectors and gold) returns. Log returns are calculated using their contemporaneous prices and previous day prices through following formula:

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (1)$$

Where $R_{i,t}$ is the normal return for asset i at time t , $P_{i,t}$ is the current price of asset i at time t , and $P_{i,t-1}$ is the previous day price of asset i . These calculated asset returns are used for further empirical analysis.

3.2.1 Event study analysis: impact of political uncertainty on assets

Previous literature provides evidences of different methodologies to explore the impact of events on variables but among the most popular ones is an event study methodology which is widely used by researchers. Mahmood et al (2011), Chaudhary et al (2016) and Rosario and Chavali (2016) applied event study methodology to investigate the impact of different events on asset returns.

As discussed above and extracted from previous literature (Amihud and Wohl 2004; Baker et al 2016; Frijns et al 2012; Goodell et al 2015; Huang et al 2015; Jens 2017; Liu et al 2017), the current study measures political uncertainty through different political events. Thus, event study methodology is appropriate because it facilitates finding out the significant impact of any individual event as well as a group of events.

Estimation Procedure for Event Study Initially event study methodology requires identifying the events of interest. Events of interest of current study are discussed above in table 1. After the event identification, event study is conducted through following steps:

Defining windows Event study incorporates defining three types of windows; event window, estimation window, and post event window. Event window indicates the particular days of happening of an event while estimation window indicates the time frame before the event that is used to calculate expected returns. Expected returns of estimation window are further used to calculate the abnormal or excess returns during event window for analyzing the impact of event in particular days. Post event window is used to evaluate the extent of the impact of event and see how long it takes to wipe off the impact of event. Figure 1 indicates the sequence of these windows, where 0 is the event day.

Different researchers suggest different lengths for estimation, event and post



Fig. 1: Event Study Windows (Source: Authors own creation)

event windows according to the objectives of study. (Chaudhary et al (2016); Mahmood et al (2011); Pynnonen (2005); Rosario and Chavali (2016); Swarnalatha and Babu (2017)). Current study uses shorter windows due to brief time lapse between some events; some even happening within a month. So the estimation window for current study is 20 days from -4 to -24, event window is of 7 days from -3 to +3 days and post event window is of 5 days +4 to +8. Thus, current study is focusing on the short term effect of political events on asset returns. Baur and McDermott (2010) used 21 days to capture the impact of uncertain events.

Abnormal returns Abnormal returns are the difference between expected returns of assets and their actual returns, hence considered to be the indication of effect of the event. Assets having significant abnormal returns are considered to be influenced by the event. Expected and abnormal returns are calculated in different ways;

Market Model In market model, the expected return of assets is calculated through linear regression of asset return and the reference market return in following way:

$$R_{i,t} = \alpha_i + \beta_i * R_{mt} + e_{i,t} \quad (2)$$

Where $R_{i,t}$ is the return of asset i at time t, $R_{m,t}$ is the market return at time t, α_i is a constant, $f(e_{i,t})$ is the error term of the model and β_i indicates the sensitivity of asset return to the reference market return. Under market model, abnormal return is calculated as follows:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i * R_{m,t}) \quad (3)$$

Market adjusted model: In market adjusted model, return of market is considered as the expected return. Thus, the abnormal return of market adjusted model is the difference between return of asset i at time t $R_{i,t}$ and the market return at time t $R_{m,t}$. $f(E[R_i])$ is as follows:

$$AR_{i,t} = R_{i,t} - E[R_i] \quad (4)$$

where

$$E[R_i] = \frac{1}{n} \sum_{t=0}^{t=1} R_i \quad (5)$$

And $\frac{1}{n} \sum_{t=0}^{t=1} R_i$ is the average of returns during estimation window. Current study adopts mean adjusted model because the study incorporates real asset like gold which doesn't have any reference market to calculate expected returns. Adopting the mean adjusted model, current study initially calculates expected returns from the 20 days estimation window and then abnormal returns are estimated for event and post event window. Although abnormal returns are a crucial part of event study, inferences cannot be drawn on the basis of these abnormal returns only, especially when the study incorporates multiple events. Therefore, average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) are also calculated.

AARs and CAARs To highlight the significant impact of events on variables, average abnormal returns are calculated for each variable. Current study incorporates 21 political events which are categorized into two parts; economically political events (9 events) and socio political events (12 events). The average abnormal returns for each group of events are calculated by averaging the abnormal returns of asset for particular group. Formula for calculating average abnormal returns is as follows:

$$AAR_i = \frac{1}{n} \sum_{i=1}^n AR_i \quad (6)$$

Where AAR_i is the average abnormal return of asset i, AR_i is the abnormal return of asset and n is the number of events. The analysis of average abnormal returns facilitates highlighting whether assets generate abnormal returns during any uncertain event, thereby evidencing the impact of event on variable. Further CAARs (cumulative average abnormal returns) are estimated for each type of events for analyzing returns behavior surrounding the event. CAARs are estimated through following formula:

$$CAAR_i = \sum_{i=1}^t AAR_i \quad (7)$$

Where $CAAR_i$ is the cumulative average abnormal return of asset i , AAR_i is the average abnormal return of asset, i and t is the time of event or post event window. The significance of CAARs allows investors to decide whether the asset generates abnormal returns during a particular event or not.

Significance test of AARs and CAARs Reliable inferences are made on the bases of significance of average abnormal returns and cumulative average abnormal returns. Various test statistics are used for testing the significance of these returns. This study makes inferences on the basis of t-statistics calculated as;

$$t = \frac{AAR_i \text{ or } CAAR_i}{SD_i} \quad (8)$$

The calculated value of t-stats, greater than 1.96 in absolute terms or the probability value lower than 0.05, indicates the significant impact of events on variable. Hence, significant cumulative average abnormal returns of assets help identifying the answer for the question do political uncertainties influence assets returns?

3.2.2 Pearson correlation

Any asset could be considered as a portfolio diversifier if it exhibits zero or negative correlation with other assets in portfolio (Baur and Lucey 2010; Theron and Van Vuuren 2018). That's because correlation indicates the relationship between variables by specifying the change in one's magnitude causing a change in others magnitude either in opposite or same direction (Schober et al 2018). Hence, general correlation of gold with PSX sectors is explored through Pearson correlation.

3.2.3 Volatility modeling using event dummies

Simple correlation indicates general relationship among variables while varying relationships with surrounding conditions could be captured through volatility modeling (Baur and McDermott 2010). Moreover, the present study aims at exploring the behaviors of gold and evaluate whether it acts as a hedge or provides any safe haven to investors in comparison to traditional sectors returns, especially during uncertain political events. The goal is to guide investors about considering gold as a safe investment option to diversify the risk of political uncertainties.

GARCH Model: Hedge and Safe Haven during Political Uncertainties Current research incorporates political events as a measure of political uncertainty and (Baur and McDermott 2010) implemented the following model to investigate the safe haven and hedge characteristics of asset during crises periods;

$$R_{asseti,t} = a + b_t r_{stock,t} + e_t \quad (9)$$

$$b_t = c_0 + c_1 D(event_1) + c_2 D(event_2) + \dots + c_n D(event_n) \quad (10)$$

$$h_t = \pi + \alpha e_{t-1}^2 + \beta h_{t-1} \quad (11)$$

Above mentioned GARCH (1,1) model captures the impact of events on asset in relation to stock market returns to indicate whether the asset co-moves with the market during uncertain events. The equation of interest in this model is equation (2), which incorporates event dummies having values 1 when returns fall in the event period and zero at all other times. Main parameters of interest are the coefficients of this mean equation (2), where parameters c_1 to c_n indicate the presence or absence of safe haven character during particular events. If these parameters are negative; the asset acts as a strong safe haven during uncertain event. If the value is zero, it indicates that the asset is a weak safe haven. Positive values of parameters indicate that asset co-moves with the market and does not provide protection against uncertainties—thus investors should not incorporate such asset in their portfolios for diversification purpose.

The dummy variables in the above model require identifying and defining events under study—their starting date and length of time or the date of happening of an event (for one day events). Moreover, studies like the one carried out by (Iqbal 2017) also investigated the hedge and safe haven characteristics of gold incorporating an EGARCH model which allows capturing the leverage effect of volatilities during such events. Subsequently, following Baur and McDermott (2010) and Iqbal (2017), the proposed econometric model for capturing relation of gold with sectors return during political uncertainties is an EGARCH model because descriptive statistics (skewness coefficients; see Table 2) indicate that data distribution is asymmetric and asymmetric GARCH type models like EGARCH can accommodate the asymmetric characteristics of volatility (Chen et al 2019).

$$R_{gold,t} = \alpha + \beta_t R_{sectori,t} + e_t \quad (12)$$

$$\beta_t = C_0 + C_1 D(sociopoliticaevent) + C_2 D(economicallypoliticaevent) \quad (13)$$

$$\log(h_t) = \omega + \phi \frac{|e_{t-1}|}{\sqrt{h_{t-1}}} + \gamma \frac{e_{t-1}}{\sqrt{h_{t-1}}} + \lambda \log(h_{t-1}) \quad (14)$$

Where D indicates a time dummy having value of 1 for event day and zero otherwise. If parameters c_1 and c_2 have zero or negative values, gold is a safe haven during certain events. On the other hand, positive values of parameters indicate the co-movement of gold with particular sector, hence lacking the criteria of being a safe haven. Dummy variables incorporated in second equation are used having an interaction with sector returns because dummy variables without interaction term would be the pure dummies; these would indicate the change in golds return in an uncertain event compared to the normal situations, but would not indicate the relationship of gold with particular sector during that event. The coefficients and t-stats of c_0 indicate whether gold acts as a hedge for sectors, while safe haven characteristics are indicated through total effects of parameters c_1 and c_2 ; i.e. total effect of c_1 is the sum of c_0 and c_1 and total

effect of c_2 is the sum of c_0 and c_2 . Each parameter indicates results of particular political events. Parameter c_1 is for socio-political events and parameter c_2 is for economically political events. The significance of total effect of the certain parameter highlights the behavior of golds returns (weak safe haven, strong safe haven, no impact) during that event.

4 Results and discussion

4.1 Descriptive statistics

Table 2 indicates the presence or absence of ARCH effect in variables under study which helps to validate the implementation of proposed GARCH model if variables indicate the presence of ARCH effect. The table indicates that the p-value for all the variables is below 0.05, indicating the presence of ARCH effect.

Table 2: ARCH Effect

	F-stats	Obs.*R-squared	Prob. F(1,2716)	Prob. Chi-Square
Gold	49.08	48.24	0	0
AMAS	42.35	41.74	0	0
AMPA	581.7	479.4	0	0
CAEG	145.6	138.3	0	0
CMNT	14.71	14.64	0	0
CHEM	57.62	56.46	0	0
BANK	116.5	111.8	0	0
ENGR	11.99	11.94	0	0
FRTZ	3.92	3.92	0.05	0.05
FPCP	351.1	311.1	0	0
GACR	14.98	14.91	0	0
INSR	383.9	336.6	0	0
INVBNK	61.5	60.18	0	0
LEAS	177.6	166.8	0	0
LEAT	239.1	219.9	0	0
MISC	21.3	21.15	0	0
MODR	28.53	28.25	0	0
OGEC	27.91	27.65	0	0
OGMC	31.17	30.84	0	0
PABR	133.3	127.1	0	0
PHRM	38.34	37.84	0	0
PWGD	251.2	230.1	0	0
REFN	18.58	18.46	0	0
SUGR	45.05	44.35	0	0
SYAR	29.01	28.72	0	0
TECH	10.16	10.13	0	0
TEXC	59.01	57.8	0	0
TEXS	106.4	102.4	0	0
TEXW	69.42	67.74	0	0
TOBC	4.21	4.21	0.04	0.04
TRNS	71.3	69.53	0	0
VAAI	116.4	111.7	0	0
WOOL	102.3	98.67	0	0

Table 3 reports the descriptive statistics of the daily returns of variables under study. The results indicate that gold comparatively exhibit less acute negative and positive values compare to most of the other assets under study and have comparatively lower standard deviations. Kurtosis coefficients of all variables are greater than three and skewness coefficients for most of the variables are negative, indicating that distributions of returns have fatter tails and are asymmetrical.

Table 3: Descriptive Statistics Under Study

	Mean	Median	Std. Dev.	Min.	Max.	Skew.	Kurt.
Gold	0.0004	0.00042	0.0114	-0.0871	0.0888	-0.023	9.17
AMAS	0.00044	0.00063	0.0156	-0.0893	0.0647	-0.145	4.35
AMPA	0.00025	-0.0001	0.0179	-0.1459	0.1223	0.035	6.73
CAEG	0.00013	0.00041	0.0145	-0.0923	0.1185	-0.038	6.28
CMNT	0.00023	-0.0004	0.0175	-0.0776	0.1223	0.392	5.89
CHEM	0.00023	0.00069	0.0121	-0.0617	0.0436	-0.369	4.71
BANK	0.00005	-0.0005	0.0141	-0.0835	0.1012	0.174	7.7
ENGR	0.00002	0.00023	0.0142	-0.1008	0.127	-0.002	9.56
FRTZ	0.00023	-1E-05	0.0151	-0.2603	0.0511	-2.018	35.5
FPCP	0.00017	0.00042	0.0106	-0.1599	0.0409	-1.716	24.1
GACR	0.00022	0	0.0201	-0.1989	0.1846	0.274	13.3
INSR	-0.0002	0.00047	0.0152	-0.331	0.2465	-2.81	124
INVBK	-0.0003	-0.0003	0.0194	-0.1196	0.1537	0.195	8.13
LEAS	0.00007	-0.0005	0.0371	-0.1961	0.2812	0.325	7.85
LEAT	0.00041	-9E-05	0.0273	-0.166	0.228	0.433	11.1
MISC	0.00018	0.00049	0.0158	-0.159	0.0665	-0.498	8.93
MODR	0.00006	-0.0002	0.0192	-0.0989	0.1481	0.258	7.65
OGEC	0.00051	0.00019	0.0147	-0.1703	0.0487	-0.61	10.9
OGMC	0.00018	-0.0003	0.0145	-0.0757	0.1467	0.071	7.89
PABR	0.00016	0	0.0208	-0.1835	0.3445	1.675	45.5
PHRM	0.00045	0.00048	0.0137	-0.1022	0.0863	-0.104	5.6
PWGD	0.00003	-0.0012	0.0247	-0.1137	0.2208	0.942	8.84
REFN	-1E-05	-0.0002	0.0215	-0.4164	0.1988	-2.646	58.9
SUGR	0.00031	0.0003	0.0111	-0.069	0.0833	0.116	6.39
SYAR	0.00017	-0.0003	0.0219	-0.1488	0.1165	-0.068	9.18
TECH	0	-0.0005	0.0204	-0.2637	0.1215	-0.596	15.4
TEXC	0.00021	-7E-05	0.0132	-0.0783	0.0784	0.1	6.04
TEXS	0.00015	-0.0003	0.0145	-0.1082	0.0913	-0.007	8.38
TEXW	0.00054	0	0.0257	-0.2616	0.1747	0.098	13.8
TOBC	0.00091	0.00024	0.0166	-0.4355	0.0487	-6.629	177
TRNS	0.00031	-2E-05	0.0182	-0.0805	0.0942	0.121	5.22
VAAI	0.00061	0	0.0233	-0.1316	0.177	0.489	9.61
WOOL	-0.0004	0	0.026	-0.177	0.155	-0.041	5.73

Table 3 summarizes the descriptive stats of gold and the selected sectors of PSX under study incorporating mean, median, standard deviation, minimum, maximum, skewness and kurtosis for each asset.

4.2 Event study analysis

The impact of political uncertainties on gold and sectors is indicated through significant AARs and CAARs values which are presented in Table 4. Table 4

Table 4: AARs and CAARs of Gold and PSX Sectors

	Socio-Political			Economically-Political		
	AARs	CAAR	t-stats	AARs	CAAR	t-stats
Gold	-0.0041	-0.0062	-0.62	-0.0031	-0.0033	-0.93
AMAS	-0.001	-0.0077	-2.16**	0.0071	0.022	3.09***
AMPA	-0.0024	-0.0091	-0.64	-0.0095	-0.0111	-1.99**
CAEG	0.0005	-0.0028	-0.77	-0.0022	-0.0068	-1.52*
CMNT	0.0112	0.0111	0.64	-0.0006	0.0024	0.3
CHEM	0.0028	-0.0013	-0.38	-0.0044	0.0044	0.63
CEMF	0.0169	0.0211	1.12	-0.0125	0.0142	1.18
BANK	0.0067	0.0151	2.11**	-0.003	-0.0001	-0.02
ENGR	0.0048	0.0069	0.73	-0.0034	-0.0068	-2.05**
FRTZ	0.0064	0.0079	1.86**	-0.0019	0.0021	0.44
FPCP	0.0019	-0.0027	-0.73	-0.0008	-0.0026	-1.11
GACR	0.0108	0.0164	2.06**	0.003	-0.0035	-0.31
INSR	0.0029	0.0032	1.07	-0.0001	0.0104	3.27***
INVBK	0.01228	0.0168	1.05	-0.011	0.0034	0.46
LEAS	0.0153	0.0113	0.66	0.0059	0.047	3.01***
LEAT	-0.0061	-0.0654	-1.77**	0.0199	0.0198	1.44*
MISC	0.0021	0.0106	1.41*	-0.0066	0.0096	1.96**
MODR	-0.0019	0.0013	0.18	-0.0014	0.0072	1.98**
OGEC	0.0087	0.0224	2.98***	-0.0031	-0.0039	-0.46
OGMC	0.0066	0.014	2.13**	-0.0042	0.0085	1.84**
PABR	0.0017	0.0037	0.59	-0.0026	-0.015	-0.82
PHRM	0.0082	0.002	0.27	-0.0019	0.0115	2.60***
PWGD	0.0192	0.0391	1.02	-0.0052	0.0101	0.43
REFN	0.0055	0.0173	2.30**	-0.0011	0.0065	0.9
SUGR	0.0016	-0.006	-1.05	-0.0013	-0.0063	-1.08
SYAR	0.009	0.0017	0.24	-0.0016	-0.0011	-0.11
TECH	0.0041	0.0135	0.99	-0.0063	-0.0108	-1.64
TEXC	0.0099	0.004	0.88	0.0028	0.0044	1.11
TEXS	0.0017	0.0035	0.58	0.0051	0.0018	0.2
TEXW	0.004	-0.0022	-0.49	0.0003	0.0113	1.63*
TOBC	0.0014	0.002	0.41	-0.0051	-0.0054	-1.3
TRNS	0.0044	0.0119	1.58*	-0.0039	0.0055	0.81
VAAI	-0.0008	-0.0109	-0.92	0.0002	0.0132	0.9
WOOL	0.0085	0.0318	1.73**	-0.0025	-0.024	-1.22

shows that neither socio-political nor economically political events have any significant influence on gold. There are also some sectors of Pakistan Stock Exchange that are safe from the impact of both types of political uncertainties including Cement, Chemical, Food and Personal Care Products, Paper and Board, Power Generation and Distribution, Sugar, Synthetic and Rayon, Technology and Communication, Textile Composite, Textile Spinning, Tobacco, and Vanaspati and Allied Industries. Socio-political events are found to be significantly influential for Commercial Banks, Fertilizers, Glass and Ceramics, Oil and Gas Exploration Companies, Refinery, Transport and Woolen sectors while

economically political events are significantly influential for Automobile Parts and Accessories, Cable and Electric Goods, Engineering, Insurance, Leasing, Modarabas, Pharmaceutical and Textile Weaving sectors. On the other hand, Automobile Assembler and Parts, Leather and Tanneries, Miscellaneous, and Oil and Gas Marketing Companies are influenced by both types of political uncertainties. Results reported in the above table indicate that political uncertainties, in either type, influence most of the sectors of Pakistan Stock Exchange causing distress for investors. Since gold is safe from such influences, it could provide some protection to investors from losses caused by such uncertainties.

4.3 Pearson correlation

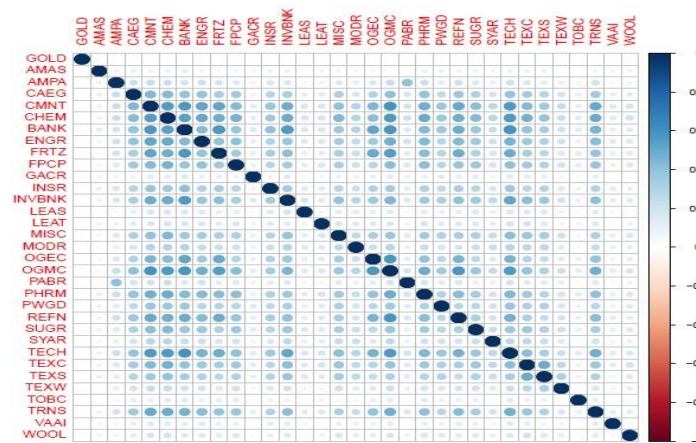


Fig. 2: Pearson correlation of Gold with PSX sectors

Figure 2 shows that gold exhibits either negative or almost zero correlations with all PSX sectors under study indicating gold's diversification characteristics. Further properties of gold are unveiled by investigating its hedge and safe haven characteristics during political uncertainties to find whether it should be considered as a portfolio diversifier by investors.

4.4 Volatility modeling: hedge and safe haven characteristics of gold

Table 5 incorporates the results for hedge and safe haven characteristics of gold against each sector. The coefficient value indicates the hedge, total effect indicates the safe haven characteristics, while total effect is the sum of coefficient and particular parameter.

Table 5: Hedge and Safe Haven Characteristics of Gold

	Coef. (p-value)	EPE T. effect (p-value)	SPE T. effect (p-value)
AMAS	0.00 (.022)**	-0.117 (.592)	-0.123 (.529)
AMPA	0.00 (.021)**	0.059 (.775)	-0.310 (.078)*
CAEG	0.00 (.022)**	0.001 (.997)	-0.055 (.772)
CMNT	0.00 (.018)**	0.018 (.935)	-0.152 (.257)
CHEM	0.00 (.017)**	0.085 (.690)	-0.587 (.061)*
CEMF	0.00 (.022)**	0.037 (.829)	0.035 (.770)
BANK	0.00 (.022)**	0.011 (.983)	0.039 (.811)
ENGR	0.00 (.021)**	-0.056 (.729)	-0.168 (.360)
FRTZ	0.00 (.019)**	0.005 (.988)	-0.298 (.044)**
FPCP	0.00 (.020)**	0.063 (.915)	-0.352 (.057)*
GACR	0.00 (.025)**	-0.201 (.337)	0.039 (.809)
INSR	0.00 (.024)**	-0.006 (.987)	0.207 (.446)
INVBNK	0.00 (.022)**	0.066 (.616)	0.032 (.849)
LEAS	0.00 (.021)**	0.022 (.947)	-0.057 (.296)
LEAT	0.00 (.019)**	-0.169 (.313)	-0.350 (.242)
MISC	0.00 (.021)**	0.082 (.607)	0.209 (.267)
MODR	0.00 (.023)**	0.106 (.736)	-0.013 (.941)
OGEC	0.00 (.022)**	0.027 (.958)	0.056 (.741)
OGMC	0.00 (.021)**	0.046 (.925)	-0.210 (.170)
PABR	0.00 (.019)**	0.063 (.853)	0.146 (.604)
PHRM	0.00 (.025)**	-0.002 (.994)	-0.294 (.022)**
PWGD	0.00 (.021)**	-0.083 (.576)	0.019 (.773)
REFN	0.00 (.020)**	-0.006 (.981)	-0.112 (.261)
SUGR	0.00 (.021)**	0.004 (.994)	-0.118 (.675)
SYAR	0.00 (.021)**	-0.083 (.576)	-0.275 (.078)*
TECH	0.00 (.021)**	0.016 (.956)	0.071 (.660)
TEXC	0.00 (.022)**	-0.035 (.915)	-0.072 (.624)
TEXS	0.00 (.022)**	-0.058 (.810)	0.140 (.454)
TEXW	0.00 (.021)**	0.084 (.629)	0.081 (.420)
TOBC	0.00 (.020)**	-0.011 (.976)	-0.075 (.545)
TRNS	0.00 (.022)**	-0.020 (.944)	-0.007 (.948)
VAAI	0.00 (.020)**	-0.095 (.945)	-0.047 (.784)
WOOL	0.00 (.030)**	0.024 (.891)	-0.093 (.091)*

*** 1%, ** 5%, * 10% critical values. EPE= economically political events, SPE =Socio-political events.

Table 5 indicates that the hedge coefficients for all sectors under study are significant at 5 percent significant level indicating that Gold acts as a hedge for PSX sectors. Total effects of economically political events for all sectors and of socio-political events for most of the sectors are not found to be significant depicting that gold does not act as a safe haven for most of the sectors under study. Total effects of socio-political events for Automobile Parts and Accessories, Chemical, Fertilizer, Food and Personal Care Products, Pharmaceuticals, Synthetic and Rayon, and Woolen sectors are found to be significant and negative, implying that gold acts as a safe haven for these sectors during socio-political events. Results reported in table 5 indicate that gold not only acts as a hedge for PSX sectors in normal conditions, but it also acts as a safe haven during political uncertainties for many sectors listed on Pakistan Stock Exchange. These findings are consistent with the findings of [Ahmad et al \(2017\)](#), [Akbar et al \(2019\)](#), [Aftab et al \(2019\)](#), [Iqbal \(2017\)](#), and [Rasheed et al](#)

(2021) indicating the hedge and safe haven characteristics of gold during various economic, market and political uncertainties in Pakistan.

According to [Baur and McDermott \(2010\)](#), assets are the best diversifiers when they hold little or no correlations with other assets in the portfolio. Based on such findings, the results of current study indicate the diversification potential of gold; zero values for hedge coefficients, negative values for total effects and all other insignificant values clearly indicate that gold doesn't exhibit any correlation with most of the sectors of PSX except for some where it holds negative correlations. These findings indicate that in Pakistan, gold does not co-move with the sectors of PSX suggesting that if these sectors are hit by political uncertainties leading to loss of investment returns, then gold can provide them protection in such circumstances. Therefore, incorporating gold in their asset allocation strategy could generate diversification benefits for Pakistani investors. Findings suggest that investors investing in Pakistan Stock Exchange, or any sector, must consider gold as a diversifier to design a best diversified portfolio.

5 Conclusion

Highly (politically) unstable economies create highly uncertain investment environment as well; subsequently, investors in such economies always seek for some safe investment options. As Pakistan is among one of the most (politically) unstable economies, it's crucial that Pakistani investors be aware of which sectors of the Pakistan Stock Exchange are more prone to the risk of political uncertainties and which safe alternative to use to diversify such risk. In this regard, the current study explored the impact of political uncertainties on sectors of PSX and Gold using event study analysis. The properties of gold as a diversifier are investigated through volatility modeling to see if it acts as a hedge and safe haven for different sectors of Pakistan Stock Exchange. Impact of political uncertainties is investigated through two types of political events; economically political events like budget announcements and socio-political events that have a direct or indirect impact on society. Event study analysis indicate that gold is not influenced by any type of political events under study while most of the sectors of Pakistan Stock Exchange are significantly influenced by either socio-political events, economically political events or both. Sectors that are an exception to the political uncertainty include Cement, Chemical, Food and Personal Care Products, Paper and Board, Power Generation and Distribution, Sugar, Synthetic and Rayon, Technology and Communication, Textile Composite, Textile Spinning, Tobacco, and Vanaspati and Allied Industries.

Volatility modeling indicates that Gold acts as a hedge for all sectors under study and it also acts as a safe haven for Automobile Parts and Accessories, Chemical, Fertilizer, Food and Personal Care Products, Pharmaceuticals, Synthetic and Rayon, and Woolen sectors for socio-political events. Zero values for hedge coefficients and negative significant values of total effects indicate that gold doesn't hold any significant correlation with most of the sectors of Pakistan Stock Exchange. The insignificant values indicate that it does not co-

move with the other assets under study during such uncertainties. According to [Baur and McDermott \(2010\)](#), asset exhibiting insignificant relationship indicates the absence of co-movement with the other asset so it could be considered as a diversifier. Hence, results indicate that gold could be considered as a best diversifier for diversifying the risk of political uncertainties in Pakistan. Findings suggest that investors in Pakistan must hold highly diversified portfolios by incorporating real assets like gold that provide diversification benefits during political uncertainties. As most of the sectors are prone to the risk of political uncertainties, investors should not just rely on stock investments; rather, they must consider other safe assets like gold for diversification purpose so that if stock exchange is hit by political events and they face loss in their returns, it can be mitigated by gold returns.

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Table 6: Appendix: Description of Sectors Under Study

Name of Sector	Abbr.	Tot. Cos	Included
Automobile Assembler	AMAS	12	12
Automobile parts & accessories	AMPA	10	10
Cable and electric goods	CAEG	7	7
Cement	CMNT	22	20
Chemical	CHEM	27	27
Commercial banks	BANK	21	21
Engineering	ENGR	18	14
Fertilizer	FRTZ	6	6
Food & personal care products	FPCP	24	16
Glass and Ceramics	GACR	9	9
Insurance	INSR	29	24
Inv. Banks/ Inv. Cos./ Securities Cos.	INVBK	28	25
Jute	JUTE	2	0
Leasing companies	LEAS	10	8
Leather & tanneries	LEAT	5	4
Miscellaneous	MISC	23	18
Modarabas	MODR	30	22
Oil and gas exploration companies	OGEC	4	4
Oil and gas marketing companies	OGMC	8	8
Paper and board	PABR	10	8
Pharmaceutical	PHRM	12	11
Power generation and distribution	PWGD	19	19
Refinery	REFN	4	4
Sugar and allied industries	SUGR	28	27
Synthetic and Rayon	SYAR	10	7
Technology and communication	TECH	13	11
Textile composite	TEXC	53	40
Textile spinning	TEXS	67	60
Textile weaving	TEXW	11	9
Tobacco	TOBC	3	3
Transport	TRNS	5	4
Vanaspati & Allied Industries	VAAI	2	2
Woolen	WOOL	2	2
Real Estate	REIT	1	0
Investment Trust			