Is Gold a Hedge and Safe Haven during Political Uncertainties?

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Abstract

Technological advancements not only bolstered almost all activities, but also accelerated the spread of information in blinks. Thus, announcements about market volatilities along with subpar financial instruments' performance have led investors to search for alternative assets to cope with amplified uncertainties. Investors in politically unstable economies, like Pakistan, are more prone to the risks of uncertainties so require some safe investments. Previously gold has been investigated as a hedge and safe haven during various economic and market conditions but literature lacks investigation of gold during political uncertainties. So by investigating the role of gold as a hedge and safe haven during political uncertainties against sectors of Pakistan Stock Exchange (PSX), the current study not only contributes to literature, but also contributes to the knowledge of Pakistani investors and asset managers that whether they should consider gold as a diversifier or not. The study incorporates daily gold prices (gold bullion Pkr. per Tola), daily stock prices of PSX sectors and political events of Pakistan for a time span of 2009 to 2019. Appling EGARCH with quantile dummies and event dummies, findings indicate that gold acts as a hedge and safe haven against the stock market and most of its sectors in normal as well as politically uncertain situations. Thus, Pakistani investors must consider gold in asset allocation strategies for having an optimal portfolio that can cope with the risk of acute market conditions and political uncertainties. Findings of current study facilitate Pakistani investors, investment advisors and asset managers to make healthy investment decisions and enjoying the benefits of diversification through inclusion of gold in their portfolios.

Keywords: *Asset allocation, gold, stocks, political uncertainty, hedge, safe haven, EGARCH*

JEL Classification: *C32, C58, D72, G10, G11*

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1. Introduction

"When information becomes available about a cataclysmic event-like a terrorist or military attack-investors often flee the market in search of safer financial instruments and panic selling ensues" (Chen & Siems, 2004, p. 349).

Increased globalization, leading to amplified uncertainties has compelled investors to search for safe alternatives (Kaplan, 2015). This emerging need has also drawn the attention of researchers and asset managers to investigate some safe alternative investment options that could provide protection to investors amid uncertainties (Vicente, Cerezetti, Faria, Iwashita & Pereira, 2015). Although investment environments are always surrounded by different risks like economic uncertainties, financial uncertainties, policy uncertainty etc. but the current study is mainly focusing on acute market conditions and political uncertainties. Acute market conditions are when stock market drops significantly at its lowest levels i.e. when it exceeds certain threshold given by lowest 1%, 5% and 10% quantile of the return distribution (Baur & McDermott, 2010; Iqbal, 2017). While political uncertainty implies the lack of assuredness (Pastor & Veronsei, 2012) and the possibility of an unanticipated political event that may cause significant influence on the benefits of investments (Osei-Assibey, 2016).Political uncertainties are mostly found to lead negative stock market reactions (Symon, 2018; Pastor &Veronsei, 2012; Kelly, Pastor & Veronsei, 2016; Luo, Chen & Wu, 2017) hence, increased number of political events across countries has illuminated the need for investigating the role of different assets during political uncertainties (Taimur & Khan, 2015). At the same time, the growing importance of commodities i.e. agricultural commodities as well as metals like gold, silver, platinum etc. have attracted investors to investigate the role of such alternatives as a safe option during such turmoil (Batten, Ciner & Lucey, 2010) because assets that reduce portfolio's variance while retaining their average returns are most desirable by investors, and such diversification property is enhanced by assets with negative correlation to each other (Iqbal, 2017; Rasheed, Ahmad, Javid & Khawaja, 2021). In this regard, Baur and Lucey (2010) and Baur and McDermott (2010) investigated gold as a hedge and a safe haven amid different economic uncertainties and following these researchers' various studies have investigated the role of gold as a hedge and safe haven amid market and economic turmoil in different international markets. But no evidence in literature is found for investigating the behavior of gold amid political uncertainties.

1.1 Maximum diversification portfolio

Current study unveils the diversification potential of gold for traditional stock portfolios. The concept of diversification termed as "the only free lunch in finance" is implemented by various portfolio allocation strategies including Minimum Variance Portfolio, equally weighted Portfolio, a Tangent (Maximum Sharp ratio) portfolio and

Most diversified (MD) Portfolio, while greater diversification is exhibited through MD portfolio comparatively (Theron & Vuuren, 2018).Choueifaty and Coignard (2008) introduced the Maximum Diversification (MD) portfolio approach that focuses on creating a portfolio as diversified as feasible by incorporating negligibly correlated assets, resulting in higher returns and lower risk levels comparative to other traditional strategies. Maximum diversification portfolio strategy is found to be more effective than other portfolio strategies (Theron & Vuuren, 2018).

1.2 Political stability of Pakistan

Based on World Bank's identified factors including transfer of government power, violent demonstrations, armed conflict, social unrest, international tensions, terrorism, religious and regional conflicts, Pakistan is ranked at 189th position among 195 countries at a global ranking for political stability by World Bank (World Bank, 2019). Although it is going to be an emerging market through its economic developments during recent years (World Bank, 2019) but still unsuccessful to be stable politically.

As mentioned above, stock markets are highly influential for political events, so how could a country that has a long history of political instability be a different case? Hence, investors in countries like Pakistan face political uncertainties more frequently that causes distress and doubts about their future returns. But despite the increasing popularity of alternative investments, although the majority of investors in developed nations are already becoming aware of the diversification benefits of these (Jacobs, Muller & Weber, 2014), but situation is quite different in emerging economies. So, investors in emerging economies like Pakistan need such investigations more critically. Therefore, current study contributes well in literature as although gold has been investigated during acute market conditions in different international markets but rare evidence is found in Pakistan as well as gold has never been investigated during political uncertainties, so it also contributes significantly to the knowledge and awareness of individual investors in Pakistan that whether they should consider gold to diversify their portfolios.

2. Literature Review

Literature documents the impact of political uncertainties on stock returns (Pastor & Veronsei, 2013; Taimur& Khan, 2015; Kelly et al., 2016) and also documents evidence for investigating the role of alternative investments like Oil (Tiwari, Suleman, Ullah & Shahbaz, 2021; Tiwari Nasreen, Ullah & Shahbaz, 2020), crypto-currencies (Huynh, Shahbaz, Nasir & Ullah, 2020) and commodities (Iqbal, 2017) to mitigate the risk of such uncertainties. Among all other commodities and especially precious metals, gold and silver has gained amplified attention from investors (Batten et al.,

2010) due to positive returns of portfolios by inclusion of commodity contracts to financial investments (Creti, Joets& Mignon, 2013).

2.1 Gold as a hedge and a safe haven

"The beauty of gold is; it loves bad news" (Harry, 1996).

Gold has been considered as a mean of exchange and a store of value for millennia, but it's worth as a hedge and a safe haven has been increased after certain evidences from literature against economic downturns and financial losses (Capie, Mills & Wood, 2005). An asset is considered as a hedge that exhibits negative (strong hedge) or no (weak hedge) correlation with other assets on average, and considered as a safe haven that exhibits negative (strong) or no (weak) correlation with other assets during certain conditions (Baur & McDermott, 2010).

The behavior of gold has been investigated against various assets and varying economic and market conditions, like stocks, bonds, oil (Baur & Lucey, 2010; Barunik, Kocenda &Vacha, 2016), inflation, exchange rate risks (Iqbal, 2017; Batten et al., 2010) etc. Contradictory views prevail about the hedge and safe haven characteristics of gold during uncertainties, like Ampomah, Gounopoulos and Mazouz (2014) states that although gold provides protection to investors during negative economic conditions but the safe haven and hedging characteristics of gold are not consistent during varying uncertain conditions. Similarly, Choudhry, Hassan and Shabi (2015) argue that gold's performance as a safe haven may decline during periods of financial crisis due to bidirectional interdependence between stock returns and gold returns. On the other hand, Bredin, Conlon and Poti (2015) state that although gold acts as a hedge for equity investors but it's safe haven characteristics are further established during financial crises periods. Choi and Hammoudeh (2010) found decreasing conditional correlations among commodities and stock returns, thus having 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. Low and Faff (2016) indicate that investors seeking for protection of their assets against exceedingly volatile market conditions should invest in precious metals as these are the better options to diversify the risk of portfolio. So in light of these studies, the current study aims at investigating the role of gold during political uncertainties.

2.2. Political uncertainties and stock returns

The impact of political uncertainty on asset prices, volatility and financial market movements have been documented by many empirical studies (Baker, Bloom and Davis, 2016; Jens, 2017; Goodell, McGroarty & Urquhart, 2015; Liu, Shu &

Wei, 2017). Pastor and Veronsei (2013) found stocks to be more volatile amid higher political uncertainty because of fluctuating markets' expectations. Similarly, Goodell et al. (2015) state that political uncertainty rises with election due to vagueness about future macroeconomic policies, because government spending policies change with the change of government so having significant influence on financial markets (Belo, Gala & Li, 2013). A significant drop in stock prices is documented by Liu et al. (2017) during a political event; the Bo Scandal., in China. Nazir and Anwar (2014) and Murtaza, Abrar and Ali (2015) studied the impact of political events on Pakistan stock market and indicated a significant negative impact of political events on stock market returns. Similarly, Ghufran, Awan, Khakwani and Qureshi (2016) reported political uncertainty as a significant factor causing stock market volatility in Pakistan.

All above studies indicate the impact of political uncertainty on stock markets but no one provides the mitigating measure. On the other hand, gold has been investigated during various conditions but no evidence is found for its behavior during political uncertainty. So following research questions are proposed; does gold act as a hedge or a safe haven during acute market conditions in Pakistan? And does gold act as a hedge or a safe haven during political uncertainties? The first question addresses the general relationship of gold with PSX and its sectors during declining market, while then the relationship is investigated more specifically during political uncertainties.

3. Research Methodology

3.1. Data description and selected sample

The study uses share prices of firms listed on PSX, prices of KSE-100index, prices of Gold bullion and history of political events of Pakistan. The financial information of listed firms and KSE-100index is collected from official website of PSX. Data for daily gold prices (gold bullion PKR. per Tola) is obtained from goldrates.pk (https://goldrates.pk) while data on political events of Pakistan is collected from ABC News. The time span of 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 33 sectors due to the limitation of data availability of 2 sectors. Among the selected sectors, 471 companies are included out of a total of 543 listed companies on PSX, hence representing more than 85% of the population. Each variable contains 2719 values for daily data.

Initially, most of studies in this area were unable to isolate political uncertainty from economic uncertainty (Kelly et al., 2016), due to the issue of endogeneity (Ullah, Akhtar &Zaefarian, 2017; Ullah, Zaefarian& Ullah, 2020), thus policy uncertainty was widely employed as a proxy for political uncertainty in literature. But now political

uncertainty is measured through different approaches like policy uncertainty (Baker et al., 2016), elections (Jens, 2017; Goodell et al., 2015), political news (Amihud& Wohl, 2004), political scandals (Liu et al., 2017), political crises like riots, protests (Huang, Wu, Yu & Zhang, 2015), budget announcement (Edirisinghe, 2017; Khan, Baig, Usman, Shaique& Shaikh, 2017), expected events (Kelly et al., 2016) etc. In light of these studies, the current study is considering political announcements like budget announcements, political news, protests and change in government, either through elections or an unanticipated change due to legal verdict, as a measure of political uncertainty. A total of 21 political events are selected which are divided into two parts; economically political events like budget announcements, and socio-political events like any political event having direct or indirect exposure to society.

Table 1 indicates the political events selected in light of previous relevant studies like; Jens (2017) indicate that the impact of political uncertainty must be measured through political events like election rather than broader uncertainty index. Khan et al. (2017) indicate that budget announcements are the part of political events because transformation of governments causes changes in budget policies which influence stock prices. Belo et al. (2013) indicate that political uncertainties related to governments' spending policy have significant impact on stock returns, due to the inherent uncertainty about government's spending policy decisions associated with its fiscal and monetary policy (Liu et al., 2017). Goodell et al. (2015) indicate that although political events like elections are not the unanticipated events but the associated unanticipated change in future macroeconomic policy creates uncertainty and causes stock market volatility due to frequently revising investors' expectations. Tirtiroglu, Bhabra and Lel (2014) indicate that political events explain the volatility patterns of stock market because investors adopt a "wait and see" attitude due to the increased political uncertainty, and such uncertainty keeps rising due to fluctuating public's expectations about the forthcoming political event before it actually happens. So in light of all the above mentioned studies, the political events mentioned in Table 1 help capturing the impact of political uncertainty in Pakistan.

Table 1: List of Political Events in Pakistan

Date	Event
Jun11, 2009	Budget Announcement
Apr 8, 2010	18th Amendment in Constitution.
Jun 19, 2010	Budget Announcement
Jan 4, 2011	Assassination of Governor of Punjab; Salman Taseer.
Jun3, 2011	Budget Announcement
Jun19, 2012	PM Yousaf Raza Gillani's Disqualification

May 11,2013	General Elections
Jun 11, 2013	Budget Announcement
Sep 9, 2013	Presidential Elections: Mamnon Hussain elected as president.
Jun 3, 2014	Budget Announcement
Aug 13,2014	Long March and Sit-In by PTI and PAT
Jun5, 2015	Budget Announcement
Jun 15,2016	Budget Announcement
Jun 12,2017	Budget Announcement
Jul 28, 2017	PM Mian Nawaz Sharif's Disqualification
Jul 6, 2018	Nawaz Sharif sentenced to Jail
Jul 25, 2018	General Elections
Sep 4, 2018	Presidential Elections
Jun 11, 2019	Budget Announcement
Oct 27, 2019	Azadi March; Moulana Fazl-ur-Rehman
Dec 17, 2019	Musharaf sentenced for death

3.2 Asset returns

Current study is interested in exploring the behaviors of assets through their returns, thus log returns of all assets under study are calculated using following formula:

$$R_{i,t} = In[\frac{P_{it}}{P_{it}-1}]$$

Where R_{it} is the return for asset i at time t, P_{it} is the current price of asset i at time t, and P_{it-1} is the previous day price of asset i. Graphical representation of gold prices in comparison to stock prices is depicted in Figure 1.

Figure 1 indicates the relationship between gold and KSE 100 index; showing a negative relationship between both assets at most of the points under study. The graph indicates that both assets do not co move with each other except for a very short period of time where both are showing an increasing trend. Otherwise in rest of years, both are moving in quite different directions like at the starting years both are indicating an increasing trend specifying the favorable market conditions for both assets. Although initially gold indicated more positive trend but it then showed fluctuations and then a downward trend while stock exchange still indicated an increasing trend though at a comparatively slower pace. Hence having quite opposite movements indicate that both assets exhibit different behaviors during varying market conditions and apparently both assets do not co-move with each other. Such opposite behavior of both assets create diversification benefits in portfolios for investors.
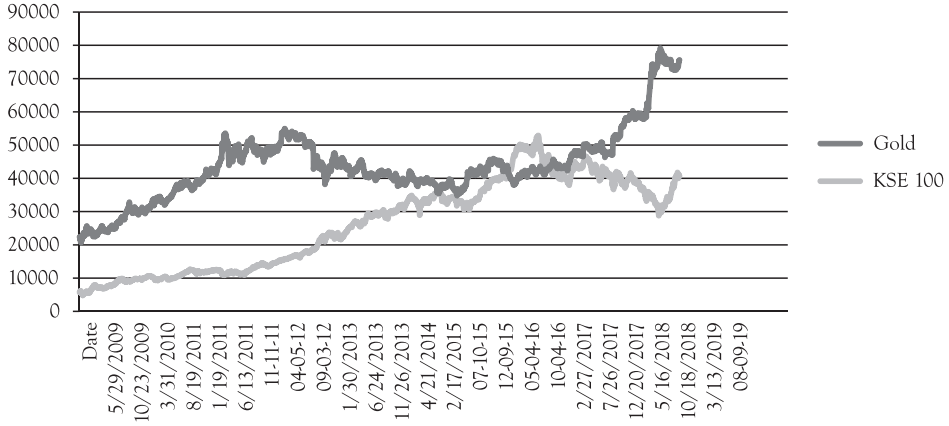
Figure 1: Behavior of Gold and KSE 100 index from 2009 to 2019

3.3. Volatility modeling using quantile dummies

According to Baur and McDermott (2010) an asset holding hedge characteristic provides protection on average i.e. in normal circumstances and can co move with the other asset in uncertain or acute conditions. On the other hand, there is a possibility that some assets co move in normal conditions but negatively correlate in extreme conditions or uncertainties. Researchers like Baur and Lucey (2010), Baur and McDermott (2010, 2016) and Iqbal (2017) implemented GARCH models to investigate such hedge and safe haven characteristics of assets because simple correlations and conditional correlations indicate the general relations among variables. So, following Baur and Lucey (2010), Baur and McDermott (2010; 2016) and Iqbal (2017) the econometric model for investigating the safe haven and hedge characteristics of gold during acute market conditions, is as follows (Model 1):

$$R_{gold_{i,t}} = \alpha + \beta_t R_{each\ other\ asset,\ t} + \varepsilon_t \tag{1a}$$

$$\beta_t = c_o + c_1 D(R_{each\ other\ asset,\ t}\ q_{10}) + c_2 D(R_{each\ other\ asset,\ t}\ q_5) + c_3 D(R_{each\ other\ asset,\ t}\ q_1) + c_4 D(R_{each\ other\ asset,t\text{-}1}\ q_{10}) + c_5 D(R_{each\ other\ asset,\ t\text{-}1}\ q_5) + c_6 D(R_{each\ other\ asset,\ t\text{-}1}\ q_1) \tag{1b}$$

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

Where $R_{gold\ i,t}$ is the return of gold, $R_{each\ otherasset\ i,t}$ is return of other assets. Above mentioned model is an EGARCH model with quantile dummies in which the relation between gold return and other assets' returns is modeled through equation 1a having α and β parameters that require estimation. ε_t represents the error term of the model. While in equation 1b, parameter β_t is modeled as a dynamic process in which c_1 to c_6 are the parameters capturing impact of acute market conditions on assets.

Acute market conditions are when stock market falls below a certain threshold

level i.e. at lowest 1%, 5% and 10% levels (Baur & McDermott, 2010; Iqbal, 2017). These extreme asset return movements are captured using quantile regression (eq. 1b):

$$\beta_t = c_o + c_1 D(R_{each\ other\ asset,\ t}\ q_{10}) + c_2 D(R_{each\ other\ asset,\ t}\ q_5) + c_3 D(R_{each\ other\ asset,\ t}\ q_1) + c_4 D(R_{each\ other\ asset,t-1}\ q_{10}) + c_5 D(R_{each\ other\ asset,\ t-1}\ q_5) + c_6 D(R_{each\ other\ asset,\ t-1}\ q_1) \quad (1b)$$

where; q_{10} indicates 10% quantile i.e. when stock market returns fall below its lowest 10% level, q_5 indicates 5% quantile i.e. returns falling below lowest 5% level, and q_1 indicates 1% quantile i.e. returns falling below lowest 1% level. These quantile are created as dummy variables (D) which is equal to 1 when asset return exceeds certain threshold of the return distribution, otherwise zero, at its contemporary and one period lagged returns. Then these dummy variables are incorporated in the equation after having an interaction with asset returns (R) because dummy variables without interaction term would be the pure dummies that indicate only the change in gold return at certain threshold level but would not indicate the relationship of gold with asset at that threshold level (Baur & McDermott, 2010).

Quantile regression provides a better picture of variable's dependence relationship than simple regression, through exhibiting the impact on dependent variable at different levels of independent variables. The independent variable is distributed into different quantile, each showing the impact at a certain threshold level, assuming that contemporaneous and lagged returns of independent variables (KSE-100index and its sectors) may have different impact on gold. The values and significance of coefficients illustrate the relationship at certain quantile.

The hedge and safe haven characteristics of gold could be inferred from resulting values of parameters. If sum of parameters c_1 to c_3 is negative (negative correlation) or equal to zero (no correlation), gold acts as a safe haven against the assets for their current values while if sum of parameters c_4 to c_6 is negative or equal to zero, gold acts as a safe haven against assets for their lagged values. Gold acts as a hedge against assets if c_o is having zero (weak hedge) or negative (strong hedge) values. Negative correlation of gold at extreme market conditions indicate that the price of gold increases at extreme market conditions so it can save investors from losses in such conditions and could be used as a diversifier in portfolios. Eq. (1c) is used to capture the asymmetric response of shocks to volatility of assets. The three equations; 1a, 1b and 1c are jointly estimated with Maximum Likelihood.

3.4. Volatility modeling using event dummies

As current research incorporates political events as a measure of political uncertainty so following Baur and McDermott (2010) the proposed model to investigate the safe haven and hedge characteristics of gold during political uncertainties is as

follows (Model 2):

$$R_{gold_{i,t}} = \alpha + \beta_t R_{each\ other\ asset,\ t} + \varepsilon_t \qquad (2a)$$

$$\beta_t = c_o + c_1 D(event1) + c_2 D(event\ 2) + \ldots\ldots\ldots + c_n D(event\ n) \qquad (2b)$$

$$\log(h_t) = \omega + \phi \frac{|e_{t-1}|}{\sqrt{h_{t-1}}} + \gamma \frac{e_{t-1}}{\sqrt{h_{t-1}}} + \lambda \log(h_{t-1}) \qquad (2c)$$

Where D indicates a time dummy having value of 1 for event day and zero otherwise. If parameters c_1, c_2 to c_n have zero or negative values, gold is a safe haven during certain event while positive values of parameters indicate the co-movement of gold with other asset, hence lacking the criteria of being a safe haven. Dummy variables incorporated in second equation are used having an interaction with asset returns because without interaction term the pure dummies indicate the change in gold return during political event compare to the normal situations but would not indicate the relationship of gold with other asset during that event. Eq. (2c) captures the asymmetric reaction of events to volatility of assets assuming that negative and positive events influence assets' returns differently. The three equations; 2a, 2b and 2c are jointly estimated with Maximum Likelihood.

4. Results and Findings

This section reports the results and findings of empirical analysis.

4.1 Descriptive analysis

Table 2 reports the descriptive statistics of the daily returns of variables under study indicating that gold exhibits less extreme negative and positive values compare to most of other assets under study and it has comparatively lower standard deviation. Kurtosis coefficients of all variables are greater than three and skewness coefficients are negative, indicating that distributions of returns have fatter tails and are asymmetrical, so EGARCH model is employed because asymmetric GARCH type models like EGARCH, APARCH, and GJR-GARCH are developed to accommodate the asymmetric characteristics of volatility (Chen, Zhang, Tao &Tan, 2019).

Table 2: Descriptive Analysis of Assets under Study

	Mean	Median	Std. Dev.	Min.	Max.	Skewness	Kurtosis
KSE	0.0007	0.0007	0.0107	-0.051	0.053	-0.13	5.63
Gold	0.0004	0.0004	0.0114	-0.087	0.089	-0.02	9.17
AMAS	0.0004	0.0006	0.0157	-0.089	0.064	-0.15	4.35
AMPA	0.0003	-0.0001	0.0262	-0.303	0.304	0.46	51.9

CAEG	0.0001	0.0004	0.0146	-0.092	0.119	-0.04	6.28
CMNT	0.0002	-0.0004	0.0175	-0.077	0.122	0.39	5.89
CHEM	0.0002	0.0007	0.0121	-0.061	0.044	-0.37	4.71
CEMF	0.0001	0.0004	0.0276	-0.398	0.143	-1.08	21.4
BANK	0.0001	-0.0005	0.0142	-0.083	0.101	0.17	7.70
ENGR	0.0000	0.0002	0.0143	-0.101	0.127	0.00	9.56
FRTZ	0.0002	0.0000	0.0152	-0.260	0.099	-2.02	37.4
FPCP	0.0002	0.0004	0.0106	-0.160	0.041	-1.72	24.1
GACR	0.0002	0.0000	0.0202	-0.199	0.185	0.27	13.3
INSR	-0.0002	0.0005	0.0153	-0.331	0.247	-2.82	124.1
INVBK	-0.0003	-0.0003	0.0195	-0.119	0.154	0.20	8.13
LEAS	0.0001	-0.0005	0.0372	-0.196	0.281	0.33	7.85
LEAT	0.0004	-0.0001	0.0273	-0.166	0.228	0.43	11.1
MISC	0.0002	0.0005	0.0159	-0.159	0.066	-0.50	8.93
MODR	0.0001	-0.0002	0.0193	-0.099	0.148	0.26	7.65
OGEC	0.0005	0.0002	0.0148	-0.170	0.048	-0.61	10.9
OGMC	0.0002	-0.0003	0.0145	-0.075	0.146	0.07	7.89
PABR	0.0002	0.0000	0.0209	-0.183	0.344	1.68	45.5
PHRM	0.0005	0.0005	0.0137	-0.102	0.086	-0.10	5.61
PWGD	0.0000	-0.0012	0.0248	-0.113	0.220	0.94	8.84
REFN	0.0000	-0.0002	0.0216	-0.416	0.198	-2.65	58.9
SUGR	0.0003	0.0003	0.0111	-0.069	0.083	0.12	6.39
SYAR	0.0002	-0.0003	0.0220	-0.148	0.116	-0.07	9.18
TECH	0.0000	-0.0005	0.0204	-0.263	0.121	-0.60	15.4
TEXC	0.0002	-0.0001	0.0132	-0.078	0.078	0.10	6.04
TEXS	0.0002	-0.0003	0.0146	-0.108	0.091	-0.01	8.38
TEXW	0.0005	0.0000	0.0257	-0.261	0.174	0.10	13.8
TOBC	0.0009	0.0002	0.0166	-0.435	0.048	-6.63	177
TRNS	0.0003	0.0000	0.0183	-0.080	0.094	0.12	5.22
VAAI	0.0006	0.0000	0.0234	-0.131	0.177	0.49	9.61
WOOL	-0.0004	0.0000	0.0260	-0.177	0.155	-0.04	5.73

4.2 ARCH LM test

Sjolander (2010) indicates that Engle's ARCH-LM test is mostly considered as a

standard test for detecting ARCH due to its simplicity. ARCH-LM test proposes the null hypothesis of no ARCH effect. So before empirical analysis, initially the presence of ARCH effect is tested in the variables under study through ARCH-LM test. Results reported in Table 3 indicate that the null hypothesis of absence of ARCH effect is rejected at 5% significance level because the p value for all the variables is below 0.05 indicating the presence of ARCH effect hence suggesting the use of GARCH model for capturing volatility and time variations in returns.

Table 3: Results for ARCH Effect

	F-stats	Obs.*R-squared	Prob. (1,2716)	Prob. Chi-Square
KSE	103.5	99.82	0.00	0.00
Gold	49.08	48.24	0.00	0.00
AMAS	42.35	41.74	0.00	0.00
AMPA	581.7	479.4	0.00	0.00
CAEG	145.6	138.3	0.00	0.00
CMNT	14.71	14.64	0.00	0.00
CHEM	57.62	56.46	0.00	0.00
CEMF	18.65	18.54	0.00	0.00
BANK	116.5	111.8	0.00	0.00
ENGR	11.99	11.94	0.00	0.00
FRTZ	3.92	3.92	0.05	0.05
FPCP	351.1	311.1	0.00	0.00
GACR	14.98	14.91	0.00	0.00
INSR	383.9	336.6	0.00	0.00
INVBNK	61.50	60.18	0.00	0.00
LEAS	177.6	166.8	0.00	0.00
LEAT	239.1	219.9	0.00	0.00
MISC	21.30	21.15	0.00	0.00
MODR	28.53	28.25	0.00	0.00
OGEC	27.91	27.65	0.00	0.00
OGMC	31.17	30.84	0.00	0.00
PABR	133.3	127.1	0.00	0.00
PHRM	38.34	37.84	0.00	0.00
PWGD	251.2	230.1	0.00	0.00
REFN	18.58	18.46	0.00	0.00

SUGR	45.05	44.35	0.00	0.00
SYAR	29.01	28.72	0.00	0.00
TECH	10.16	10.13	0.00	0.00
TEXC	59.01	57.80	0.00	0.00
TEXS	106.4	102.4	0.00	0.00
TEXW	69.42	67.74	0.00	0.00
TOBC	4.21	4.21	0.04	0.04
TRNS	71.30	69.53	0.00	0.00
VAAI	116.4	111.7	0.00	0.00

4.3 Hedge and safe haven during acute market conditions

Following tables indicate the results of EGARCH with quantile dummies, to highlight that gold acts as a hedge or a safe haven against stock market and its sectors. The equation of interest is;

$$\beta_t = c_o + c_1 D(R_{each\ other\ asset,\ t}\ q_{10}) + c_2 D(R_{each\ other\ asset,\ t}\ q_5) + c_3 D(R_{each\ other\ asset,\ t}\ q_1) + c_4 D(R_{each\ other\ asset,t\text{-}1}\ q_{10}) + c_5 D(R_{each\ other\ asset,\ t\text{-}1}\ q_5) + c_6 D(R_{each\ other\ asset,\ t\text{-}1}\ q_1)\ \ (1b)$$

Table 4 indicates the results of hedge coefficients (co), Table 5 indicates the safe haven effect for contemporaneous returns and Table 6 indicates the safe haven effect for lagged returns.

Table 4: Gold as a Hedge

	Coeff	t-stats	p-value
KSE	0.00**	2.00	0.05
AMAS	0.00*	1.75	0.08
AMPA	0.00**	1.96	0.05
CAEG	0.00**	1.92	0.05
CMNT	0.00**	2.16	0.03
CHEM	0.00*	1.86	0.06
CEMF	0.00*	1.79	0.07
BANK	0.00*	1.77	0.08
ENGR	0.00*	1.78	0.08
FRTZ	0.00*	1.88	0.06
FPCP	0.00*	1.87	0.06
GACR	0.00**	2.31	0.02

INSR	0.00*	1.70	0.09
INVBNK	0.00**	2.13	0.03
LEAS	0.00	1.29	0.20
LEAT	0.00	1.49	0.14
MISC	0.00	1.27	0.20
MODR	0.00**	2.31	0.02
OGEC	0.00	1.59	0.11
OGMC	0.00*	1.86	0.06
PABR	0.00**	2.12	0.03
PHRM	0.00**	2.33	0.02
PWGD	0.00**	2.25	0.02
REFN	0.00	1.44	0.15
SUGR	0.00	1.60	0.11
SYAR	0.00*	1.84	0.07
TECH	0.00	1.62	0.11
TEXC	0.00**	2.01	0.04
TEXS	0.00*	1.77	0.08
TEXW	0.00**	2.36	0.02
TOBC	0.00**	2.36	0.02
TRNS	0.00	1.55	0.12
VAAI	0.00**	2.36	0.02
WOOL	0.00*	1.85	0.06

***, **, * statistical significance at 1%, 5% and 10% levels respectively.

Table 4 indicates that gold acts as a hedge against stock market as well as most of the sectors. Among 33 sectors under study gold is found to be a hedge against 25 sectors while it is also found that gold does not hedge against some sectors like Leasing companies, Leather and Tanneries, Miscellaneous, Oil and Gas Exploration companies, Refinery, Sugar, Technology and Transport because the coefficients for these sectors are insignificant i.e. showing no relationship with gold. According to Baur and McDermott (2010) absence of relationship between assets also indicates the diversification benefits as both assets would behave differently in varying conditions. Hence, gold is found to provide protection to investors on average. Further its safe haven property is indicated in Table 5.

Table5: Gold as a Safe Haven

	0.10	t-stats	0.05	t-stats	0.01	t-stats
KSE	0.00	0.06	-0.03	-0.50	0.04	1.23
AMAS	-0.06	-1.65	-0.05	0.24	0.01	1.38
AMPA	-0.06*	-1.79	0.02	1.98	0.01	-0.27
CAEG	-0.06	-1.39	0.01	1.37	-0.03	-0.89
CMNT	0.03	0.80	-0.03	-1.53	0.03	1.70
CHEM	0.05	0.28	0.02	-0.18	0.01	-0.12
CEMF	-0.02	-0.89	0.01	1.23	-0.03*	-1.73
BANK	-0.06	-1.16	-0.05	0.21	0.03	1.71
ENGR	-0.07	-1.65	0.00	1.54	0.01	0.32
FRTZ	-0.03	-0.60	0.00	0.61	-0.02	-0.58
FPCP	0.00	-0.07	-0.07	-0.98	0.10	2.73
GACR	0.02	0.71	-0.01	-0.85	0.01	0.55
INSR	-0.08	-1.61	-0.02	1.13	-0.01	0.29
INVBNK	-0.04	-1.05	0.03*	1.77	0.00	-0.93
LEAS	-0.01	-0.48	-0.05*	-1.91	0.00***	2.73
LEAT	-0.03	-1.03	-0.05	-0.61	-0.02	1.36
MISC	-0.08**	-2.15	-0.02	1.38	-0.02	-0.06
MODR	0.04	1.26	-0.01	-1.47	-0.02	-0.26
OGEC	-0.05	-1.15	-0.04	0.31	-0.01	0.63
OGMC	-0.03	-0.79	0.02	1.20	0.03	0.12
PABR	0.02	0.58	-0.03	-1.26	0.01	1.51
PHRM	-0.01	-0.20	0.04	0.85	-0.03	-1.40
PWGD	0.00	0.00	-0.01	-0.30	-0.02	-0.31
REFN	-0.02	-0.79	-0.03	-0.16	-0.01	0.47
SUGR	-0.11*	-1.86	-0.01	1.50	-0.08	-1.01
SYAR	-0.05	-1.61	0.01	1.65	0.03	1.00
TECH	-0.08**	-2.38	0.02	2.61	-0.02	-1.01
TEXC	-0.05	-1.00	0.04	1.54	-0.04	-1.50
TEXS	0.04	0.95	-0.07**	-2.22	-0.02	1.25
TEXW	0.03	1.13	0.00	-1.10	-0.01	-0.29
TOBC	0.08	1.86	0.07	-0.19	0.01	-1.25
TRNS	-0.01	-0.30	-0.03	-0.46	0.00	0.84

VAAI	0.03	0.89	0.02	-0.27	-0.03*	-1.67
WOOL	0.01	0.26	-0.01	-0.70	-0.05	-1.33

***, **, * statistical significance at 1%,5%,10% level. The total effect is the sum of marginal effect and hedge coefficient.

Table 5 indicates the behavior of gold at three different threshold levels of each asset i.e. q_{10}, q_5 and q_1. It is found that it is a strong safe haven against Automobile Parts and Accessories, Miscellaneous, Sugar and Technology when returns of these sectors fall below 10% threshold level. Gold is a safe haven against Investment Banks, Leasing Companies and Textile Spinning when returns of these sectors fall below 5% threshold levels. Gold is found to be a strong safe haven against Close End Mutual Funds and Vanaspati and Allied industries and a weak safe haven against Leasing Companies when returns of these sectors fall below 1% threshold level. As all other sectors show insignificant relationship so having no relationship with these sectors, gold is still able to provide protection to Pakistani investors.

Table 6: Gold as a Safe Haven for Lagged Returns of Assets

	0.10	t-stats	0.05	t-stats	0.01	t-stats
KSE	0.05	0.67	0.06	0.13	0.05	-0.12
AMAS	-0.01	-0.13	-0.06	-0.88	-0.03	0.26
AMPA	-0.06*	-1.71	0.01	1.35	-0.08*	-1.86
CAEG	0.00	0.00	0.00	-0.08	0.06	0.74
CMNT	0.02	0.41	-0.05	-1.20	0.02	0.77
CHEM	0.01	0.22	0.01	-0.11	0.06	0.66
CEMF	-0.06*	-1.90	0.04	2.96	-0.05*	-1.92
BANK	-0.01	-0.27	-0.05	-0.55	-0.09	-0.31
ENGR	0.00	-0.02	0.04	0.72	0.02	-0.23
FRTZ	-0.05	-0.96	0.00	0.76	-0.01	-0.07
FPCP	-0.02	-0.29	0.10	1.36	0.15	0.29
GACR	0.04	1.01	-0.01	-1.02	-0.07	-0.99
INSR	0.00	0.00	0.05	0.65	-0.03	-0.62
INVBNK	-0.03	-0.85	0.00	0.53	0.00	0.04
LEAS	0.02	1.01	-0.01	-1.06	0.07	2.91
LEAT	0.02	0.37	-0.02	-0.73	-0.07	-1.29
MISC	0.00	0.04	0.04	0.58	0.09	0.54
MODR	0.01	0.39	-0.01	-0.58	-0.07	-0.66

OGEC	0.05	0.98	-0.02	-1.12	-0.40***	-4.25
OGMC	-0.04	-0.78	0.04	1.16	0.07	0.33
PABR	-0.02	-0.60	0.01	0.62	-0.09**	-2.12
PHRM	0.01	0.13	-0.10*	-1.69	-0.08	0.22
PWGD	0.00	-0.06	-0.01	-0.31	-0.10	-1.51
REFN	-0.05	-1.18	-0.10	-1.10	0.03**	1.89
SUGR	-0.02	-0.29	-0.11	-0.96	-0.13	-0.19
SYAR	0.01	0.37	0.01	-0.10	0.09	1.46
TECH	-0.01	-0.32	0.02	0.72	-0.03	-0.67
TEXC	0.03	0.57	-0.04	-0.91	0.00	0.31
TEXS	0.08	1.66	0.02	-0.94	0.09	0.67
TEXW	0.02	0.43	0.04	0.54	-0.03	-1.05
TOBC	0.05	0.87	0.02	-0.42	0.17	1.24
TRNS	-0.01	-0.27	0.07	1.44	0.07	0.04
VAAI	-0.01	-0.28	0.04	1.07	0.03	-0.03
WOOL	-0.02	-0.67	0.06	2.16	-0.02*	-1.80

***, **, * statistical significance at 1%,5%,10% level. The total effect is the sum of marginal effect and hedge coefficient.

The model also assumes that lagged returns of assets may also affect the gold returns so the safe haven behavior of gold at different threshold levels of lagged returns of assets is reported in Table 6. Table 6 indicates that gold behaves as a safe haven against Auto Mobile Parts and Accessories and Close End Mutual Funds when their lagged returns fall below 10% and 1% threshold levels, against pharmaceutical sector for returns falling below 5% level and against Oil and Gas Exploration Companies, Paper and Board, Refinery and Wool for lagged returns falling below 1% level. Presence or absence of leverage effect in variables under study is indicated in Table 7, which indicates that rare evidences are found for the presence of leverage effect (Υ).

Table 7: Coefficients of Variance Equation

	Ω	Φ	Υ	λ
KSE	-0.17***	0.11***	0.00	0.99***
AMAS	-0.17***	0.11***	0.00	0.99***
AMPA	-0.17***	0.11***	0.01	0.99***
CAEG	-0.17***	0.11***	0.00	0.99***
CMNT	-0.17***	0.11***	0.00	0.99***
CHEM	-0.17***	0.11***	0.00	0.99***

CEMF	-0.17***	0.11***	0.00	0.99***
BANK	-0.17***	0.10***	0.00	0.99***
ENGR	-0.17***	0.11***	0.00	0.99***
FRTZ	-0.17***	0.11***	0.00	0.99***
FPCP	-0.17***	0.11***	0.00	0.99***
GACR	-0.17***	0.11***	0.00	0.99***
INSR	-9.09***	0.29***	-0.09***	0.00
INVBNK	-0.17***	0.11***	0.01	0.99***
LEAS	-0.17***	0.11***	0.00	0.99***
LEAT	-0.17***	0.11***	0.01	0.99***
MISC	-0.17***	0.11***	0.00	0.99***
MODR	-0.17***	0.11***	0.00	0.99***
OGEC	-0.17***	0.10***	0.00	0.99***
OGMC	-0.17***	0.11***	0.00	0.99***
PABR	-0.17***	0.11***	0.00	0.99***
PHRM	-0.17***	0.11***	0.00	0.99***
PWGD	-0.17***	0.11***	0.00	0.99***
REFN	-0.17***	0.10***	0.01	0.99***
SUGR	-0.17***	0.11***	0.00	0.99***
SYAR	-0.17***	0.11***	0.00	0.99***
TECH	-0.17***	0.10***	0.00	0.99***
TEXC	-0.17***	0.11***	0.00	0.99***
TEXS	-0.18***	0.11***	0.00	0.99***
TEXW	-0.17***	0.11***	0.01	0.99***
TOBC	-0.17***	0.11***	0.00	0.99***
TRNS	-0.17***	0.10***	0.00	0.99***
VAAI	-0.17***	0.11***	0.00	0.99***
WOOL	-0.18***	0.11***	0.00	0.99***

***, **, * statistical significance at 1%, 5%, 10% level

4.4 Safe haven and hedge for political uncertainties

Second objective of current study is to explore whether gold provides any protection to investors in a politically instable economy by acting as a hedge or a safe haven against stock market and its sectors during political uncertainties. Hence the safe haven

characteristics of gold are highlighted during each type of events individually for each asset. Following tables indicate the results of EGARCH using quantile dummies.

	Hedge	Safe Haven	
	coefficient	Total effect EPE	Total Effect SPE
KSE	0.000**	0.022	-0.358**
AMAS	0.000**	-0.117	-0.123
AMPA	0.000**	0.059	-0.310*
CAEG	0.000**	0.001	-0.055
CMNT	0.000**	0.018	-0.152
CHEM	0.000**	0.085	-0.587*
CEMF	0.000**	0.037	0.035
BANK	0.000**	0.011	0.039
ENGR	0.000**	-0.056	-0.168
FRTZ	0.000**	0.005	-0.298**
FPCP	0.000**	0.063	-0.352*
GACR	0.000**	-0.201	0.039
INSR	0.000**	-0.006	0.207
INVBNK	0.000**	0.066	0.032
LEAS	0.000**	0.022	-0.057
LEAT	0.000**	-0.169	-0.350
MISC	0.000**	0.082	0.209
MODR	0.000**	0.106	-0.013
OGEC	0.000**	0.027	0.056
OGMC	0.000**	0.046	-0.210
PABR	0.000**	0.063	0.146
PHRM	0.000**	-0.002	-0.294**
PWGD	0.000**	-0.083	0.019
REFN	0.000**	-0.006	-0.112
SUGR	0.000**	0.004	-0.118
SYAR	0.000**	-0.083	-0.275*
TECH	0.000**	0.016	0.071
TEXC	0.000**	-0.035	-0.072
TEXS	0.000**	-0.058	0.140
TEXW	0.000**	0.084	0.081

TOBC	0.000**	-0.011	-0.075
TRNS	0.000**	-0.020	-0.007
VAAI	0.000**	-0.095	-0.047
WOOL	0.000**	0.024	-0.093*

Equation: $\beta_t = c_o + c_1 D(EPE) + c_2 D(SPE)$

***, **, *statistical significance at 1%, 5% and 10% levels respectively. Total effect is the sum of marginal effect and hedge coefficient, EPE= economically-political events, SPE= Socio-political events

Table 8 clearly indicates that gold act as a hedge against all of the assets under study during political uncertainties but it is also found that all the coefficients are zero, neither of them is negative. The zero coefficient indicates no correlation of gold with assets (weak hedge) while negative coefficients indicate negative or opposite relation of gold with assets (strong hedge). Results indicate that gold is found to be a strong safe haven against stock market returns, Automobile Parts and Accessories, Chemical, Fertilizers, Foods and Personal Care Products, Pharmaceuticals, Synthetics and Rayon, and Wool during socio political events in Pakistan. Strong safe haven characteristics of gold indicate that gold prices increases during socio political events when prices of other assets fall due to uncertain situations. All other assets are found to have insignificant relationship (no correlation) with gold during both types of political uncertainties in Pakistan, but no asset is found to have a significant positive relationship (co-movement) with gold during any uncertainty. So, findings suggest that gold could provide protection (Baur & McDermott, 2010) to Pakistani investors during political uncertainties as it does not indicate any co movement with Pakistan stock market or any of its sectors. Results of empirical analysis indicate that gold acts as a hedge against stock market and almost all of its sectors in normal conditions and it provides protection to investors during political uncertainties as well. Although the extent of protection differs with the differing relationship of each asset with gold, but the absence of co-movement of gold with any asset under study provides evidence of its diversification benefits for Pakistani investors' portfolios. Moreover, rare evidences are found for the presence of leverage effect (Table in Appendix). These findings are consistent with the findings of Iqbal (2017), Ahmed, Kashif and Feroz (2017), Aftab, Shah and Ismail (2019) and Akbar, Iqbal and Noor (2019) indicating the hedge and safe characteristics of gold during various economic and market conditions in Pakistan. Hence findings of current research contribute further that as gold has been found as a safe asset during market and economic downturns it is also found to be a safe asset during political uncertainties.

5. Conclusion and Recommendations

Investors surviving in instable economies are always at a risk of losing their returns, as Pakistan is among the most (politically) instable economies across globe so Pakistani investors are more prone to the risk of uncertainties. Due to increasing extent of uncertainties resulting from rapid changes in economic and political environments, investors seek for some safe investment options that can diversify the risk and help maintaining an optimal portfolio which is only possible if investors have a right combination of uncorrelated assets in their portfolios because uncorrelated or negatively correlated assets can provide protection against each other. Current study investigated the behavior of gold in comparison to Pakistan stock exchange and its sectors, to highlight the fact that whether gold can provide protection to investors during market downturns and political uncertainties so that they can consider gold as a diversifier for such uncertainties. Results from empirical analysis indicate that gold acts as a hedge against stock market and its sectors during normal conditions but acts as a safe haven during market down turns and against socio-political events for some assets only. But at the same time, it is also found that with rest of the assets it does not indicate significant positive relationship either during acute market conditions or political uncertainties, so it is not found to co move with any of these assets. Hence, either the presence of hedge and safe haven characteristics or the absence of co movements with assets under study, gold is found to provide protection to Pakistani investors and could save them during declining market and from the risk of political uncertainties. Thus, findings suggest gold as a diversifier during market or political uncertainties in Pakistan so investors in politically instable economies must consider gold for their asset allocation strategies to cope with the uncertainties of market downturns and political events.

Current research is limited to the investigation of behavior of one commodity against stock market and its sectors during political uncertainties. As political uncertainties are rising with the passage of time, researchers must explore other commodities and other non-traditional assets in this aspect so that investors in highly politically instable economies may have variety of safe options.

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Appendix:

Table I: Results for Leverage Effect of Model II

	Conditional Volatility			
	ω	ϕ	Υ	λ
KSE	-0.169***	0.106***	0.005	0.990***
AMAS	-0.169***	0.106***	0.003	0.990***
AMPA	-0.173***	0.107***	0.004	0.989***
CAEG	-0.173***	0.107***	0.004	0.989***
CMNT	-0.173***	0.107***	0.005	0.989***
CHEM	-0.173***	0.106***	0.004	0.989***
CEMF	-0.172***	0.106***	0.004	0.989***
BANK	-0.171***	0.106***	0.004	0.989***
ENGR	-0.172***	0.106***	0.005	0.989***
FRTZ	-0.173***	0.106***	0.005	0.989***
FPCP	-0.174***	0.107***	0.004	0.989***
GACR	-0.173***	0.107***	0.004	0.989***
INSR	-0.171***	0.106***	0.004	0.989***
INVBNK	-0.171***	0.106***	0.004	0.989***
LEAS	-0.171***	0.106***	0.004	0.989***
LEAT	-0.172***	0.106***	0.004	0.989***
MISC	-0.171***	0.106***	0.004	0.989***
MODR	-0.171***	0.106***	0.004	0.989***
OGEC	-0.171***	0.106***	0.004	0.989***
OGMC	-0.173***	0.107***	0.004	0.989***
PABR	-0.170***	0.106***	0.004	0.990***
PHRM	-0.175***	0.106***	0.005	0.989***
PWGD	-0.171***	0.107***	0.005	0.989***
REFN	-0.172***	0.106***	0.005	0.989***
SUGR	-0.171***	0.105***	0.005	0.989***
SYAR	-0.173***	0.106***	0.005	0.989***
TECH	-0.171***	0.106***	0.005	0.989***
TEXC	-0.171***	0.105***	0.005	0.989***
TEXS	-0.172***	0.106***	0.004	0.989***

TEXW	-0.170***	0.106***	0.004	0.990***
TOBC	-0.171***	0.106***	0.005	0.989***
TRNS	-0.171***	0.106***	0.005	0.990***
VAAI	-5.797***	0.344***	-0.078**	0.378***
WOOL	-0.174***	0.107***	0.003	0.989***