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Does Economic Policy Uncertainty Affect Stock Market Returns Equally in Different Sectors? An evidence from Emerging Capital Market

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ABSTRACT

This study spotlights the impact of Economic Policy Uncertainty (EPU) on stock returns in the Pakistan Stock Exchange (PSX) across six key sectors: cement, automobile assembler, automobile parts and accessories, engineering, oil and gas marketing, and refinery. Utilizing panel data from January 2015 to December 2023, the research employs EGARCH-Bivariate modelling to analyse the dynamic relationship between EPU and stock returns. The findings reveal a statistically significant correlation across all sectors, indicating that PSX investors often perceive uncertainty as an opportunity rather than a risk, favouring investments during downturns to secure future long-term profits. This research enhances the understanding of how uncertainty influences stock market performance in emerging economies like Pakistan. It provides critical insights for investors, policymakers, and market participants, aiding in portfolio management and strategic decision-making. The study contributes to the broader financial literature by shedding light on the relationship between EPU and market dynamics in emerging markets.

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Introduction

Finance determinants and economic indicators have long been recognized for their significant impact on the stock market. The stock market is the mirror of a country's financial system and is considered the hub of capital and financial market instruments. In recent years, particularly in emerging economies, understanding the sources of volatility in stock markets has gained increased attention due to global economic integration and policy shifts. Among the various factors posing threats to the functioning of the stock market, a notable one is economic policy uncertainty (EPU), which is emerging as a significant determinant that affects stock market behavior (Antonakakis et al., 2013; Xu et al., 2021; Nagpal, 2022). EPU refers to the ambiguity and lack of predictability surrounding economic policies, including fiscal, monetary, and trade policies. It arises due to changes in government regulations, political dynamics, and other macroeconomic factors that can deeply affect investor behavior and market outcomes (Bekaert and Hoerova, 2016; Menzly et al., 2004). However, previous studies claimed that investors and business decision-makers are unable to evaluate the risks, opportunities, and trade-offs if they are uncertain about governmental regulations (Marcus, 1981). Besides its impact on the stock market, policy uncertainty affects employment and causes instabilities in investment decisions (Bernanke, 1983). Thus, many scholars hypothesized that policy uncertainty negatively affects economic growth and stock returns (Gong et al., 2022; Antonakakis et al., 2013).

Due to government interventions and uncertainty in macroeconomic variables could affect employment, economic growth, foreign direct investment, and exports. This sort of scenarios effect EPU which resultantly cause in declining in the stock market returns and further account for sluggish economic recoveries (Ullah et al., 2023; Chiang, 2019). Although the majority of the research to date has focused on developed economies, a growing body of literature has started investigations on how economic policy uncertainty affects stock returns in developing economies. In this regard Qi et al. (2022) analyzed the Chinese stock market and found a significant negative nexus between policy uncertainty and stock returns and suggested that emerging economies are more vulnerable to policy changes and political instability, which validate the impact of uncertainty on stock market performance. South Asia, PSX facilitates savings mobilization, equity financing, and investment. The importance of PSX extends beyond national borders, attracting foreign investors due to its high growth potential, strong performance, transparency and governance through reforms and digitalization. Its inclusion in global indices like MSCI Emerging Markets has increased its visibility, making PSX a critical driver of economic development, innovation, and financial inclusion in Pakistan.

Pakistan's stock market based on its vibrant and growing nature, offers an interesting context to study the effect of EPU on stock yields. Pakistan has been confronted with substantial fluctuations in economic policies, political instability, and changes in government regimes unexpectedly. These factors contribute to an environment of heightened uncertainty. As a result of the uncertainty and market shocks, the stock market might be depressed by selling the equities and stocks that increase the market volatility. Moreover, in existing literature the impact of EPU on stock market returns is limited, particularly

regarding its effects across different sectors within emerging markets. This research gap presents an opportunity to explore whether EPU influences stock returns uniformly or if there are sector-specific variations. Firstly, this study fills the research gap in a particular area by examining the impact of EPU on stock returns in the context of Pakistan. In addition, to identify specific sectors within the PSX that are more sensitive to EPU. Furthermore, to analyze whether the impact of EPU on stock returns varies during periods of high and low uncertainty.

The study in hand is a novel work that aims to contribute to the existing body of knowledge on how EPU affects stock market returns, particularly in the context of emerging economies like Pakistan. Moreover, the study uses the correlation, unit root, and EGARCH-Bivariate modeling technique which are the methodological contribution in the context of Pakistan and for those countries that have similar governance settings. It will contribute to understanding the link between EPU and stock performance and provide incredible insights to investors, policymakers, and market players who can make informed decisions and change the strategies to navigate the challenges posed by uncertainty.

Section 1 presents the introduction of relationship between EPU and stock returns. The remainder of the study is organized as follows: section 2 highlights the existing state of the literature between EPU and stock returns. In section 3 the study describes the data, source and Methodological approach of the research. Section 4 presents the empirical results and discussion of the study. Conclusion and recommendations is presented in section 5 of this study.

Literature Review

This study draws upon the Risk-Return Tradeoff Theory and Behavioral Finance Theory to explain the sectoral impact of EPU on stock returns. According to classical finance theory, higher uncertainty increases perceived risk, which should typically lead to lower asset valuations (Black, 1976). However, the Risk Premium suggests that investors may demand higher returns to compensate for increased uncertainty, potentially causing short-term return spikes in certain sectors (Pastor and Veronesi, 2012). Moreover, Behavioral Finance suggests that in emerging markets like Pakistan characterized by information asymmetries and speculative trading investors may overreact or misinterpret policy signals, leading to sector-specific anomalies (Barberis et al., 1998). These theoretical perspectives support the heterogeneous impact of EPU across different sectors, as observed in our empirical results.

The impact of EPU on stock market returns have a matter of considerable interest among scholars and practitioners in the field of finance and economics. Understanding the nexus between EPU and stock market performance is crucial for investors, policymakers, and stock brokers, as it provides insights into the dynamics of market behavior and the implications for investment decisionmaking. This literature review aims to examine existing studies that have investigated the impact of EPU on stock returns. Many researchers

hypothesized that uncertainty affects employment (Julio and Yook, 2012; Rodrik, 1991; Gomado, 2024; Bahmani-Oskooee and Saha, 2019). Eventually, EPU can influence stock prices similarly. Li et al. (2016) mentioned that the link between EPU and stock prices didn't start to be conducted until the global economic disaster of 2008, even though the influence of EPU on many macroeconomic variables has been examined. A significant development in the literature attributed to Baker et al. (2016), the author made a significant impact by creating an EPU index that have applied in numerous investigations. The index is constructed upon the average of three primary indicators of uncertainty. Investors, decision-makers, and researchers have recently shown a strong interest in the implications of EPU on the stock market. Stock prices may fluctuate in one country due to unpredictability in another country. Likewise, Kaur and Singla (2023) explored the BRICS nations using data from January 2004 to December 2020 and QARDL was utilized for empirical results. Kaur and Singla (2023) discovered that the bond test shows the long term cointegration commodity prices and all stock returns. Furthermore, the evidence shows that short run metal and oil rates have substantial asymmetric impact on all BRICS stock market returns but there is no cointegration found in gold prices and stock returns in short run.

However, Momin and Masih (2015) used an autoregressive distributed lag model to analyze the effects of US Policy uncertainty on the stock market of the BRICS nations between January 2000 and March 2015. The Indian stock market was the only one impacted by the US EPU among BRICS countries (Momin and Masih, 2015). Dakhlaoui and Aloui (2016) used the data from 1997 to 2011 to examine the effects of Policy uncertainty in the US on stock yields of the BRICS nations. The study concluded that there is a negative correlation between the BRICS stock indexes and the EPU in the US stock market, however positive and negative values in the volatility distribution is also depicted. Another outcome is that at times of a global economic crisis, there is a very wide-ranging connection between uncertainty and stock returns due to the imbalance.

Though, a country's stock prices can be impacted by domestic political unrest. When allowing for asymmetries in the NARDL framework, both EPU and oil price uncertainty have had a significant impact on emerging and developed economies. Moreover, findings suggest that emerging economies are more vulnerable to inflationary shocks, while developed countries exhibit more resilient inflation patterns, due to better policy responses and economic infrastructures (Anderl and Caporale, 2023). Similarly, another study have been examined the impact of EPU on stock return in emerging markets (ASEAN5) under the influence of Chinese EPU. Ur Rahman et al. (2023) employed a non-parametric conditional density estimation approach to model stock incomes from March 2011 to June 2018 across ASEAN-5 markets. The findings indicate that Chinese EPU generally leads to reduction in stock returns and surge in market volatility within these counties. However, Malaysia presents a notable exception, where Chinese EPU positively influences the stock returns. This change suggests that other factors, such as Malaysia's reliance on global markets and external economic factors, may play significant role in shaping the stock market performance than EPU alone. Additionally, the study highlights that the risk of simultaneous investments in China and ASEAN-5 stock markets, especially during extreme market con-

ditions. The impact of Chinese EPU becomes noticeable at both positive and negative tails of stock return distributions, indicating a heightened influence during periods of extreme market movements (Ur Rahman et al., 2023). Batabyal and Killins (2021) also postulates the detrimental impact of EPU in Canadian stock market, the OLS and ARDL methods was being untitled for empirical evidences. By nonlinear adjustment of EPU measure, higher inflation can dampen investment and real savings over the longterm (Batabyal and Killins, 2021).

Policy uncertainty has a negative impact on stock yields in European, Turkey, Norway, Russia Ukraine and Switzerland (Sum, 2012). Sum (2012) utilized the OLS approach to analyze the data from 1993 to 2012 and reported similar findings. Antonakakis et al. (2013) examined the 28 years of US data ranging from 1985 to 2013 by employing dynamic conditional correlation methodology. Further, the author found that S&P 500 stock returns and EPU are adversely connected. Similarly, in the US stock market, the data was analyzed from 1986 to 2012 by Bijsterbosch and Guérin (2013) who came to the conclusion using a Markov regime-switching model that there is a non-linear connection between EPU and stock prices and uncertainty not seem affected during periods characterized by medium or low uncertainty. Chang et al. (2015) used a bootstrap panel causality test for 7 countries in the Organization for Economic Co-operation and Development from 2001 to 2013 and established that in Italy and Spain stock price indexes bring about policy uncertainty while in the USA and the UK stock price uncertainty is caused by policy uncertainty. Furthermore, they contended that there is no causal relationship among the factors in France, Germany and Canada. Likesise, Ko and Lee (2015) conducted a wavelet analysis from 1998 to 2012 by considering the 11 countries from America, Asia and Europe and discovered that stock prices fall during the rise in EPU. EPU escalation has a detrimental impact on stock returns, while Arouri et al. (2016) employed the Markov regime-switching method for the United States from 1900-2014 also obtained the same results.

Li et al. (2016) conducted rolling-window causality tests with bootstrap full-sample and subsample from China spanning over the period 1995 to 2012 using Indian data sample from 2003-2013 and proclaimed that shock in economic policy can affect adversely the stock prices. In some sub-periods, the authors revealed bidirectional causation and further concluded that there is a slightly negative correlation between EPU and stock returns in the two nations. In their investigation of Chinese data from January 1996 to 2013, where Chen et al. (2017) employed OLS and a VAR model and discovered that an increase in EPU decreased future stock market returns over various time horizons. Likewise, Christou et al. (2017) utilized the data from Australian, Canadian, Chinese, Japanese, South Korean, and from the American stock markets over the period of 1998 to 2014, employed the panel VAR model and explored that rising policy ambiguities has a harmful impact on stock returns. Demir and Ersan (2018) aimed to explore the connection among stock returns and EPU for travel businesses listed on Borsa Istanbul. Authors found that the performance of the tourist sector is impacted by local and international uncertainties using multiple regression techniques between January 2002 and December 2013. Additionally, it was shown that EPU had a significant negative effect on the stock returns of Turkish tourist enterprises.

However, Xiong et al. (2018) found that absolute changes in EPU had more pronounced effect on stock market returns in Shanghai compared to Shenzhen. This conclusion was drawn using a dynamic conditional correlation bivariate generalized autoregressive conditional heteroskedasticity (DCC-GARCH) model, based on data spanning from 1995 to 2016. The researchers also discovered that during financial crises, stock return variations are more pronounced. The association among EPU and stock returns in G7 and BRICS nations from 1985 to 2015 was examined by Yuan et al. (2022) using quantitative regression. The results for the 10 countries provided crucial information. The findings show that EPU has an unbalanced association with stocks of United States and Italy while having a negative impact on the stock markets of China, India, Germany and Japan. While there was no correlation between Policy uncertainty and stock prices in UK and France, moreover a minor effect of uncertainty on Canada and Russia stock markets. Chiang (2019) used the GARCH model to analyze the correlations among EPU, risk and excess stock returns in the G7 nations from 1997 to 2016. According to the findings, a rise in EPU lowers excess stock returns.

Therefore, Jin et al. (2019) hypothesized the link between EPU and the danger of a stock market drop contrasts with earlier research. Researchers estimated the association using OLS for China from 2009-2017 and determined that EPU reduces accident risk. As was discussed in the literature, there are differences in the correlations between EPU and stock prices and returns depending on the nation. None of the research in the literature has thought about how positive and negative shocks may affect this relationship. Separating the influence of favorable and unfavorable circumstances on financial markets leads to more accurate outcomes. In this context, our analysis makes a distinction between period and shock to explain the causal linkages between the stock market and EPU.

Overall, the prevailing works validates the negative nexus between EPU and stock market returns. While most studies have focused on developed economies, a limited number of studies have explored this relationship in emerging economies, including Pakistan. The findings indicate that policy uncertainty can adversely affect investor sentiment and stock market performance. Furthermore, sectoral variations and the impact of uncertainty during different periods deserve to be considered in the analysis.

Methodology

Data, Variables and Estimation Techniques

The purpose of this study is to examine the nexus between EPU and stock returns. Six sectors cement, automobile assembler, automobile parts and accessories, engineering, oil and gas marketing, and refinery were selected across the PSX for dynamic relationship. Therefore, monthly frequencies of 52 firms from chosen sectors are utilized for empirical investigations, from January, 2015 to December, 2023. EPU index was obtained from www.uncertainty.com that is originally developed by Baker et al. (2016). It is highly regarded metric that quantifies the degree of ambiguity and unpredictability associated

with economic policies, encompassing fiscal, monetary, and trade policies. The selection of this index is based on its proven dependability and validity in accurately measuring the dynamics of policy uncertainty. Stock returns are calculated by determining the average price fluctuation of market shares that are listed and traded on PSX, which is extracted from www.investing.com. This metric quantifies the market capitalization of equities and serves as an indicator of overall performance of the stock market.

Table 1: Variable Definition and Data Sources

Variable	Notation	Definition	Source
Economic Policy Uncertainty	EPU	Economic Policy Uncertainty Index	Policy uncertainty index by M. A. Choudhary, F. Pasha, and M. Waheed (2020); www.policyuncertainty.com
Stock Prices	SP	Average price change of shares in the market over time	www.investing.com

Model Specification

A comprehensive methodological approach has been employed in this study to thoroughly examine the correlation between EPU and stock returns in Pakistan. The study employed the EGARCH (1,1) model, which stands for Exponential Generalized Autoregressive Conditional Heteroscedasticity, first proposed by Nelson (1991). The selection of this model is considered appropriate for this study due to its capacity to effectively capture asymmetric effects. This feature enables detailed insight into how positive and negative shocks influence stock returns within the context of PSX. The EGARCH (1,1) model is specified as follows:

$$y_t = \mu + \delta y_{t-1} + u_t, \qquad u_t \sim N(0, \sigma_t^2) \tag{1}$$

The mean equation is specified as follows:

$$R_{i,t} = \mu_i + \phi_i R_{i,t-1} + \rho_i \, EPU_t + \varepsilon_{i,t} \tag{2}$$

Variance equation:

$$\ln(\sigma_{i,t}^2) = \omega_i + \alpha_i \left| \frac{\varepsilon_{i,t-1}}{\sigma_{i,t-1}} \right| + \gamma_i \frac{\varepsilon_{i,t-1}}{\sigma_{i,t-1}} + \beta_i \ln(\sigma_{i,t-1}^2) \tag{3}$$

Where $R_{i,t}$ denotes the stock returns of sector i at time t, and μ_i represents the constant term for sector i. The autoregressive coefficient is denoted by ϕ_i, while ρ_i measures the effect of economic policy uncertainty (EPU) on sector i's returns. The error term is represented by $\varepsilon_{i,t}$ $(\sigma_{i,t-1}^2)$, where $\sigma_{i,t}^2$ is the conditional variance or volatility.

The constant term of the variance equation is denoted by ω_i, and α_i represents the ARCH effect coefficient. The parameter γ_i captures the asymmetry or leverage effect, whereas β_i represents the GARCH term, indicating the persistence in volatility.

$$\ln(\delta_t^2) = \omega_t + \alpha \ln(\delta_{t-1}^2 - 1) + \gamma u_{t-1} + \beta \left[\frac{|u_{t-1}|}{\sqrt{\delta_{t-1}^2}} - \sqrt{\frac{2}{\pi}} \right] + \rho \, \text{StockReturn}_t \qquad (4)$$

Where $\ln(\delta_t^2(A))$ represents the natural logarithm of the conditional volatility of stock returns, which serves as a measure of stock market fluctuations. The coefficient of the ARCH term is denoted by α, while γ represents the leverage effect, often referred to as the asymmetric impact of positive and negative news. The coefficient of the GARCH term is denoted by β. The coefficient ρ measures the magnitude of the impact of Economic Policy Uncertainty (EPU) on stock returns within the context of the Pakistan Stock Exchange (PSX). The logarithm of the conditional variance, $\ln(\sigma_{i,t-1}^2)$, aids in analyzing volatility behavior over time. Furthermore, $\ln(\delta_t^2(A))$ is an important metric for assessing the variability and risk associated with stock market returns within a particular sector, represented by $\delta_t^2(A)$.

This logarithmically transformed measure provides a systematic method for analyzing the extent of changes in stock returns across time. By using the natural logarithm of the conditional variance, the conversion ensures statistical robustness and comparability across sectors. and compare across periods and sectors. In addition, this modification helps to stabilize the data variance, making it ideal for econometric modeling and empirical investigation. Persistence of volatility is captured by β, representing long-term shock effects. in stock returns relies heavily on ARCH coefficient (α). ARCH models connect prior squared shocks with existing volatility dynamics. The coefficient α measures the impact of prior shocks on current volatility, providing insights into its short-term behavior in reaction to market shocks. A greater α denotes stronger short-term influence of shocks on volatility, implying a greater impact of prior shocks on current volatility levels. The leverage effect γ, clarifies asymmetric response to update shocks. This coefficient reflects the contrasting effects of positive and negative news reporting's on future volatility. In financial markets, negative shocks are generally shown to have a greater impact on volatility than positive shocks. γ captures how the negative impacts volatility is greater than positive one, providing insights into how the market reacts to various sources of information. The leverage impact aids in risk predicting under asymmetric evidence for risk management and forecasting because it allows you to predict how different market events may affect future volatility levels. The GARCH coefficient (β) analyzes how historical conditional variances affect current stock return volatility. GARCH (Generalized Autoregressive Conditional Heteroskedasticity) models incorporate volatility's longterm persistence as well as the feedback effects of previous volatility on current volatility. Volatility persistence (β) measures how past shocks affect future volatility levels. Estimating β helps measure volatility stability and predictability dynamics in the stock market, offering valuable insights for risk management and investing decisions. Finally, the coefficient ρ measures how economic policy uncertainty affects stock returns within the PSX. This

coefficient measures the magnitude and direction of association between EPU and stock market performance. Estimating ρ allows academics to examine how policy uncertainty affects stock returns, providing vital guidance for strategic financial decision-making.

Results and Discussion

The table 2 provides descriptive statistics of the nexus between EPU and stock returns in context of PSX. The average stock market returns have been comparatively low, with EPU rating suggesting a moderate level of EPU. Frequent rises in EPU may be suggested by the positively skewed distribution, given that the median EPU exceeds the mean. Conversely, the median return of the stock market surpasses the mean, suggesting a negative bias in returns and the occurrence of significant negative returns. There is a significant amount of variability shown by the relatively high standard deviations of EPU and stock market returns. Investors encounter a constantly changing and possibly hazardous environment due to this fluctuation, which could signal shift in EPU and stock market performance. Other characteristics that help to determine the shapes of the distributions include skewness and kurtosis. Stock market returns exhibit positive skewness, while the EPU also demonstrations a positive skewness, suggesting a distribution leaning towards increased levels of EPU. In addition, the kurtosis values for both variables indicate heavier tails and a greater likelihood of severe events compared to a normal distribution. There are ample footprints suggesting that normality is not the case, with near-zero probabilities and notably high numbers for EPU and stock market returns.

Furthermore, industries like Automobile Assembler have lower mean returns and negative skewness, which means these firms tend to do worse when policy volatility is high. Moreover, sectors like Cement and Automobile Parts and Accessories have bigger skewness and kurtosis, which means there are more unusual events and more variation in the prices of these sectors firms. Investors who want security in a world where economic policy changes often have a hard time because of this volatility. Compared to other fields, engineering stands out because its spread is pretty even. This makes it more evenly affected by changes in economic policy.

Moreover, visual analyses is also performed for deeper insight between the relationship between EPU and sectoral stock market behavior. Figure 1 demonstrates the overall trend in Pakistan's Economic Policy Uncertainty Index and aggregate stock market returns from 2015 to 2023. The chart reveals pronounced fluctuations in EPU, particularly during key political and economic events, and shows that these uncertainty spikes often coincide with dips in stock returns, suggesting a potential inverse relationship. Sectoral dynamics, density plots is also developed for six key sectors of the PSX: Cement, Automobile Assembler, Automobile Parts & Accessories, Engineering, Oil & Gas Marketing, and Refinery. These are presented in Figures 2 to 7.

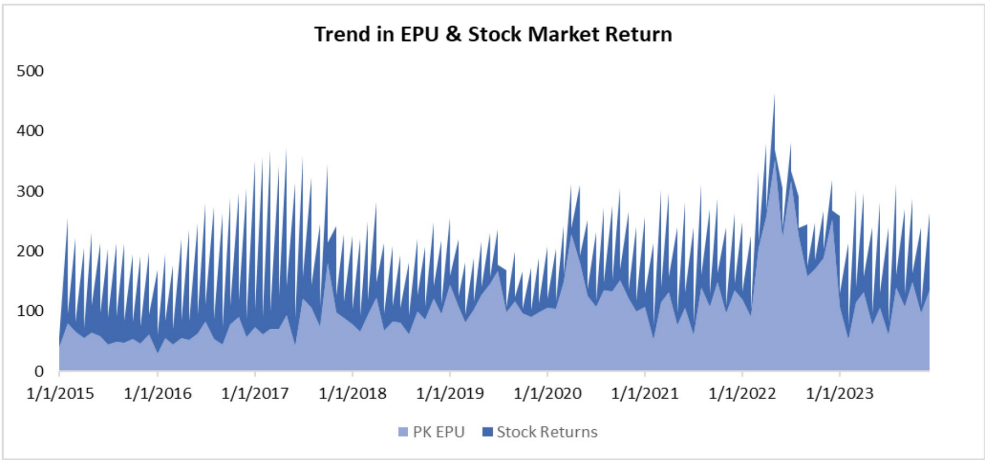
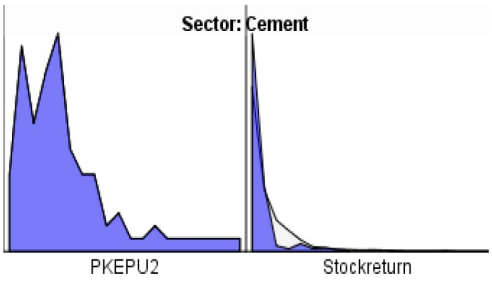
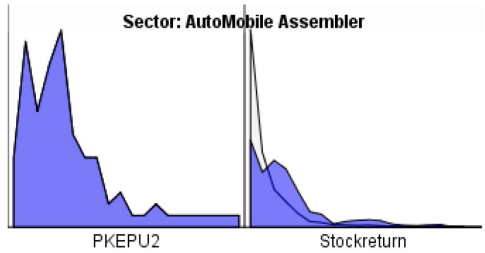


Figure 1: Trend in EPU and Stock Market Return

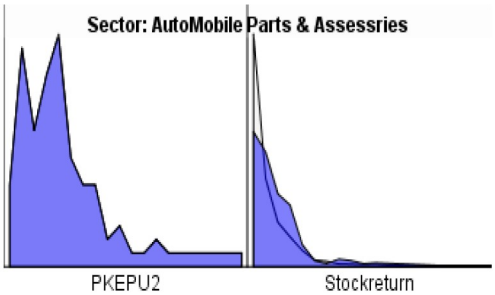


(a) Sector: Cement

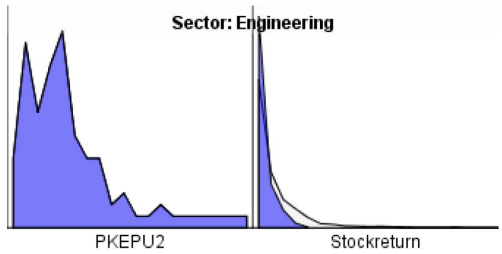


(b) Sector: Automobile Assembler

Figure 2: Overall caption describing both images

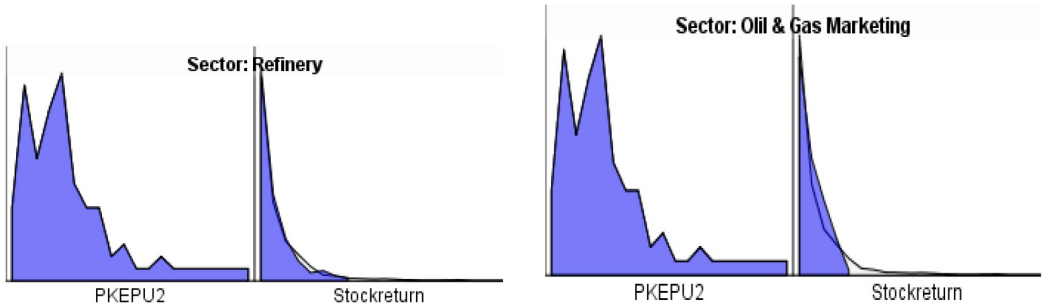


(a) Sector: Automobile Parts & Accessories



(b) Sector: Engineering

Figure 3: Overall caption describing both images



(a) Sector: Refinery (b) Sector: Oil & Gas Marketing

Figure 4: Overall caption describing both images

Unit Root Test:
Unit root tests play a vital role in assessing the stationarity of data distribution before selecting econometric models for analysis. Due to the distinct behavior of stationary and non-stationary series. Furthermore, the handling of each distribution type also differs. For highly accurate findings, the study utilizes two different unit root tests: the Augmented Dickey-Fuller test (ADF) and the Phillips Perron test (PP). The results of the test for all variables are detailed in Table 3. Both tests show that all variables become stationary after the first difference in all sectors.

Table 3: Unit Root Test Results

Sector	**Variable**	**ADF**		**PP**	
		Level	**1st Diff.**	**Level**	**1st Diff.**
Cement	EPU	0.02	-8.02*	0.34	-7.99*
	Stock Market Return	1.99	-11.01*	-1.99	-12.33*
Automobile Assembler	EPU	0.04	-7.44*	0.36	-7.95*
	Stock Market Return	2.00	-11.02*	-2.00	-12.34*
Automobile Parts & Accessories	EPU	0.01	-7.99*	0.33	-7.96*
	Stock Market Return	1.99	-11.01*	-1.99	-12.33*
Engineering	EPU	0.02	-8.01*	0.34	-7.97*
	Stock Market Return	2.01	-11.03*	-2.01	-12.35*
Oil & Gas Marketing	EPU	0.01	-7.99*	0.33	-7.96*
	Stock Market Return	0.98	-11.00*	-1.98	-12.32*
Refinery	EPU	0.03	-8.98*	0.31	-8.09*
	Stock Market Return	2.15	-10.99*	-2.11	-12.42*

Note: Asterisks (*) indicate significance at the 5% level. ADF = Augmented Dickey-Fuller test; PP = Phillips-Perron test.

Table 2: Descriptive Statistics

Sector	Statistic	EPU	Stock Market Return
Cement	Mean	0.890	0.160
	Median	1.130	0.400
	Standard Deviation	4.900	4.640
	Skewness	0.250	(1.990)
	Kurtosis	4.110	10.280
	Jarque-Bera	22.550	808.210
	Probability	0.000	0.000
Automobile Assembler	Mean	0.800	0.100
	Median	1.420	2.150
	Standard Deviation	3.980	4.050
	Skewness	(2.030)	0.190
	Kurtosis	2.800	3.000
	Jarque-Bera	29.020	22.020
	Probability	0.280	0.160
Automobile Parts & Accessories	Mean	0.650	0.280
	Median	2.010	3.100
	Standard Deviation	2.220	3.340
	Skewness	3.310	3.420
	Kurtosis	5.250	6.760
	Jarque-Bera	20.120	33.900
	Probability	0.000	0.000
Engineering	Mean	0.820	0.720
	Median	2.140	3.010
	Standard Deviation	6.030	6.060
	Skewness	0.230	0.300
	Kurtosis	6.270	5.280
	Jarque-Bera	31.300	21.690
	Probability	0.000	0.000
Oil & Gas Marketing	Mean	0.910	2.140
	Median	2.220	2.160
	Standard Deviation	3.750	0.070
	Skewness	0.470	0.760
	Kurtosis	6.450	6.890
	Jarque-Bera	30.010	31.220
	Probability	0.000	0.000
Refinery	Mean	0.770	0.190
	Median	1.340	2.890
	Standard Deviation	5.550	8.800
	Skewness	0.270	0.310
	Kurtosis	5.810	4.460
	Jarque-Bera	29.500	26.750
	Probability	0.000	0.000

The findings of two different unit root tests, namely the Augmented Dickey-Fuller Test (ADF) and the Phillips Perron test (PP), are summarized in the table above. The significance of the test statistics of the associated test is indicated by the stars (*) (5%), the results are presented in a manner that is distinct for each of the six sectors, which are as follows: cement, automobile assembler, automobile parts and accessories, engineering, oil and gas marketing, and refinery.

Table 4: Correlation Matrix

Sectors	**1**	**2**	**3**	**4**	**5**	**6**
Cement	1.000	0.090	0.090	0.090	0.090	0.090
Automobile Assembler	0.090	1.000	-0.500	-0.500	-0.500	-0.500
Automobile Parts & Accessories	0.090	-0.500	1.000	0.200	0.200	0.200
Engineering	0.090	-0.500	0.200	1.000	-0.310	-0.310
Oil & Gas Marketing	0.090	-0.500	0.200	-0.310	1.000	0.090
Refinery	0.090	-0.500	0.200	-0.310	0.090	1.000

A correlation matrix is an important measure for understanding the relationship between two variables. However, it does not address the problem of causality in any way. Additionally, correlation provides insights into the multicollinearity that exists between two variables. When there is a strong correlation between two variables, often greater than 0.9, this can cause problems of multicollinearity in regression models. A correlation matrix between EPU and stock market return is presented in Table 3, which can be seen that there is no cause for concern over multicollinearity when the correlation coefficient is low in all selected sectors.

Table 5: Stock Market Return (EGARCH – Bivariate)

Variables	EPU	Stock Market Returns
Cement		
Ω	0.046*** (0.000)	0.32*** (0.000)
α	-0.26 (0.300)	-0.28 (0.200)
γ	0.10 (0.20)	0.09 (0.12)
β	0.91*** (0.000)	0.91*** (0.000)
ρ	0.01 (0.25)	0.09 (0.15)
LL	-388.20	-388.59
SS	7.11	7.07
Automobile Assembler		
Ω	0.035*** (0.005)	0.030*** (0.004)
α	-0.18 (0.13)	-0.15 (0.12)
γ	0.08 (0.21)	0.06 (0.11)
β	0.85*** (0.000)	0.80*** (0.000)
ρ	0.02 (0.13)	0.01 (0.12)
LL	-350.20	340.80
SS	6.50	6.20
Automobile Parts & Accessories		
Ω	0.042*** (0.003)	0.038*** (0.004)
α	-0.22 (0.14)	0.19 (0.13)
γ	0.09 (0.13)	0.07 (0.12)
β	0.88*** (0.000)	0.83*** (0.000)
ρ	0.01 (0.14)	0.02 (0.13)
LL	-360.50	355.60
SS	7.20	7.00
Engineering		
Ω	0.038*** (0.000)	0.037*** (0.000)
α	-0.20 (0.23)	-0.18 (0.22)
γ	0.07 (0.21)	0.08 (0.21)
β	0.86*** (0.000)	0.85*** (0.000)
ρ	0.03 (0.12)	0.02 (0.12)
LL	-355.70	350.40
SS	6.80	6.70
Oil & Gas Marketing		
Ω	0.040*** (0.005)	0.035*** (0.006)
α	-0.24 (0.13)	-0.17 (0.13)
γ	0.10 (0.22)	0.06 (0.22)
β	0.90*** (0.000)	0.80*** (0.000)
ρ	0.02 (0.13)	0.01 (0.13)
LL	-370.90	345.80
SS	7.50	6.50
Refinery		
Ω	0.037*** (0.000)	0.036*** (0.000)
α	-0.19 (0.23)	-0.22 (0.22)
γ	0.08 (0.12)	0.09 (0.11)
β	0.87*** (0.000)	0.88*** (0.000)
ρ	0.01 (0.23)	0.03 (0.22)
LL	-355.00	365.20
SS	7.00	7.30

Note: * 10% significance; ** 5% significance; *** 1% significance.

The analysis based on the bivariate EGARCH model for each sector provides significant impact of EPU on stock market returns across various sectors. Starting with the sector of Automobile Assembler, the coefficients denoted as EPU (β) exhibits statistical significance at the 1% level, thereby suggesting a robust association between EPU and the returns of

the stock market. According to our findings, there is a positive relationship between a one-unit increase in EPU and an increase in stock market returns. This implies that investors in the sector perceive uncertainty as a favorable circumstance rather than a potential risk. The observed coefficients for lagged conditional volatility (α) and correlation (ρ) indicate that historical fluctuations in volatility and correlation have a negligible effect on present stock market returns within this particular sector. When examining the Automobile Parts & Accessories sector, it is evident that comparable trend exists, wherein there is notable positive correlation between EPU and stock market returns. Nevertheless, it is worth noting that coefficient for alpha parameter exhibits a significantly greater magnitude in relation to Assembler sector. This suggests that previous instances of volatility disturbances exerts more pronounced influence on present stock market returns. These findings indicate that individuals who invest in particular industry that exhibit a heightened level of responsiveness to fluctuations in historical volatility. Furthermore, Within the Engineering sector, the observed coefficients for EPU, lagged volatility, and correlation exhibit statistical significance. This suggests robust influence of both present and historical levels of EPU on stock market returns. The observed coefficient for the lagged conditional mean term (γ) indicates a relatively high value, implying that previous disturbances in the mean exhibit a significant influence the present stock market returns. It can be inferred from this statement that investors who involved in engineering segment exhibit a high level of vigilance in tracking economic policy advancements and subsequently modifying their investment approaches.

In the context of the Oil & Gas Marketing sector, our analysis reveals significant coefficients for EPU and lagged volatility. However, the influence of previous shocks on the mean and correlation of current stock market returns appears to be comparatively less pronounced. The findings of this study indicate that individuals who invest in the aforementioned sector demonstrate a predominant focus on the level of EPU prevailing at present, and the subsequent impact it has on the volatility of the market. Moreover, Within the Refinery sector, our observations reveal a noteworthy positive correlation between EPU and stock market returns. This finding aligns with similar patterns observed in other sectors. Nevertheless, the observed coefficients for the lagged conditional mean term (γ) indicates that previous disturbances in the mean significantly influence the present stock market returns within this particular sector. It can be inferred from the statement that individuals who invest in the Refinery sector exhibit a high level of attentiveness towards alterations in economic policy and the potential consequences that such changes may have on the future performance of the market. Talking about the Cement sector, it is evident that there are notable coefficients for the EPU variable, as well as for all other variables under consideration. Remarkably, the coefficient pertaining to the lagged correlation term (ρ) exhibits a relatively elevated value in relation to other sectors. This observation implies that previous correlations between EPU and the stock market returns exert a noteworthy influence on the present market dynamics within this particular sector. Moreover, the substantial coefficient observed for the alpha parameter suggests that previous instances of volatility shocks have a significant impact on the current stock market returns. This finding underscores the significance of volatility persistence within the Cement sector. Therefore, the empirical results of the study align with the existing liter-

ature, confirming that economic policy uncertainty does not impact all sectors equally in emerging capital markets.

Discussion

The findings of the bivariate EGARCH model provide valuable insights to understand the relationship between the EPU and the stock market returns particularly in sectoral perspectives. This research contributes significantly to the existing body of literature and enhances the understanding of this complex relationship. First revelation of the study that there is a consistent positive asymmetric correlation between EPU and stock market returns in all selected sectors by confirming that investor considers uncertainty as a chance rather than merely a risk. Our findings suggest that in circumstances where a higher level of uncertainty about economic policies, investors tend to employ more assertive trading strategies with the aim of exploiting potential market fluctuations influenced by policy-related events. Asafo-Adjei et al. (2020) also found a significant relationship between EPU and stock Market returns and suggested that by analyzing the variations in coefficient magnitudes across various sectors, one can potentially obtain valuable insights into how different sectors react to EPU. The Automobile Assembler and Automobile Parts & Accessories sectors exhibit significantly reduced coefficients for lagged conditional volatility. This implies that past volatility shocks have a relatively minimal impact on current stock market returns within these industries. This finding aligns with expectations for sectors characterized by stable demand, regulatory consistency, and relatively slower capital flows, where investors adopt a more conservative approach in response to policy shifts. Our results are consistent with Chau et al. (2014), who reported similar behavior under conditions of political instability, noting that volatility was largely absorbed by the implementation of Islamic indices reducing sensitivity in certain sectors.

In contrast, Engineering and Cement sectors display higher coefficients for lagged volatility, indicating that the effects of previous shocks persist longer, which is in line with theoretical expectations. These sectors are typically cyclical and sensitive to macroeconomic and infrastructure policy shifts, and thus more prone to persistent volatility effects. This finding is corroborated by Ghani and Ghani (2024), who highlighted similar persistence of volatility due to external shocks in these industries. Importantly, these observations underscore the heterogeneity of sectoral responses to EPU, emphasizing that sector-specific characteristics, such as capital intensity, export exposure, and government dependency, significantly influence how shocks are transmitted over time. This aligns with the expectations derived from the Risk-Return Tradeoff and Behavioral Finance Theory, where different investor behaviors and institutional structures result in asymmetric responses across sectors.

Furthermore, Li et al. (2016) employed a rolling window approach and found time-varying linkages between EPU and stock returns in both China and India. Our findings extend this observation to Pakistan, demonstrating that sectoral responses to EPU are not static and can evolve with the intensity and nature of economic policies over time. Additionally, the significant lagged conditional volatility terms in sectors like Refinery and Engineering

reaffirm that past shocks play a vital role in shaping current return dynamics, supporting the theoretical expectation that investors update their risk perceptions based on historical policy patterns. This suggests a form of rational learning and adaptive behavior in investment decisions. In contrast Aziz et al. (2020) found the influence of the GARCH term on conditional volatility is found to be significant in all the macroeconomic models, with the exception of the ER model. The observed phenomenon suggests a notable degree of persistence in volatility, specifically that previous levels of volatility can be informative in forecasting future levels of volatility. Furthermore, the observed variations in the coefficients pertaining to lagged correlation factors across different sectors suggest that there exist varying levels of interdependence between EPU and stock market returns as time progresses. The findings of the study indicate a stronger and more persistent relationship between EPU and stock market returns. Kang and Ratti (2013); Kang et al. (2015) findings indicate that EPU and oil-market specific demand shock contribute to approximately 19% and 12% respectively of the long-run variability observed in real stock returns.

This is supported by the observation that specific industries, such as cement industry, exhibit relatively higher coefficients for lagged correlation. These findings indicate that investors may need to modify their risk management strategies to account for the enduring relationships between EPU and market performance in industries characterized by higher correlation persistence (Uddin et al., 2020) Decisively, the outcomes derived from the bivariate EGARCH model shed light on intricate nature of the association between the volatility of economic policy and performance of stock market within diverse sectors. Aziz et al. (2020); Kundu and Paul (2022) has establish similar results, Kundu and Paul (2022) suggested that an increase in EPU is associated with heightened volatility across various markets and sectors during the same time period. This show that it result a decrease in overall returns. Subsequently, the observed phenomenon exhibits an upward trend in returns and a simultaneous decline in volatility, which can be attributed to the occurrence of a positive uncertainty shock (Das et al., 2019). Through a comprehensive understanding of these industry-specific reactions, investors are empowered to make good moves pertaining to their investments, policymakers are equipped to assess the potential market ramifications of policy alterations, and analysts are enabled to make more precise predictions about market trends. Further investigation is imperative to explore additional factors that may influence the observed associations and to assess the reliability of the findings across different periods and market conditions (Uddin et al., 2020; Batabyal and Killins, 2021).

Conclusion, Recommendations and Future Direction

Pakistan is an emerging country with essential volatility under varied economic conditions and volatility in stock exists due to the fragile democratic structure and economic instability. Hence EPU exist in a country like Pakistan due to the prevailing dynamics in the economic parameters mainly due to unstable democratic and law and order situation. Under such circumstances investors have different attitude in Pakistani market as they perceive any negative shock as a signal for future further uncertainty which boost their

current investment leading to possible market recessions and then sudden positive shock make them highly profitable. Therefore, in this study, EPU and stock market returns across the different sectors have been analyzed using the bivariate EGARCH model that offers valuable perception into the complex connection. The findings not only highlight the significant impact that EPU has on stock market returns, but it also demonstrates that investor's view uncertainty within Pakistan's capital markets not only both as a source of risk and as a strategic investment opportunity for earning profit on any future increase in its prevailing stock holding market value. Furthermore, the sector-specific responses revealed through the analysis highlight the significance of accounting for the characteristics of the industry as well as past trends when evaluating the influence that EPU has on the performance of the stock market. For investors, policymakers, and market analysts who are navigating the complexities of financial markets in an uncertain economic backdrop, these insights are of the utmost importance. It is critically important for investors who want to effectively reduce risks and capitalize on opportunities to adapt their risk easing policies to the specific complexities of sector-specific reactions. Investors can reduce exposure to sector-specific volatility and improve portfolio flexibility and long-term returns through diversifying their investment portfolios among variety of industries that have varied degrees of sensitivity to changes in policy.

Furthermore, investors might be better located to forecast market dynamics and frame their strategies accordingly if they continuously analyze past trends in EPU and stock market returns at regular intervals. Additionally, for stakeholders to stay adaptive to evolving market trends and adapt their plans to the ever-changing market conditions, it is vital that they apply robust analytical techniques and undertake continuous analysis.

Future research can investigate elements that may influence the stock returns, notably geopolitical events, macroeconomic indicators, and sector-specific fundamentals. These aspects are in addition to uncertainty that is associated with economic policy. In order to get additional insights into the stability and generalizability of observed correlations, robustness testing can be conducted over variety of time periods, market situations, and analytical techniques. In addition, expanding the scope of the research to incorporate data from different countries can shed light the ways which EPU affects global stock markets and whether or not there are variances in the responses of different sectors across different countries. Moreover, the utilization of high-frequency data and trending econometric methodologies can provide more detailed insights into the short-term dynamics of EPU and stock market returns. This enables stakeholders to make decisions that are better informed in real time, which in turn improves market efficiency.

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