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Abstract

The Pakistani economy has encountered substantial exchange rate volatility due to many endogenous and exogenous shocks, including adopting different exchange rate systems, the global financial crisis, sanctions, and the COVID-19 pandemic. Data was collected from the period of 2002 to 2023. Exchange rate Volatility was used as a dependent variable, whereas Trade Volume, Oil Price, and Economic Policy Uncertainty were used as independent variables. Numerous economic techniques, such as Descriptive Statistics, OLS, Unit Roots, and Quantile Regression, were used while using the EViews software to get the desired results. Secondary data was collected from Authentic sources in Pakistan. The analysis utilizes the technique of linear regression to present statistics on the results, along with a unit root test. The finding revealed a negative impact of ERV (Exchange Rate Volatility) on the EPU; however, the outcomes confirmed a positive effect of Oil price and Trade Volume on Economic Policy Uncertainty. Unit roots results describe that data is stationary for all the selected variables, which means that the null hypothesis is accepted. The findings confirmed that the Pakistani currency appreciates the rise in international oil prices and trade in Pakistan. Government officials and policymakers can benefit from the insights and suggestions provided by this study to traverse the difficulties and seize the chances of creating Pakistan's economic policies. Governments, legislators, and other pertinent stakeholders may find our study's conclusions helpful.

Keywords: Exchange Rate, Oil Price, Trade Volume, Quantile Regression, Economic Policy Uncertainty

1. Introduction

Globalization and technology have changed our lives, and uncertainty is more significant than ever. The fundamental causes of the recent increase in uncertainty are political polarization, division, and the growing importance of government expenditures in the economy as a whole.

An exchange rate significantly impacts a nation's economy, affecting trade competitiveness, investment flows, and overall macroeconomic stability. Exchange rate volatility, or EVR for short, is the risk of unanticipated currency value changes. It might also mean how much a country's currency has moved in value during a specific period relative to other currencies. The main element influencing the course of global trade and commerce is the stability or volatility of exchange rates.

Few studies have examined the effects of the EPU on the foreign exchange market (FOREX) thus far. First, they anticipate that growing ERV levels correspond with an increase in the EPU (Shahbauddin & Ali, 2024; Ali, 2022; Nilavongse et al., 2020; Chen et al., 2019; Bartsch, 2019; Christou et al., 2018; Balcilar et al., 2016). Second, it seems that the ERV response is more susceptible to the local EPU than the foreign one (Nilavongse et al., 2020; Ali, 2018)

Several variables, such as worldwide supply and demand, impact the cost of oil. Dynamics, events, production and inventory levels, and market speculation can also cause significant volatility in oil prices, resulting in both short-range fluctuations and longstanding trends. The impact of oil price changes on trade volume can be understood through several vital mechanisms.

The fluctuation of exchange rates is a significant issue affecting all facets of Pakistan's economy. Exchange rate volatility directly impacts the nation's trade balance: the price of imports and the competitiveness of exports. Both importers and exporters may experience worry due to a fluctuating currency rate, which might affect their trade volumes and profitability. Variations in currency rates impact the inflationary pressures inside the economy. When the price of imported goods and raw materials rises, local currency depreciation may lead to import inflation (Subhani et al., 2022; Bagh et al., 2017).

Currency rate volatility may be impacted by shifts in the world economy, speculative activity in the foreign exchange market, market intervention by the State Bank of Pakistan (SBP), and political stability or unrest in Pakistan (Alam et al., 2018; Ali, 2022).

Currency rate stability or volatility primarily affects international commerce, business volume, and direction. The risk connected with unanticipated shifts in the exchange rate is known as currency rate fluctuation. Given the current state of Pakistan's economy, macroeconomic factors might be unstable. Macroeconomic considerations influence a currency index's value and pinpoint the main variables influencing Pakistan's exchange rate (Rafiq et al., 2023).

They explored the development of oil prices amid rising exchange rates in emerging markets. They found that higher crude oil prices perfectly lead to an appreciation of certain emerging market currencies against the US dollar. Impulse response functions were used to examine the effects from 2003 to 2010. They concluded that the movement of oil prices relative to exchange rates varied from period to period, with a more pronounced impact after the 2008 financial crisis.

Moreover, economic policy uncertainty can affect international trade and investment flows. Uncertainty surrounding trade policies, such as tariffs and trade agreements, can disrupt supply chains, increase costs, and deter cross-border investment. Uncertainty about future policies can also impact exchange rates and affect the competitiveness of exporting industries. Trade disputes and geopolitical tensions can amplify economic policy uncertainty and reduce global trade, hampering economic integration and growth.

Policy implications of economic policy uncertainty involve understanding how policymakers can mitigate its adverse effects and promote financial stability. Enhancing policy transparency, credibility, and consistency can help reduce uncertainty and give businesses and consumers more confidence and predictability. Clear and effective communication of policy intentions and objectives can also help reduce ambiguity and improve overall economic decision-making.

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The relationship between oil price and trade volume can be traced back to recognizing oil's importance as a critical input in production processes, transportation, and energy consumption across various sectors. Fluctuations in oil prices have been observed to influence. The role of economic policy uncertainty in studying the effects of exchange rate uncertainty resulting from monetary policy is significant. That explores the relationship between economic policy uncertainty and currency value fluctuations. Exchange rates play a vital role in international trade, capital flows, and overall macroeconomic stability, making it crucial to understand the impact of economic policy uncertainty on exchange rate dynamics.

Exchange rates represent how much a single currency is worth over another and are influenced by many factors, including economic fundamentals, interest rates, inflation differentials, and market expectations. However, economic policy uncertainty can introduce additional volatility and unpredictability into exchange rate movements, affecting the competitiveness of nations, the profitability of businesses, and the stability of financial markets.

In an international economy, a shock from one nation may spread to other countries or markets. Therefore, panel data collection could aid in a better understanding of these spillovers. Nevertheless, the literature offers substantial proof of the EPU's capacity in a particular nation to forecast the route taken by EPUs overseas (Audi, 2024; Olubiyi, 2023; Gupta et al., 2020; Jiang et al., 2019) One key aspect of their role in economic policy uncertainty on exchange rates is the effect on investor sentiment and capital flows. Uncertainty surrounding economic policies can create a risk-off environment, leading investors to seek safe-haven assets or withdraw investments from countries with uncertain economic conditions. This can result in capital flight, depreciating the currency of the affected country. Conversely, in times of heightened uncertainty, investors may seek investments in countries with more stable and predictable economic policies, leading to an appreciation of their currencies.

1.1. Objective of the study

The main objective of this study is to investigate the impact of economic policy uncertainty on the dynamics of exchange rates, with a specific focus on the influence of two key variables:

- Analyze the Relationship between Economic Policy Uncertainty, International Oil Price, and Exchange Rate Dynamics.
- Assess the Impact of Economic Policy Uncertainty and Trade Volume on Exchange Rate.
- Investigate the Mechanisms and Transmission Channels between Economic Policy Uncertainty, International Oil Price, Trade Volume, and Exchange Rate Dynamics.

2. Literature Reviews

Khan and Ali (2015) examined the relationship between Pakistan's stock market price and exchange rate volatility. They used monthly time series data covering the KSE-100 Index values and the Pakistani Rupee exchange rate with the US dollar, covering the period from January 1992 to February 2013. The Philips Perron (PP) unit root test is used to verify stationarity. All of the variables were stationary at the first difference, according to the findings of the PP test. Use the GARCH model to determine the volatility of each variable. The Granger causality analysis is then performed using the series for each variable. The Granger causality test findings indicate a reciprocal association between currency rates and Pakistani stock price volatility.

Roussel et al. (2021) focused on the factors influencing cash calls in Pakistan. They selected family consumption, presidential consumption, hobby value, client charge index, population growth, and remittances as independent variables, with broad money as the dependent variable. The study used the ARDL technique, a significant development in econometric modeling, to integrate multiple variables into the model. The study's findings, which showed that the variables in the model had different integration orders, concluded that socioeconomic factors significantly influence Pakistan's money demand. Therefore, in the case of Pakistan, the demand for money was significantly influenced by socioeconomic factors.

Hasan and Islam (2023) examined a study to explore the impact of macroeconomic factors on Bangladesh's stock exchange. The study's primary purpose was to check the influence of variables on stock exchange fluctuation. The study's outcomes confirmed the significant influences of all the variables. The valuable and insightful findings are helpful for policymakers and officials to control the exchange rate in the country.

Awan et al. (2023). Given the importance of stock markets to all economies, price volatility has garnered significant attention in the financial markets. This research used monthly data from January 2015 to December 2021 to empirically evaluate the variables impacting the volatility of the Pakistani stock market. This research used the three-month moving standard deviation approach to calculate stock price volatility. The variables influencing stock price volatility are examined using the ARDL approach. Strong, long-term positive relationships exist between the money supply, interest rate, exchange rate, and stock price volatility. However, it was shown that there are short-term effects and a positive, statistically significant association between the money supply, the industrial production index, and stock price volatility. However, a robust and adverse correlation exists between the short-term fluctuations of stock prices and the consumer price index, interest rate, and exchange rate. A diagnostic examination of the obtained coefficients was also performed to provide the most precise, objective, and linear estimates feasible. Using the ARCH model, the volatility of the stock prices was also assessed to assess the sensitivity of the estimated coefficients regarding significance, sign, and magnitude. Overall, the empirical results were entirely trustworthy. It was suggested that fiscal and monetary policies be implemented by the government and central bank, emphasizing monetary expansion and stable exchange rates.

Rashid et al. (2023) examined the time-varying return and volatility spillover effects of consumer prices, industrial output, interest rates, and currency rates on stock market returns in Pakistan. They first estimated the conditional variance using the GARCH model to achieve this. The effects of the underlying variables' time-varying return and volatility spillover on stock market returns were then assessed using the Gaussian state-space model, which allowed the coefficients to change with time. Findings indicate a substantial, time-varying influence of inflation, interest, and currency rates on stock returns. These results are only sometimes present. The results showed how the degree and timing of the transmission of macroeconomic volatility to stock return volatility changed over time, adding to the body of data supporting the time-varying volatility effects. Empirical studies have shown that investors and firm

managers may reduce the risks related to interest rates, consumer prices, and currency rates by creating and using more effective hedging methods.

Iqbal et al. (2023) examined the effects of variations in charge volatility on the trade of commodities between Pakistan and Japan using a nonlinear autoregressive distributed lag technique. Even though the covariance technique was employed in a prior Central study, a current investigation was conducted to evaluate the impact of the covariance assumption on trading fees and turnover on empirical findings. In this study, 102 Pakistani businesses that bought goods from Japan and 62 industries that exported goods to Japan between 1980 and 2020 had their corporate-level reactions to the asymmetric and asymmetric impacts of exchange rate changes studied. The findings indicated that asymmetric substitution charge fluctuations may significantly impact substitution flows that compete with Japan in the short and long term in more than half of the uploading and exporting industries. An analysis of this suggested that central policies should be implemented consistently, even though consideration should be given to the effects of exchange rate volatility on specific businesses.

Babar, H. et al. (2024) researched to evaluate the macroeconomic forces and stock exchange of Emerging economies of Asia. Data was collected from 1999 to 2019 for the Asian stock markets of Pakistan, China, India, Philippines, and Japan. Research findings confirmed that GDP, Interest rate, exchange rate, and money supply positively impacted the selected markets. Further results show that GDP has a leading behavior with market return, and market return has a leading behavior with GDP, CPI, ER, and IPI.

3. Methodology

The study's primary purpose is to investigate the role of economic uncertainty in the exchange rate volatility in Pakistan. The research design, including sampling techniques, sampling size, and research instruments, has also been discussed using the E-VIEWS Software.

Based on the information provided, this chapter discusses the Description, regression model, and unit root test.

3.1. Data Collection

Within the defined period, gather data on economic policy uncertainty, international oil price, trade volume, and exchange rates for Pakistan from 2002 to 2023 Utilizereliable and relevant sources such as government publications, central bank reports, international databases, and academic research.

3.2. Regression Model

$$ERV = \beta_0 + \beta_1 EPU + \beta_2 OP + \beta_3 TV + \text{eit.} . (1)$$

Where is

ERV= Exchange Rate Volatility

EPU = Economic Policy Uncertainty

OP= Oil Price

TV= Trade Volume

Eit_ Error Term

3.3. Variable Explanations

3.3.1. Exchange rate

The foreign exchange market, the world's decentralized currency trading market, determines exchange prices. Supply and demand dynamics, interest rates, inflation rates, geopolitical events, and speculation influence the market. Governments and central banks influence exchange rates through monetary policies and FX marketability interventions. by Baker et al. (2016) It is important to remember that exchange rates are subject to change and can be influenced by factors like trade volume. I collected the data to refer to reliablesources for the most up-to-date information provided in this paper.

$$\Delta ERV = \frac{ER_t - ER_{t-1}}{ER_{t-1}}$$

3.3.2. Economic Policy Uncertainty

Economic Policy Uncertainty can also affect financial markets, leading to greater volatility in assetprices and exchange rates. This can create risks for investors and businesses operating in global markets. Economic policy uncertainty can also significantly affect economic activity, leading to hesitation and delay in business investment and consumer spending decisions.

3.3.3. Oil Price

International oil price refers to international oil prices in the global market. Global sales and purchases, geopolitical events, and monetary conditions in major oil-producing countries worldwide influence it. The international oil market is highly interconnected, withsupply and demand factors in one region affecting prices in the other areas. Leading international oil -oil-manufacturing countries, such as Saudi Arabia, Russia, and the United States, can significantly affect global oil prices through their production decisions and other policies.

3.3.4. Trade volume

Trade volume is an essential variable of the level of economic activity between countries, as it reflects the volume of exports and imports and the extent to which countries engage in trade. Increased trade volume can increase economic growth, job creation, and efficiency. In contrast, decreased trade volume can lead to economic slowdowns and job losses.

3.3.5. Exports

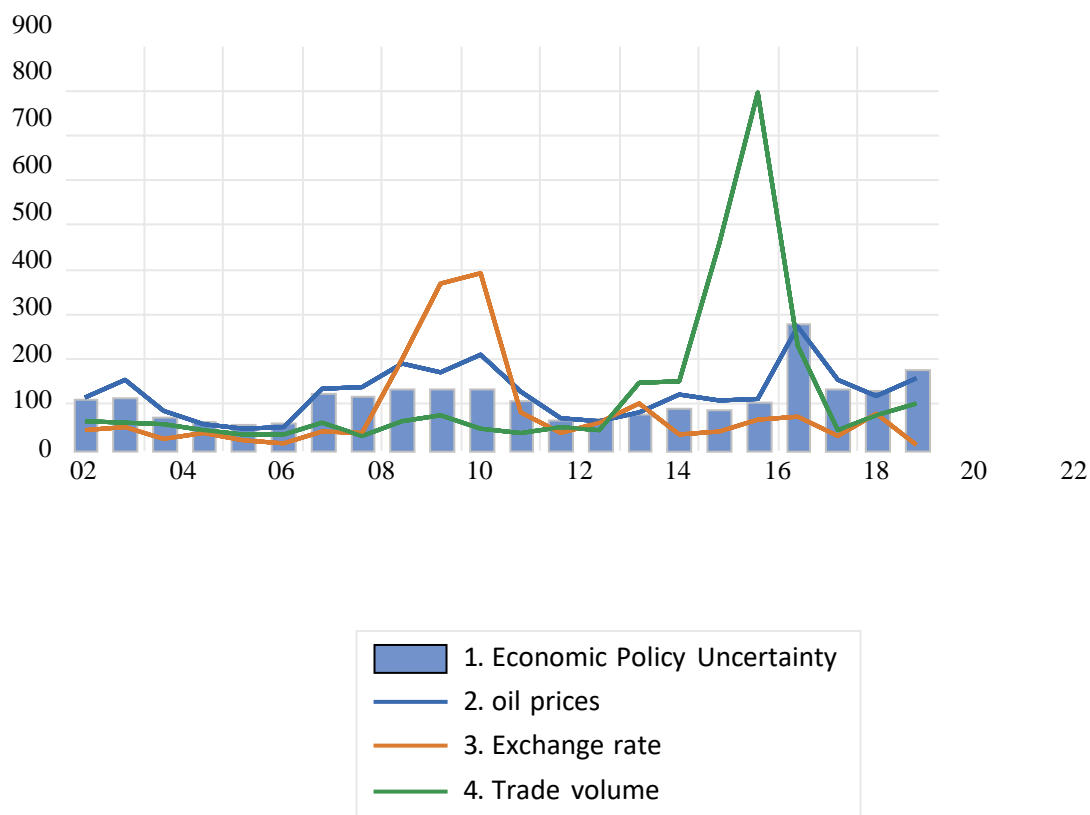
Exports play a crucial role in Pakistan's economy, generating foreign exchange earnings and creating employment opportunities. The country's major export products include textiles,leather goods, rice, sports goods, chemicals, and surgical instruments.

Pakistan's government has implemented several policies to promote exports and established various institutions that support Pakistani businesses' access to international markets. Export growth is a critical driver of Pakistan's economic development and an essential area of focus for thecountry's policymakers and business community.

3.3.6. Import

In Pakistan, imports refer to bringing goods or services from other countries to Pakistan. Imports are essential for Pakistan as they allow the government to obtain goods or services that it cannot produce or provide domestically. The value of imports is a crucial indicator of a nation's trade and industry growth and development, as it reflects foreign sale and purchase demands and the country's ability to pay for them. The government of Pakistan regulates the import of goods and services through various policies, tariffs, and trade agreements.

Mixed Figure 1



Note: The data comes from several websites and includes trade volume (TV), oil price (OP), exchange rate (ER), economic policy uncertainty (ECONOMIC POLICY UNCERTAINTY), and their logarithms for the years January 1, 2002, to January 30, 2023.

4. Results and Discussion

This report discusses how economic policy uncertainty affects Pakistan's exchange rate, issues affecting exchange rate volatility, and the importance of stock returns. The study's primary emphasis is Pakistan's economy. To analyze the time series, annual data covering 2001 through 2023 were collected. Advanced time series econometric techniques have been used.

4.1. Descriptive Statistics

A dataset distribution, variability, and central tendency are listed and described using descriptive statistics. These methods facilitate the discovery of patterns and connections and provide a comprehensive view of the data.

Table 1: Descriptive Statistics

Statistics	EPU	ERV	OP
Mean	4.708	4.413	4.814
Median	4.699	3.690	4.769
Maximum	5.631	5.968	5.607
Minimum	4.026	2.268	3.798
Std. Dev.	3.900	4.652	4.041
Skewness	0.568	0.804	-0.347
Kurtosis	1.966	1.906	1.216
Jarque-Bera	3.300	3.434	0.673
Probability	0.000	0.000	0.370

The above table shows the findings of descriptive statistics. The findings include the mean, median, maximum, minimum, standard deviation, kurtosis, skewness, and Jarque-Bera for the dependent and independent variables studied. Outcomes revealed that the mean and standard deviation of EPU (Economic Policy Uncertainty) are $\pm 4.70 \pm 3.90$, respectively. Moreover, ERV (Exchange Rate Volatility) has a mean value of 4.413 and a standard deviation value is 4.65. Lastly, OP (Oil Price) has a mean value of 4.81 and a standard deviation value of 4.041.

The closest value of Skewness to Zero describes the data's normality. Results demonstrate that EPU is positively skewed at 0.568, ERV is positively skewed at 0.804, and OP is negatively skewed at -0.347.

Kurtosis measures whether the data is heavy-tailed or light-tailed related to normal distribution. If the data has a high value of Kurtosis, it tends to have a high tail; however, if the value of Kurtosis is low, it means the data is light-tailed. If the value of Kurtosis equals 3, then the data show the normality. The above value of Kurtosis from 3 indicates that the data has a long tail and less than three shows that the data expresses a light tail. The results describe all the values of the Kurtosis are less than 3, representing the data's normality.

4.2. Regression Analysis

Table: 2 OLS

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	21.475	3.210	6.691	0.000
ERV	-0.038	0.013	-2.966	0.003
TV	0.729	0.023	31.227	0.000
OP	0.007	0.008	0.962	0.337
R-squared	0.8105	Mean dependent		107.926
Adjusted R-squared	0.8083	S.D. dependent var		60.216
S.E. of regression	26.3680	Akaike info		9.398

Table 2 above shows the regression results for the selected variables. The exchange rate negatively but significantly impacted Economic Policy Uncertainty; the Value of the coefficient of the Exchange Rate is 0.0033, which is less than the significance level of 5%. Moreover, oil prices positively and significantly impacted with the coefficient value of 0.000. Lastly, the results revealed that trade volume has a positive but insignificant impact on economic policy uncertainty. The value of R^2 and adjusted R^2 is 0.8105 and 0.8082, respectively. The value of R^2 , which is 0.8105, means approximately 81% of the variance in the dependent variable is explained by the independent variables, and 19% is presented by the rest of the variables that are not included in this study.

4.3. Unit Roots

The above results demonstrate that the Prob. Value is less than the significance level at 5%, meaning there is a presence of stationery in the results. The Prob. Value in this table indicates the acceptance of the Null hypothesis. There are no unit roots in the data.

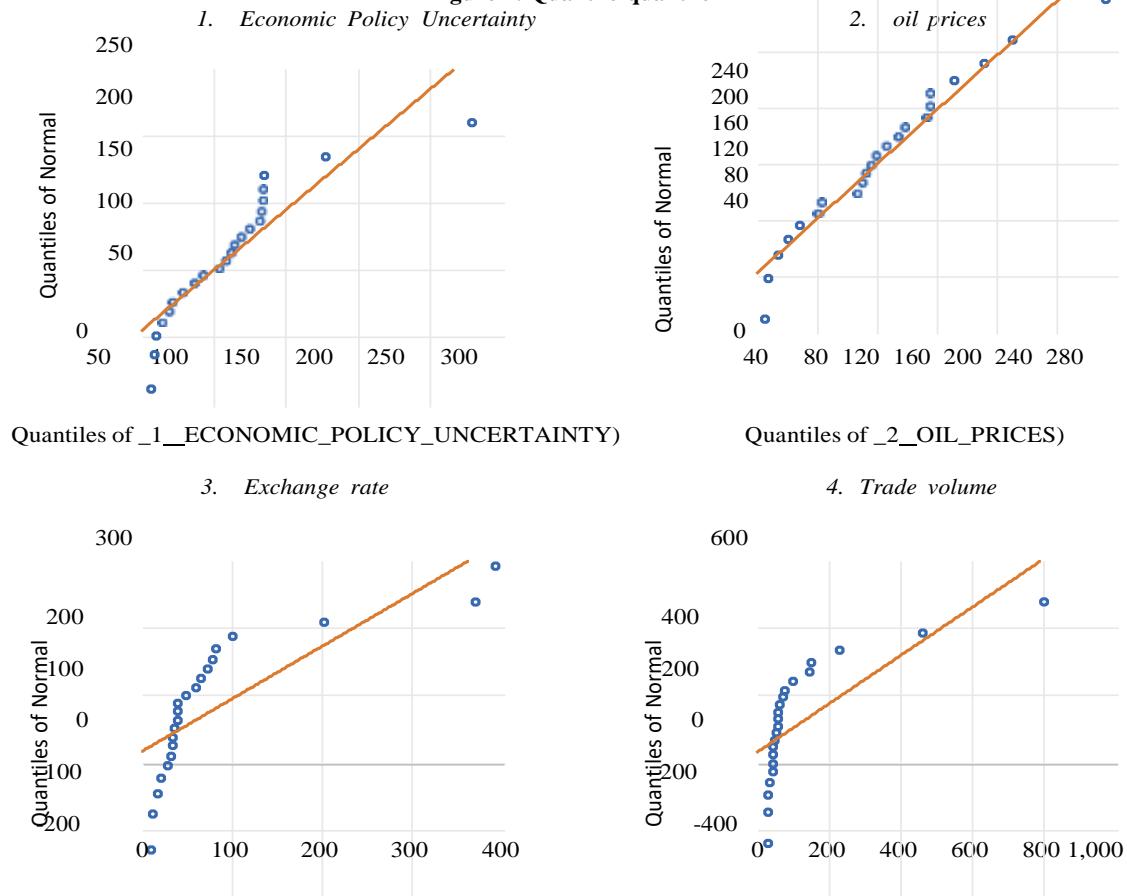
With a probability value less than the significance level of 5%, the preceding results clearly show that stationery is present in the data. Based on this table's Probability Value, the null hypothesis is accepted. No unit roots are present in the data.

Table: 3 Unit Roots

Null Hypothesis: (ECONOMIC_POLICY_UNCERTAINTY) has a unit root				
Leg Length: 1 (Automatic - based on SIC, max-lag=15)				
			t-Statistic	Prob.*
-	-	-	-13.27	0.000
Augmented Dickey-Fuller test statistic			-13.27	0.000
Test critical values:	1% level		-2.574245	
	5% level		-1.942099	
	10% level		-1.615852	
Null Hypothesis: D(OIL_PRICES) has a unit root				
A regression model, unit root, and correlation analysis are				
Leg Length: 1 (Automatic - based on SIC, max-lag=15)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-12.887	0.000
Test critical values:	1% level		-2.574	
	5% level		-1.942	
	10% level		-1.616	
Null Hypothesis: D(EXCHANGE_RATE) has a unit root. Exogenous: None				
Leg Length: 6 (Automatic - based on SIC, max-lag=15)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-8.483693	0.000
Test critical values:	1% level		-2.574435	
	5% level		-1.942126	
	10% level		-1.615835	

4.4. Quantile-quantile

Figure 2: Quantile-quantile



5. Conclusion and Summary

Uncertainty in economic operations adversely affects economic growth in any nation. Because uncertainties in economic policy impact global commerce and other macroeconomic factors, such as the currency rate, it becomes more difficult for businesses to decide what to invest in during difficult times.

This study used regression analysis, Regression analysis, OLS, unit root test, and quantile regression on data gathered from 2002 to 2023 using EViews software to examine the impact of economic policy uncertainty on exchange rate dynamics. It also considered the independent variables of international oil price and trade volume.

The OLS results describe the exchange rate negatively but significantly impacts economic policy uncertainty; the Value of the Exchange Rate coefficient is 0.0033, less than the significance level of 5%. Additionally, oil prices had a positive and substantial influence, with a coefficient value of 0.000. Finally, the results showed that trade volume influences economic policy uncertainty in a favorable but little way. Particular information on the specified period and the sort of services being referred to delivers the outcome or conclusion of the trade on the import and export of services in Pakistan. However, Pakistan generally imports more than it exports, with imports contributing significantly to the country's economy. Pakistan imports more oil and petroleum products due to rising global oil prices, which strains its foreign exchange reserves and fuels inflationary pressures in the economy. In contrast, declining international oil prices could help Pakistan's economy by lowering inflation and import costs.

The global oil price can significantly impact the volume of trade between nations. Production and transportation costs also rise in response to rising international oil prices, which raise import and petroleum product prices. This can, therefore, result in a drop in investment and consumption and slower economic growth.

5.1.1. Policy implications

To encourage prosperity, policymakers must select sensible economic measures. Market stability may result from better transparency in economic policymaking, particularly during extreme volatility. Furthermore, policymakers may utilize our results to manage exchange rate volatility better and eliminate any problems that may come from the high reliance across various markets. They should appropriately choose the time and scope of foreign currency rate intervention and exercise further control over risks in markets on which they rely heavily.

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