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Analyzing the Impact of Oil Price Shocks on the Exchange Rate Fluctuations in Pakistan

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Abstract: An oil-importing country is anxious about large oil imports. Importing countries must pay enormous foreign exchanges, which can suffer from the balance of payments. The long-term economic stability of countries like Pakistan and a rise in oil prices may be impacted. With changes in oil prices, oil importers in Pakistan see their economic strength fluctuating in developing economies. Many industries are connected with oil, and they are directly linked because petroleum is a prime production source. This study found that shocks in oil prices affected by variations in demand and risk oil prices affected by variations in demand and risk significantly contribute to changes in exchange rates. In contrast, shocks in supplies have almost no impact. The link between oil pricing shocks and exchange rates has increased significantly following the global financial crisis. The results depict that oil price shocks do not explain the change in exchange rate volatility, but this study documents a significant exchange-rate volatility connection. This research investigates how oil price shock aggressively impacts exchange-rate variations in Pakistan's economy. In this research, the method defined the connection between oil prices and currency rates. Data was collected from relevant websites from 1 January 2013 to 31 May 2021. Appropriate econometric techniques were used to achieve the research goal concerned. Finally, the research results helped the concerned stakeholders to adopt policies to balance oil shocks and changes in exchange rates in Pakistan. Subsidies on oil prices also affect the market and expenditure of the Government and tighten the deficit; therefore, oil prices must be marketed accordingly.

Keywords: Oil Prices, Stock Market, Economic Development, GARCH

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INTRODUCTION

Oil is considered an essential energy source for any economy, it contributes to the production process, and consumption increases the modernization of any economy significantly (Basher & Sadorsky, 2006); rise in oil prices leads to upward manufacturing prices, import duty, price of petroleum products and inflation that affect the financial activities (Cavalcanti & Jalles, 2013).

Oil prices, currency rates, and stock prices were all checked for their interrelationship. Oil has been recognised as a critical component of global economic growth for many years, especially for developing countries that use over half the world's total oil consumption. Since higher oil prices decrease oil-importing nations' income by transferring their money through trade balances to oil-exporting countries, rising oil prices are generally regarded as a significant exchange rate fluctuation indicator (Turhan et al., 2014).

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The relationship between three significant oil shocks and Industrial output, nominal exchange, and index of consumer prices (CPI). They found that in the BRICS countries, exchange rates were appreciating due to an overall demand shock. To investigate the oil shock effect, the researchers analyzed the US dollar and six other OECD country-specific bilateral currencies. The findings showed that shocks in aggregate global demand and petroleum demand are significant forces behind currency depreciation, but the effect of oil supply shocks is inconsequential (Cunado et al., 2015; Mandeij, 2020).

Fluctuations influence exchange rates and stock market dynamics in oil prices. Nigeria is projected to be the fifth biggest producer of OPEC petroleum. Even when all the known oil reserves are removed, there will be about 37 2 billion barrels. It accounts for more than 95% of export and foreign exchange income c from the oil sector and about 65% of government revenue from this source. In Nigeria's petroleum and natural gas, exchange rate variability has been linked to increased wealth. It has a chronic tendency to price valuations that are too favorable to exchange rates (Alam et al., 2017).

A selection of net exporters and importers of oil indicates, in the study, that supply jolts have a more significant impact on the currency rate Returns on oil exporters, and the effect of oil importers on demand shocks has increased. An aggregate demand shock is considerably more severe than a supply shock. Researchers also found that the current oil shock had a more significant effect than before the 2008 global financial crisis on actual exchange rates. Results will help the central bank stabilize currency more efficiently, and investors and risk managers will better assess portfolio risk linked to currency fluctuations correctly actuation. (Koong, 2018).

The study utilised a currency policy channel to evaluate how changes in oil prices impact Russia. According to this study, the rising oil price significantly affects the ruble's value, and the Russian economy is studied. The links between the price of oil and the Iranian economy have been examined (Markwardt & Fanegan, 2009). A significant decline in oil prices can potentially weaken the Iranian economy. For example, if the oil price lowers, the local currency depreciates, decreasing production and raising inflation (Iwayemi & Fowowe, 2011). It has been demonstrated that price shocks in the oil sector have no significant effect on the Nigerian economy. Additionally, we attempted to look at the Indonesian economy from a different vantage point. They discover that Petroleum prices have a significant economic effect (Alekhina & Yoshino, 2019; Shahbaz et al., 2016).

Significance of the Study

The importance of the research is evaluating the behavior and correlation between higher and lower oil prices and the currency, as well as the causal connections and exchange rates in developing and developed countries, to help investors by emphasizing variables of high importance to volatility. Exchange rates and statistics show that such shocks continue in oil prices. The report provides recommendations for investors, shareholders, academics, and policy-makers to grasp better the connection between oil prices and currency rates and their related economic possibilities and risk. The current study is unique from the existing research based on current data and evaluates the oil price shocks on the exchange market with COVID-19.

Objectives of study

- To empirically investigate the interconnectedness between oil price volatility and exchange rate.
- To analyse the impact of oil price shocks on exchange rate dynamics in Pakistan.
- To provide policy guidelines for the investors, SBP officers and trade finance investors in Pakistan.

REVIEW OF LITERATURE

Numerous studies have examined the relationship between oil prices and economic activity (Hamilton, 1996; Hamilton & Herrera, 2004; Lardicand Mignon, 2008)

The influence of oil price showed positive (Jalil et al., 2009); negative (Tange et al., 2010; Du et al., 2010); insignicant (Basnet & Upadhyaya, 2015) or asymmetric (Cunado & de Gracia, 2005; Zhang, 2008; Aziz & Dhalan, 2015). There are diversified results while researching to find the impact of oil price shocks on the stock market in Asian countries.

Numerous studies examined the nonlinear connection between oil prices and macroeconomic variables (Asghar et al., 2020; Brown & Yucel 2002; Lee et al., 1995; Hamilton, 1996; Mehrara, 2008; Jo, 2014; An et al., 2014; Wei & Zhao, 2016) and established that the adverse effects of higher oil price shocks are more significant than the positive effects of lower oil price shocks in oil-importing countries.

Yongcheol et al. (2014) studied the Co-integration methodology established for nonlinear Auto-Regressive Distributed Lag (ARDL). They were utilized to investigate the responsiveness of the rate of exchange to fuel rate shocks. The findings show that strong evidence suggests that the exchange rate is skewed and that such skewness is demonstrated throughout time, with slower depreciation following higher appreciation. Other things being equal, when positive or negative oil price shocks were applied throughout the test, the reaction of the exchange rate over time would be more vital to positive surprises than to negative ones. The results showed that the pace of adjustment differed across the participants.

Jawadi et al. (2016) used the GARCH jump version to analyses the connection, from August 2014 to January 2016, between crude oil prices and the euro/US currency. They indicate that oil prices fall as the U.S. currency depreciates against the euro. Furthermore, they demonstrate how vital currency exchange rate volatility transmission is for the crude oil market.

Arfaoui and Rejeb (2017) looked at the interdependencies of oil and gold from a global viewpoint in real-time, the U.S. currency, and stock prices. Natural and indirect correlations were established between 1995 and 2015 using a method based on the simultaneous equation system. The authors examined bilateral causal connections to develop theoretical solutions to the crucial problem Focused on multilateral relations. The results indicate that there are fundamental links between all markets. Initially, scientists discovered a negative relationship between oil prices and inventory prices, but gold and US dollars influenced oil prices considerably. Secondly, oil futures prices and Chinese gross oil imports affect petroleum prices. Third, the bursary influenced the dollar and the price of petroleum and gold; indirect effects have consistently reinforced global interconnectedness.

Iqbal and Raziq (2018) explored the connection concerning crude oil prices, Pakistan's rupee, and the U.S. currency. The effect of significant fuel rate fluctuations on the symbolic exchange rate must be quantified using routinely accessible data between 2006 and 2013. The auto-regressive conditional-horoscope Model (ARCH) was applied to the data; the returns significantly affected durability and leverage, and that Model was highly suitable for the details. The study investigated the oil shock effect; the researchers analyzed the US dollar and six other OECD country-specific bilateral currencies of the oil market and currency interlink.

Al-hajj et al. (2018) explored a study using oil prices and stock market returns nexus for Malaysia. Monthly data was taken from the period of 1990 to 2016. Nonlinear ARDL was used for the estimation and finding of the relevant results. The outcomes of the study found that the Malaysian stock market is susceptible while variations in oil prices.

Singhal et al. (2019). They examined a study to check the association between curd oil, gold, exchange rate, and stock returns. Data were taken from 2006 to 2018. Data was taken daily. The bound testing methodology based on Autoregressive Distributed Lag Model (ARDL) functioned. The results showed that gold prices significantly affected the stock prices while prices have negatively related to stock prices.

Castro and Rodriguez (2020) used an AVR model of the time-varying parameter to explore the Dynamic interactions, from January 1974 to July 2019, between Effective Exchange Rate (EER) and oil prices importing countries, such as the United States, using the monthly data. Although the pattern of long-term US EER replies varies across time, with a pre-mid-2000 and intermediate appreciation and depreciation in the mid-2010s, the results revealed short-term.

Alqaralleh et al. (2020) studied the influence of oil price shocks on the exchange rate of a sample of G20 nations, such as Australia, Brazil, France, Germany, India, Indonesia, Italy, Japan, Russia, Saudi Arabia, South Africa, and the United Kingdom, from 1994 to 2019. The first step was to locate asymmetric qualities in the sample of exchange rates.

Albulescu and Ajmi (2021) investigated a study to examine the relationship between the oil and stock markets of the US economy. Recursive evolving and rolling window causality methods were used to achieve the desired results. Results described that oil prices caused the USD real effective exchange rate and cemented the relationship after 2009.

Ali et al. (2022) examined their research and found a bearish trend in the stock exchange. The stock market has linked a sliding movement in oil during COVID-19. Yuan et al. (2022) explored that the BRIC's stock exchange market is more affected by inverse oil returns, whereas oil markets are more affected by buoyant stock markets.

RESEARCH METHODOLOGY

This research aimed to assess the effect of oil price shocks and currency volatility on Pakistan. Daily value was utilized to estimate oil prices and exchange rate returns between January 2013 and May 2021. The data utilized was based on a secondary source in this research. Data was gathered from the website (investing.com).

The trustworthy findings of the study may be attained with the usage of Descriptive Statistics, Correlation, Augmented Dickey- Fuller Test, VECM, Johan Integrationiont Tester, GGARCH 1.1 Model, And Impulse Response Function.

Oil Price Shocks

The difference in the first log assesses the connection between oil variations and the exchange rate with changes in oil prices. That was investigated; however, it is essential to identify the variables that influence oil prices so that the connection between oil and the exchange rate can be better understood. In order to look more closely at the connection, the researcher must first identify a shock to the oil price. In short, oil prices represent an unforeseen shift in oil prices when fundamental market values change. Oil prices reflect a change in oil prices.

Exchange Rate

The exchange rate is also considered to be the worth of one currency about another. Each nation sets the currency exchange rate system. For instance, a currency may be fluctuating, fixed or hybrid. Management may implement some exchange-rate restrictions and regulations. There may also be solid or weak currencies in countries.

Currency rates are set under floating foreign exchange systems for a broad range of purchasers and sellers, where the foreign exchange transaction continues: 7 days a week, 24 hours a day, except weekends.

Correlation

Correlation may measure linking but cannot clearly show that x causes y or y causes x. It may illustrate the strength of a connection between two variables and aid in its numerical representation through the correlation coefficient. This research uses Correlation analysis to investigate the connection between macroeconomic variables.

Equation for Correlation

$$\boldsymbol{r} = \frac{\sum\left(\mathrm{x}_i - \bar{x}\right)\left(\mathrm{y}_i - \bar{y}\right)}{\sqrt{\sum\left(\mathrm{x}_i - \bar{x}\right)^2 \sum\left(\mathrm{y}_i - \bar{y}\right)^2}} \tag{1}$$

r = Coefficient of correlation
x_i = x-variable value in the sample
x = mean value of x-variable
y_i = y-variable value in a sample
y = mean value of y-variable

Augmented Dickey-Fuller Test

The increased Dickey–Fuller (ADF) test is used in statistics and econometrics to establish if a time-series sample includes a root unit. The alternative hypo Research varies by test version but is usually stationary or trend steady. The Dickey-Fuller Test is an upgraded version suited to a broader and more complex collection of time series models. The test statistics are a negative number termed the Dickey–Fuller (ADF) enhanced statistics. The less it is, the more firmly it contradicts the unit root theory. The ADF test is conducted using the same method as the Dickey–Fuller test except for the model.

Johansen Co-integration Test

In statistics, the Johansen test is a method that co-integrates multiple time series, say k, I. Søren Johansen (1). This test enables more than one interaction and therefore is more broadly applicable than the Engle-Granger test based on a single (estimated) interplay Dickey–Fuller unit root test.

Equation of co-integration

$\lambda_{\text{trace}}(r) = -T\sum_{i=r+1}^{g} \text{In}\left(I - \lambda_i^{\wedge}\right)$

$\lambda_{\max}(r, r+1) = -T\,\text{In}\left(I - \lambda_{r+1}^{n}\right)$

There are two kinds of Johansen tests with their trace or value, and their conclusions may be somewhat different. The null hypo Research for the test is that Co-integration vector numbers are $r = r* < k$ versus $r = k$. The $r*$ test continues sequentially = 1, 2, etc., and r estimates are the first null non-reject. The null hypo Research for a trace test is the 'maximum value' test, but the alternative is to successively $r = r * +1$ and again $r* = 1$ two two etc.; the first non-rejection was used to estimate *r*.

Impulse Response Behavior

A dynamic system's impulse response or pulse response function (IRF) is its output in signal processing if a short input signal, termed an impulse, is given. More broadly, an impulse response refers to the reaction of the dynamic system to an external change. In both instances, the pulse response characterizes the system reaction as time-based (or perhaps as a function of some other independent variable that parameterizes the system's dynamic behavior) (or possibly as a function of another independent variable that parameterizes the system's dynamic behaviour).

GARCH (1, 1)

The GARCH (Generalized Autoregressive Conditional Heteroskedasticity) model was developed specifically for modelling and forecasting conditional differences. The dependent variable's variance is modelled as a function of the dependent variable's previous values and the independent or external variables' values. For this brief discussion, we will use the term ARCH to refer to both the ARCH and GARCH models, except where there is a danger of confusion.

$$\gamma_t = \alpha + \beta Xt + \mu_t \tag{2}$$

$$h_t = \gamma_0 + \delta_1 h_{t-1} + \gamma_1 \mu_{t-1}^2 \tag{3}$$

GARCH is a mathematical model that may be used to evaluate various financial data, including macroeconomic data. Typically, financial companies utilize this method to assess the volatility of stock and market index returns. They utilized the resultant data to assess prices, discover potentially higher-yielding assets, and predict current investment returns to assist in asset allocation, hedging, risk management, and investment choices. GARCH may be used to adjust for the asymmetric impact of opinion on stock prices.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1: Descriptive Statistics of the Expected Return of Oil Prices and Exchange Rates

Variable	Mean	Maxi	Mini	SD	Skew.	Kurt.	Obs.
Δ Exchange rate	0.00013	0.0796	-0.0541	0.04464	-2.986	77.028	2188
Δ Crude oil	0.00034	0.31732	-0.2798	0.02842	0.338	29.763	2188

Table 1 shows the average return of crude oil is 0.00034 in a day while the standard deviation is 0.0338. Maximum return in crude oil found with the value of 0.317. The minimum return of crude oil during the sample period is -0.2798. Skewness implies favorable skewing of values. If kurtosis equals 3, normal distribution and pattern are referred to as mesocratic. If the number is > 3, the pattern is termed leptokurtic, with the peak and fat tail at the same time. But when the kurtosis value is less than 3, it is termed platycurtic and at the same time less peak and thinner tail. The leptokurtic compliance with a maximum value of 03173 exhibits all values in the table. Kurtosis also indicates that the data are flat and thinner.

Correlation Test

Table 2: Correlation between Changes in Exchange Rates and Crude Oil Price Returns

Variables	R_ER	R-OP
R_ER	1	
R_OP	0.154**	1

Significant level at **0.01, significant level at *0.05

Table 2 shows the correlation between the exchange rate and crude oil returns. Crude oil return shows a relationship with exchange rate return with a value of 0.154, positively significant at level 0.01. Correlation findings confirm that both variables have a positive correlation, meaning an increase or decrease in one variable becomes cause to increase or decrease in another variable.

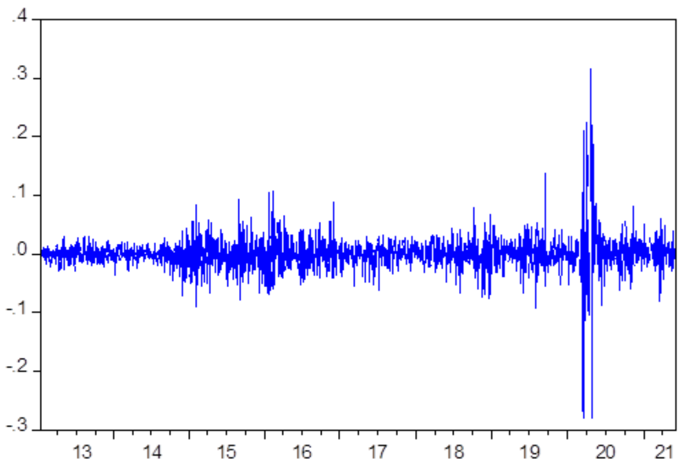

Figure 1: Oil Return Behaviour Graph 2013 to 2020

Figure 1 shows the oil return behaviour graph from 2013 to 2020. This graph indicates the volatility of oil return. Volatility means the ups and downs in oil return. The oil return was more volatile in 2019 last month or before starting 2020. The return of oil is less volatile at the start of 2013. From 2014 to 2019, volatility was between -1 to 1, which is considered the standard period. The graph also shows the volatility from the 2020 to 2021 average. It means oil returns were not more volatile from 2020 to 2021.

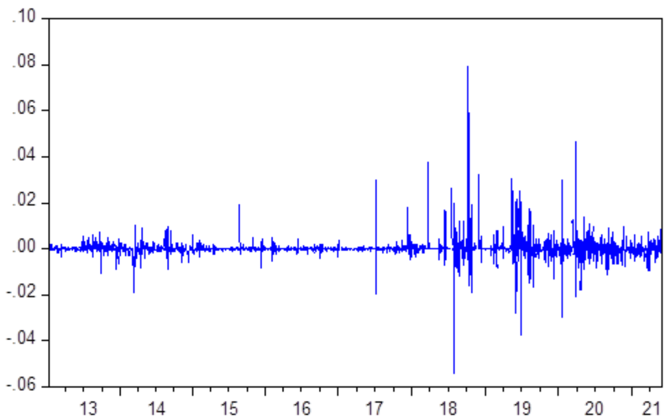

Figure 2: Return Behavior of Exchange Rate Graph 2013 to 2021

Figure 2 indicate the return behavior of the exchange rate. The exchange rate returns show less volatility from 2013 to 2018, and after that, volatility increased in exchange rate returns.

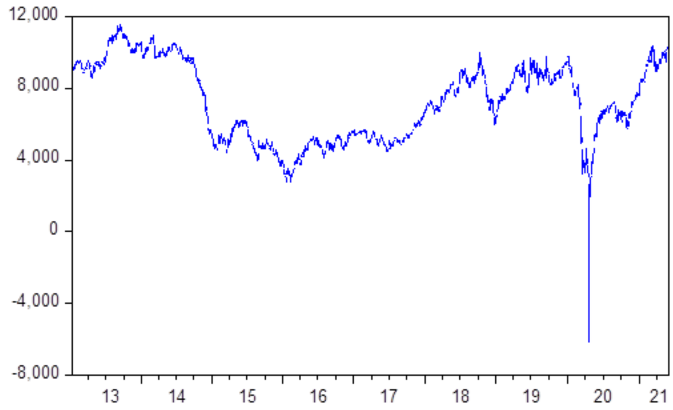

Figure 3: Trend Graph of Crude Oil Prices from 2013 to 2021

Figure 3 shows the trend of crude oil prices from 2013 to 2021. The trend figure shows the changes over the period. Crude oil prices increase and decrease over the period. However, on 20 April 2020, decrease price of crude oil went to a negative value.

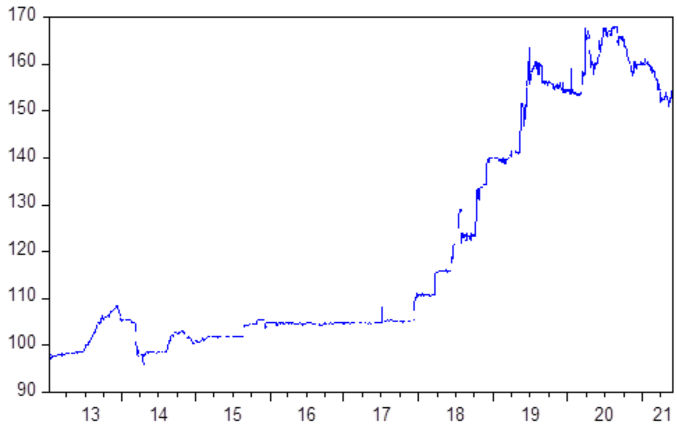

Figure 4: Trend Graph of Exchange Rate 2013 to 2021

Figure 4 shows the trend of the exchange rate from 2013 to 2021. The graph indicates no more change from 2013 to 2017. It indicates that prices of exchange rates do not increase. From 2013 to 2017, prices of exchange rates lie between Rs90 to Rs110. After 2017 the graph shows an increasing trend in exchange rate prices. The period of increased exchange rate prices start from 2018 to 2021, and prices of exchange rate lie between Rs110 to Rs153.

Table 3: Unit Root Test with an Intercept on Oil Prices and Exchange Rates

Country	Variable	ADF Unit Root Test	Test Stat	1% Critical Value	5% Critical Values	10% Critical Values
Pakistan	Crude oil	At levels	1.6642	-3.4331	-2.8626	-2.5764
		1st Difference	-34.866	-3.433	-2.862	-2.5764
		2nd Difference	-17.781	-3.4331	-2.8626	-2.5764
	Exchange Rate	At levels	-0.1323	-3.4331	-2.8626	-2.5764
		1st Difference	53.1758	-3.4331	2.86266	2.57641
		2nd Difference	-18.422	-3.4331	-2.8626	-2.5764

Table 3 Unit root test with intercept conducted to confirm whether data series is stationary or non-stationary. The above table represents Crude Oil at level *t* statistics of 1.6642, less than the critical value of 1%, 5% and 10%. That means the time series is non-stationary, and the null hypo Research must be rejected. At 1st and second

differences, *t* statistics are above critical values at 1%, 5%, and 10%, showings that the series is stationary, so we accept the null hypo Research.

The above table represents the exchange rate at level *t* statistics is -0.1323, which is less than the critical value at 1%, 5% and 10%. That means the time series is non-stationary, and the null hypo Research must be rejected. At 1st and second difference, *t* statistics are above than critical value at 1%, 5%, and 10% showing that series is stationary, so we accept the null hypo Research.

Table 4: Unit Root Test with Intercept and Trend on Oil Prices and Exchange Rates

Country	Variable	ADF Unit Root Test	Test Stat	1% Critical Value	5% Critical Values	10% Critical Values
Pakistan	Crude oil	At levels	-1.5411	-3.9622	-3.4119	-9.3835
		1st Difference	-34.883	-3.9622	-3.4119	-3.1278
		2nd Difference	-17.777	-3.9623	-3.4119	-3.1278
	Exchange rate	At levels	-0.1323	-3.4331	-2.8627	-3.1278
		1st Difference	-53.176	-3.4331	-2.8627	-3.1278
		2nd Difference	-18.423	-3.4332	-2.8627	-3.1278

Table 4 Unit root test with intercept conducted to confirm the sequence of data is stationary or not stationary. The above table represents Crude Oil at level t statistics is -1.5411, which is less than the critical value at 1%, 5% and 10%; that mean time series is non-stationary, and the null hypo Research must be rejected. At 1st and second differences, *t* statistics are above than critical value at 1%, 5% and 10% showing that series is stationary, so we accept the null hypo Research.

The above table shows that the exchange rate at level t statistics is -0.1323, less than the critical value at 1%, 5% and 10%; the mean time series is non-stationary, and the null hypo Research must be rejected. At first and second, the difference *t* statistics is above than critical value at 1%, 5%, and 10%, showing that the series is stationary, so we accept the null hypo Research.

Multivariate Co-integration Test Results (Period: 2013-2021)

Table 5: Unrestricted Co-integration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.292726	1349.05	15.49471	1
At most, 1 *	0.238089	593.3413	3.841466	0

Trace test indicates one co-integrating eqn (s) at the 0.05 level.

Table 6: Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.292726	755.7083	14.2646	0.0001
At most, 1 *	0.238089	593.3413	3.841466	0

The max-eigenvalue test indicates one co-integrating eq n (s) at 0.05.
*Denotes rejection of the hypo Research at the 0.05 level.
**MacKinnon-Haug-Michelis (1999) *p*-values.

Joselius and Johansen (1990). We may progressively go from $r = 0$ to $r = k = 1$ to calculate the number of co-integration ratios r based on trend assumptions until we refuse. The estimate presupposes for each group that the data level has no deterministic patterns and that there are intercepts in the combined equations. Intercepts. Interval delays 1 to 4 are employed by the Akaike Information Criterion (AIC). The results show that the set is co-integrated in both recession and post-recession periods, as both the data trace and the maximum own value statistics reject the zero hypotheses of nothing and one co-integrating vector in both periods. The trace test and own maximum value were identified. The test is significant at the level of 5 per cent. However, in the pre-recession Period, only the Statistics of Eigenvalue reveal Co-integration. In addition, one vector co-integrated Trace test and maximum own value test were identified in each of the three periods. These are significant at 5 per cent. This means that common stochastic trends indicate an integration of the economy between crude oil prices and exchange rates. There is, therefore, a stationary long-distance relation between the variables set (crude oil prices and exchange rates).

Impulse Response Function

In Figure 1, the impulse response of the exchange rate is low on day 1, then it increases on day two and continues to day 4. After day 4, it declined.

In Figure 2, the response of the exchange rate to oil price in the change in oil and price exchange rate is the same and from day 3, it starts to increase and again, the response of oil and exchange rate declined, and at the end, it again built a positive relation.

In Figure 3, the impulse response between the price of oil and the currency is that the exchange rate is high as the prices are increased.

In Figure 4, the impulse response of oil price on day 1 is high, and then it declines, and after day two, it is increased slowly.

Table 7: GARCH (1, 1)

Mean Equation				
Parameter	Coefficient	Std. Error	*z*-value	*p*-value
C	0.000361	2.58E-05	13.9648	0.000
R_ER(-1)	-0.312927	0.010826	-28.906	0.000
Variance Equation				
C	5.43E-06	7.90E-08	68.7232	0.000
RESID(-1)∧ 2	1.66032	0.0306	54.2595	0.000
GARCH(-1)	0.095163	0.00794	11.9852	0.000
Diagnostic Test				
R-squared	-0.027991	Mean dependent variable	0.0002	
Adjusted *R*-squared	-0.028461	S.D. dependent variable	0.00449	
S.E. of regression	0.004553	Akaike info criterion	-8.5196	
Sum squared residual	0.045336	Schwarz criterion	-8.5066	
Log-likelihood	9329.702	Hannan-Quinn criteria.	-8.5149	
Durbin-Watson stat	1.621514			

Table 7 has demonstrated that the GARCH model (1, 1) indicates that the lagged residual squared β = 1.66032 was statistically insignificant, whereas the lagging conditional variance β = 0.095163 and the exchange rate change were statistically significant. The value of $\alpha 1$ and $\beta 1$ is higher than that, indicating the model is incorrect. The $\alpha 1$ value, therefore, showed that changes in the exchange rate positively and substantially influence present market volatility. The effect of historical volatility is $\beta 1$, which is likewise positive and more significant than the *p*-value. This means that current and historical currency changes influence stock market volatility. During the 2007–2010 worldwide financial crises, when volatility was high, Pakistan's PSX stock market showed a basic illustration of this conclusion. The crisis has, however, taken time to stabilize the stock market. The findings are statistically significant such that we accept the assumption that the exchange rate has impacted crude oil volatility.

CONCLUSION

Daily data from January 2013 to May 2021 on crude oil prices and currency rates were used. The Augmented Dickey-Fuller (ADF) test revealed that all series had a stationary significance of 1 per cent, 5 per cent and 10 per cent. During this research, we utilized daily data from January 2013 to May 2021 on crude oil prices and currency rates. The sum of the coefficients (α + β) in the present study is very close, which shows that volatility shocks are still persistent and long-lasting in the conditions of variation in exchange rates. The standard deviation was over 4 per cent daily during the 2008 to 2010 worldwide financial crises. In this Research, we used daily data for

January 2013 to May 2021 Prices and exchange rates for crude oil. The ADF test revealed that the whole series is stationary regarding crude oil prices and exchange rates. The ADF test has shown that the whole series is stationary and of importance. In addition, in the present study, the sum of coefficients ($\alpha + \beta$) is very near that, indicating that volatility shocks are persistent and long-term in the conditional exchange rate variances. Most values ranged from a day. The standard deviation was more during the global financial crises between 2008 and 2010. In this Research, we used daily data for January 2013 - May 2021 on crude oil and exchange rates. The ADF test has shown that all series are standard with significance. In addition, GARCH'S total coefficients ($\alpha + \beta$) are near one in this study, showing that the volatility shocks in the conditional exchange rate variances are quiet and persistent in length. Most values ranged from 4 to 4 percent daily—the standard deviation under the global financial crises from 2008 to 2010.

Limitations

This Research focused on similarities and variations in oil price volatility. It showed valuable empirical results, some of which identified the cause of the volatility of the exchange rate. It did not use additional techniques such as EGARCH and IGARCH to assess volatility but was primarily centered on the Garch model. The research utilized the GARCH model (1, 1) to estimate financial time series volatility and to evaluate the presence of reliance on the exchange rate return. The model is sufficient to represent oil price dynamics. The Research does not seek to identify all potential reasons for the phenomena of exchange rates. The model employed must partially represent the leverage and asymmetry characteristics in inventory returns. A model that measures both elements may thus contribute to a better understanding of oil prices and currency rates.

Recommendation

There are several suggestions regarding future research:

- Range of data may be used for the desired results.
- To check the impact of oil prices on stock markets, and economic development data of developed economies may be used for further analysis.
- Other macroeconomic variables like inflation rate, GDP, interest rate and industrial production can be used in further study.

Practical Implication

Investors and traders should implement a dynamic approach to portfolio management, especially for short-time buying/selling decisions. The findings also imply that oil price shocks significantly affect the exchange rates during the pre-COVID-19 period. Given significant spillovers of oil price shocks among the exchange rates, investors should seek alternative instruments to hedge the exchange rate risks.

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