Dynamic Oil Price–Stock Market Volatility Spillovers in Oil-Exporting Countries

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Abstract

This study investigates the dynamic volatility spillovers between oil prices and stock markets in selected oil-exporting countries using the Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroskedasticity (DCC-GARCH) framework. By allowing correlations to evolve over time, the model captures the transmission of oil price uncertainty to equity market volatility under changing market conditions. The empirical results reveal limited evidence of volatility spillovers from oil prices to stock markets across most oil-exporting economies, including the DFM, Moscow Exchange, NSE30, BMVIPC, Oslo Stock Exchange, and Toronto Stock Exchange. These findings suggest that stock markets in several oil-exporting countries are relatively insulated from short-term oil price fluctuations, potentially reflecting economic diversification, institutional strength, and effective stabilization mechanisms. However, evidence of persistent volatility transmission between oil prices and the Oslo Stock Exchange indicates that in highly oil-dependent economies, sustained oil price uncertainty can exert prolonged effects on equity market volatility. Overall, the study highlights the heterogeneous and time-varying nature of oil–stock market volatility linkages and underscores the importance of dynamic modeling approaches for understanding risk transmission in oil-exporting countries. The findings offer valuable implications for investors, policymakers, and risk managers concerned with portfolio diversification and financial stability.

Keywords -

JEL Codes: C58, G15, Q43, Q40

Introduction

Oil price fluctuations play a pivotal role in shaping macroeconomic conditions and financial market dynamics, particularly in oil-exporting countries where government revenues, corporate profitability, and investor sentiment are closely tied to the performance of the energy sector. Since oil represents both a key production input and a major source of export earnings, shocks to oil prices can transmit rapidly to stock markets through multiple channels, including cash flows, discount rates, fiscal balances, and exchange rate movements. Consequently, understanding the nature and intensity of volatility spillovers between oil prices and stock markets has become a central issue in energy and financial economics.

Early empirical studies primarily focused on the impact of oil price shocks on stock returns, documenting significant but heterogeneous effects across countries and market structures (Cong et al., 2008; Park & Ratti, 2008; Bjørnland, 2009; Bhar & Nikolova, 2009; Siddiqui et al., 2020; Atif et al., 2022). Subsequent research extended this framework to emerging and oil-dependent economies, particularly the Gulf Cooperation Council (GCC) and MENA regions, highlighting strong bidirectional linkages and feedback mechanisms between oil prices and equity markets (Arouri & Rault, 2010; Berument et al., 2010; Filis et al., 2011). These studies emphasize that oil-exporting countries are especially vulnerable to oil price uncertainty, as volatility shocks can amplify financial market instability.

More recent contributions shift the focus from mean relationships to volatility transmission and dynamic dependence, recognizing that correlations between oil and stock markets are neither constant nor symmetric over time (Masih et al., 2011; Akoum et al., 2012; Basher et al., 2012; Siddiqui et al., 2023). In this context, the Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroskedasticity (DCC-GARCH) framework has emerged as a powerful econometric tool, as it allows time-varying correlations and captures evolving volatility spillovers under changing market conditions (Filis et al., 2011; Syed & Bouri, 2022; Ahmed et al, 2025; Ahmed and Kaur, 2025; Ahmed, 2025a, Ahmed, 2025b). Empirical evidence suggests that periods of heightened uncertainty—such as global financial crises, oil supply disruptions, and geopolitical tensions—intensify volatility co-movements between oil and stock markets in oil-exporting economies.

Recent studies further underline the importance of accounting for nonlinearities, asymmetries, and regime-dependent behavior in oil–stock market interactions (Rahman, 2022; Liu et al., 2023; Chang & Chang, 2023).

These findings reinforce the argument that volatility spillovers are dynamic, time-varying, and sensitive to global and domestic economic conditions. Against this backdrop, the present study employs the DCC-GARCH model to examine volatility spillovers between oil prices and stock markets in oil-exporting countries, offering fresh insights into the evolution of conditional correlations and the implications for portfolio diversification, risk management, and policy formulation.

Literature Review

The literature examining the relationship between oil prices and stock markets has expanded substantially over the past two decades, reflecting the growing recognition of oil price volatility as a critical source of financial market uncertainty, particularly in oil-exporting economies. Early studies predominantly investigated the impact of oil price shocks on stock returns and macroeconomic performance, documenting significant yet country-specific responses driven by differences in economic structure, energy dependence, and financial market development (Cong et al., 2008; Park & Ratti, 2008; Bjørnland, 2009; Bhar & Nikolova, 2009). As research progressed, attention shifted from static mean-based relationships to dynamic interdependence and volatility transmission, acknowledging that oil–stock market linkages are time-varying and sensitive to global economic conditions (Filis et al., 2011; Masih et al., 2011). This evolving strand of literature increasingly employs multivariate GARCH frameworks—particularly the Dynamic Conditional Correlation (DCC-GARCH) model—to capture changing correlations and volatility spillovers between oil prices and equity markets, offering deeper insights into risk transmission, portfolio diversification, and market integration in oil-exporting countries (Arouri & Rault, 2010; Akoum et al., 2012; Syed & Bouri, 2022). Following studies discussed are the notables in literature.

Cong et al. (2008) analyzed the relationship with the Chinese stock market and the prices of crude oil. To obtain results study examines the data from 1996 to 2007, to check for the unit root tests by using Philips-Perron and ADF tests. To check the relationship paper applies the Johansen Juseliusco-integration test, Vector Autoregressive (VAR) results demonstrate shocks in the oil prices that can increase the volatility in related indexes, such as mining and petrochemicals. Overall, the work concluded that a weak positive correlation between the stock market and various macroeconomic indicators.

Park and Ratti (2008) investigated the influence of crude oil on the equity market of the US and 13 European countries. As per the findings of the variance decomposition analysis, the 6 percent change in the volatility of stock return due to oil price shocks, for various European countries. The increase in the oil price volatility decreases the stock prices significantly.

Bjørnland (2009) examined the interdependence of equity market returns in Norway and oil prices. The author applies the structural VAR to check the transmission from oil prices. Further, the results find that a 10% rise in oil prices leads to a 2.5 percent increase in returns. The study also finds the role of other shocks in driving the stock market, particularly the monetary shock. Overall, oil prices affect the variables of the Norwegian economy by increasing the demand, as well as wealth.
Bhar and Nikolova (2009) investigated the interconnectedness of the equity returns and prices of oil in BRIC countries (Brazil, Russia, India, and China). Data in the study varies from Jan 1995 to 2007 and is of weekly frequency. The author uses the EGARCH model to examine the spillover effect. Dynamic conditional correlation is used along with mean and volatility spill-over effect. The research results work indicate that the influence of oil prices on equity returns depends share of oil imports in the economy. China being among the top importers shows the interdependence among oil and stock returns. Further, it shows that even after being a major economy, the influence of stock returns is not observed on the oil.

Lescaroux and Mignon (2009) studied the linkages of the prices of oil with various macroeconomic and financial variables in oil exporting and importing countries. The short and long-run linkages are analyzed by Granger-Causality and co-integration tests respectively. Findings indicate the presence of interconnected among the oil and the macroeconomic and financial variables. The linkage among oil and equity returns is however notable.
Sari et al. (2010) explored the connectedness of the oil prices with the dollar/euro exchange rate, and precious metals. The indication of a linkage between the spot prices of precious metals with other metals and the exchange rates is observed, though the long-term linkage among the indicators is weak.
Berument et al. (2010) assessed the influence of prices of oil on the growth output of the MENA countries which are either net exporters or net importers of oil. Using the Vector Autoregressive method, the author found the crucial effect of oil prices on the output of the MENA countries such as Algeria, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Syria, and the United Arab Emirates. In contrast, no significant effect on the output of Bahrain, Djibouti, Egypt, Israel, Jordan, Morocco, and Tunisia. In further analysis, oil supply shocks are linked with lower output growth, whereas the demand shock affects the output positively.

Šimáková (2011) analyzed the connection between WTI oil and world gold prices. The study utilizes the monthly frequency data ranging from 1970 to 2010. The study applies the Co integration, Granger causality, and VECM to check the relationship. Results detect the persisting relationship joining gold and oil prices.

Filis et al. (2011) explored the time-varying correlation between the equity, and oil prices in oil exporting and importing countries. The study makes use of DCC-GARCH-GJR in the study on the six nations exporting oil. The important finding of the research is the correlation does not vary for the countries exporting and importing the oil, but the correlation increases or decreases because of fluctuations in the oil demand due to global turmoil. Further, a dependence on the oil and equity returns. However, the correlation is positive during the GFC of 2008. The study concludes that the oil market is not a haven during a crisis kind of situation, for instance, war.

Arouri and Rault (2011) analyzed the co-integrating interrelation among the oil and share market in the Gulf Co-operation Council countries. The study makes use of monthly data ranging from January 1996 to December 2007. Data is collected from the stock market of GCC countries available for four countries. Bahrain, Kuwait, Oman, and Saudi Arabia. The authors use a bootstrap panel co-integration technique and a seemingly unrelated regression method. The study discovers the cointegration among the oil and equity markets of studied countries and regression method results indicate the positive influence of oil prices and equity returns in Saudi Arabia.

Masih et al. (2011) explored the role of volatility in oil prices, affecting the equity returns in the South Korean Market. The study covers the Asian financial crisis and detects the volatility of oil has a notable influence on the share market returns of South Korea.

Bodenstein et al. (2011) examined the role of external shocks in oil prices. Authors observed the variations in the oil prices that increase prices, and transfer the wealth towards oil exporting countries. Moreover, it declines consumption and depreciates the oil prices in the oil-importing country.

Basher et al. (2012) studied the oil prices, stock markets, and currencies in the emerging markets. The authors apply the IRF (Impulse Response Function) and the structural autoregression model to probe the time-varying linkages among the variables. Findings indicate that positive shocks affect the equity markets negatively, and the US dollar in the short-run.

Samadi et al. (2012) examined the dependence between the stock return of the Tehran stock exchange and macroeconomic variables. The study includes exchange rates, world gold prices, inflation, liquidity, and oil prices in macroeconomic variables. The data period used by the authors is 1999 to 2011, and employ the (GARCH) technique to detect the influence of macroeconomic variables on the share market and leverage impact in the Tehran Stock Exchange. The research findings indicate that there is no impact of gold price or inflation on the stock returns in Tehran.

Lee et al. (2012) examined the linkages between the prices of oil and gold futures. The study employed an ECM with GARCH to check the asymmetrical long-term and causal linkage among the WTI prices of oil and gold futures in the market. Results indicate the asymmetrical cointegration between the variables.

Asaolu and Ilo (2012) explored the linkages between the Nigerian stock market and the prices of oil. The author analyses it using the VECM and co-integration method, on data from 1984 to 2007. Further, research findings indicate a long-term interrelation between the oil and the stock market, and are tied together in the long run. Further in the results, the relationship is negative, during the rise in the oil prices, the equity returns in Nigeria decreased, though the oil sector is dominant in the Nigerian economy.

Akoum et al. (2012) investigated the long and short-run dependence between a basket of prices of crude oil, and equity returns, of six GCC countries, all six oil-producing countries, and two non-oil-producing countries, Jordan and Egypt. The study employs data from a period ranging from 2002 to 2009 and uses wavelet coherence methodology in analysis. Findings suggest that short-term dependency is weak among crude oil and stock returns, while dependency is strongly linked in the long-term during the studied period. Further analysis shows dependency increases after 2007 and it varies across the different countries.

Omag (2012) investigated the connectedness of prices of gold and select financial variables in Turkey, on data periods ranging from Jan 2002 to December 2011. The study makes use of the ANOVA regression model to check the relationship. The research findings indicate that there is a positive association between the national gold price and the Istanbul Stock Exchange 100 Index.

Bhunia and Das (2012) studied the linkage between Gold and stock prices in India. The study makes use of data ranging from April 2001 to March 2011. Authors apply Johansen Co integration to check long-term and Granger causality to check short-term relationships. The research findings indicate co-integrating linkages between the gold price and the National Stock Exchange Market in India. Short-term causality results of Granger causality suggest a causal relationship between gold and the stock market, indicating causality from gold price to the stock market.

Mensi et al. (2021) explored the interrelation among the oil futures, sectoral indices of China, and gold futures. The study used the Diebold and Yilmaz spillover index to check the time-varying asymmetrical spillover among the oil prices and the sectoral indices.

Syed and Bouri (2022) studied the volatility spillover due to uncertainty in world economic policy and the prices of oil, on the volatility of the equity markets of oil importing and exporting countries. The findings indicate that uncertainty in economic policies has a smaller effect in exporting countries, in comparison to the oil importing countries. However, volatility spillover of oil prices is higher in exporting countries in relation to countries importing oil.

Atif et al. (2022) explored the linkages across the equity markets and the prices of crude oil in the oil-exporting and importing countries. The study applies the Granger-Causality, and impulse response function. The study found increased dependence, in response to a crash in oil prices during the pandemic. Though oil prices affected both oil importing and countries exporting the oil prices, the oil prices had a larger effect on the countries exporting the oil.

Philips et al. (2022) probed the influence of exchange rate and inflation in the cyclical nexus of the prices of oil and the exchange rate in the oil-exporting and importing countries. The study finds the effect of inflation insignificant, whereas, the influence of the exchange rate is significant.

Rahman (2022) examined the asymmetric linkage between the crude oil price and the U.S. aggregate real stock returns. The authors find the asymmetric influence of the positive and negative oil price shocks. The effect of oil price asymmetries is significant in affecting stock returns.

Chang and Chang (2023) studied the linkages between oil price, share market, and currency of China, by applying the Bayesian Multivariate quantile on quantile approach. Authors found the links between the combination of oil price and share price, and stock price and exchange rate vary at different quantiles.

Liu et al. (2023) studied the co-movement between the volatilities of the prices of oil and the share price. The authors applied the quantile regression, dynamic copula, and Markov-Switching, on the data range 2000 to 2020. Tien and Hung (2022) examined the influence of spillover among the GCC stock markets, by applying the wavelet-based DCC approach. Findings indicate spillover effect is time-varying, and is found at different time scales. The linkages are observed in the short-term, medium-term, and long-term. Further, the negative shocks have a more profound impact in comparison to the positive shocks.

Kaur and Mittal (2023) studied the interconnection of the prices of oil, the equity market, and the Indian Rupee. The study applies the Johansen cointegration and the wavelet coherency to study the relationship. The findings detect the impact in the short run, and the relationship becomes stable in the long-run.

In summary, the existing literature provides strong evidence that oil prices and stock markets are closely interconnected, with volatility spillovers playing a particularly important role in oil-exporting economies. While earlier studies focused largely on the impact of oil price shocks on stock returns or macroeconomic variables, more recent research highlights the time-varying, asymmetric, and nonlinear nature of oil–stock market linkages using advanced econometric techniques such as multivariate GARCH, wavelet, and quantile-based approaches. Despite these advances, several gaps remain. First, empirical evidence on volatility spillovers in oil-exporting countries is still fragmented, with limited comparative analysis that captures evolving conditional correlations across different market regimes. Second, many studies either rely on static correlation measures or focus on mean effects, thereby overlooking the dynamic transmission of volatility under changing economic and geopolitical conditions. Third, relatively few studies systematically employ the DCC-GARCH framework to jointly model volatility spillovers and time-varying correlations between oil prices and stock markets in oil-exporting economies. Addressing these gaps, the primary objective of the present study is to examine the magnitude and dynamics of volatility spillovers between oil prices and stock markets in oil-exporting countries using a DCC-GARCH approach, thereby offering new insights into risk transmission, portfolio diversification, and policy implications in energy-dependent financial systems.

Methodology and Data

The study makes use of 10 years of data ranging between January 2013 to March 2023, of stock markets and currency rates of major oil exporting countries, along with the Brent crude oil prices.

Table 1 Oil Exporting Countries and Stock Markets

Country	Stock Market
Saudi Arabia	Tadawul
UAE	DFM
Russia	Moscow Exchange
Nigeria	NSE30
Mexico	BMVIPC
Oman	MSM30
Brazil	BOVESPA
Iraq	ISX60
Canada	TSX
Norway	Oslo Stock Market

DCC-GARCH (Dynamic Conditional Correlation GARCH)

Developed by Robert Engle in 2002, DCC-GARCH is the extended form of the GARCH model that models the correlation between the time-series data over the period. The parameters of the DCC-GARCH, model the volatility, and the linkages with the volatilities in the long and short-run. It is crucial tool to measure the diversification potential among the financial variables. The variance and mean equations of the DCC GARCH are the following. The α and β, parameters measure the ARCH and GARCH effects respectively.

$$r_t = u_t + e_t \tag{1}$$

r_t is the return of the series, u_t and $e_t$are constant and vector of residual respectively.

n $$h_t = c + \alpha e_{t-1}^2 + \beta h_{t-1} \tag{2}$$

$h_t$here stands for the conditional volatility, whereas $c$is the constant. $\alpha$is the ARCH effect, whereas β measure the GARCH effect.

$$H_t = D_t R_t D_t \tag{3}$$

matrix of conditional co-variance matrix is represented by the H_t, whereas D_t represents the k x k diagonal matrix with the time-varying standard deviations on the diagonal. R_t is the time-varying correlation matrix. R_t further can be defined as -

$$R_t = Q_t^{*-1} Q_t Q_t^{*-1} \tag{4}$$

$$Q_t = (1-(1-\theta_1-\theta_2)Q^* + \theta_1\varphi_{t-1} + \theta_2\varphi_{t-1} \tag{5}$$

Q_t is the conditional variance that follows a GARCH process. Q_t^* is the unconditional co-variance estimated in the steps above. θ_1 and θ_2 are the scalar parameter measuring the long, and short-term effect on the conditional correlation. The conditional correlation estimator can be written as –

$$\rho_{ijt} = \frac{q_{ijt}}{\sqrt{q_{ii}\, q_{jj}}} \tag{6}$$

Results and Findings

This section includes the transmission of volatility among the oil prices and the share markets of the oil-exporting countries. The results are based on the DCC-GARCH model.

The DCC GARCH model was developed by Engle (2009), it measures the conditional correlation between the variables. The parameters mu and omega measure the estimated mean and constant term in the volatility equation respectively. Further, the parameters alpha1 (α) and beta1 (β) measure the volatility spillover in the short and long-run respectively. The dcca1 and dccb1 represent the joint α and β, representing the joint ARCH and GARCH effect respectively.

Oil Prices and Tadawul

The estimated mean, of the oil prices, is not significant, as the p-value is higher than 0.05, similarly, the consta nt term in the volatility equation is not significant. Whereas, the GARCH and ARCH terms are significant for th e oil prices, the co-efficient are 0.87 and 0.12 respectively. In the case of the Tadawul, the estimated mean with a standard error is very low, but significant, whereas the constant term in volatility is not significant. The stock market of Saudi Arabia, Tadawul, shows a significant ARCH effect of 0.10, whereas the coefficient of the GAR CH effect is 0.94. Further, the spillover from oil prices to the Saudi share market in the short-term is 0.01. Th e transmission spillover in the long term is high at 0.94.

Table 2 Oil Prices and Tadawul

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000339	0.34126	0.732911
ROIL.omega	0.000006	0.000004	1.37038	0.170569
ROIL.apha1	0.122578	0.016359	7.49316	0.000000
ROIL.beta1	0.876422	0.013349	65.65515	0.000000
RSATADAWUL.mu	0.000754	0.000179	4.20283	0.000026
RSATADAWUL.omega	0.000004	0.000003	1.06051	0.288911
RSATADAWUL.alpha1	0.103516	0.018623	5.55864	0.000000
RSATADAWUL.beta1	0.877777	0.032373	27.11419	0.000000
Dcca1	0.17930	0.008654	2.07200	0.038265
Dccb1	0.941039	0.038237	24.61037	0.000000

Oil Prices and Dubai Financial Market

The UAE stock market indicates significant ARCH and GARCH effect of 0.12 and 0.87, respectively. The h igh GARCH effect of 0.87 shows that there is a high volatility persistence. The, α parameter, showing the spillov er of clustering of volatility from oil prices to the share market is not significant, whereas, the parameter β indica ting the spillover of volatility persistence is high and significant. In other words, there is no short-term spill-over of volatility from oil prices to the Dubai financial markets, however, there is a strong and significant spill-over o f the volatility persistence.

Table 3 Oil Prices and Dubai Financial Market

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34067	0.733352
ROIL.omega	0.000006	0.000004	1.37517	0.169079
The ROIL.apha1	0.122578	0.016327	7.50760	0.000000
ROIL.beta1	0.876422	0.013368	65.56047	0.000000
RDFMDUBAI.mu	0.000405	0.000293	1.38197	0.166980
RDFMDUBAI.omega	0.000003	0.000000	28.10655	0.000000
RDFMDUBAI.alpha1	0.124986	0.041626	3.00258	0.002677
RDFMDUBAI.beta1	0.874014	0.023025	37.95990	0.000000
Dcca1	0.012439	0.011558	1.07627	0.281806
Dccb1	0.938522	0.081093	11.57344	0.000000

Oil Prices and Moscow Exchange

The ARCH effect is significant in the stock market of Russia, Moscow exchange, which is 0.12, and also the long-term persistence in the volatility of the index. The short-term spillover of volatility from oil prices to the stock index is not significant. In contrast, the spillover in the long run, is 0.97, clearly indicating the strong relationship in spillover among oil prices and the Stock Market of Russia.

Table 4 Oil Prices and Moscow Exchange

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000339	0.34143	0.732781
ROIL.omega	0.000006	0.000004	1.37848	0.168056
ROIL.apha1	0.122578	0.016505	7.42672	0.000000
ROIL.beta1	0.876422	0.013361	65.59316	0.000000
RMOEX.mu	0.000731	0.000273	2.67933	0.007377
RMOEX.omega	0.000004	0.000010	0.42614	0.670007

RMOEX.alpha1	0.129566	0.049072	2.64035	0.008282
RMOEX.beta1	0.860349	0.045097	19.07767	0.000000
Dcca1	0.017394	0.010113	1.72002	0.085429
Dccb1	0.973143	0.020770	46.85282	0.000000

Oil Prices and NSE30

The table above indicates the ARCH and GARCH results of oil prices and NSE30 of Nigeria, and joint ARCH and GARCH between the both. As mentioned earlier short-term volatility clustering is 0.122578 in the case of oi l prices, whereas the long-term persistence is 0.876422, significantly higher than the ARCH effect. The share ma rket of Nigeria is more volatile in the short-term as compared to the oil price. Whereas, long-term persistence in t he volatility is lower at 0.709078 in comparison to the persistence in the volatility of oil prices. The spillover of volatility from oil prices to the NSE30 in the short-term is low and not significant, but the spillover, in the long r un, is significant and higher at 0.94.

Table 5 Oil Prices and NSE30

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34076	0.73328
ROIL.omega	0.000006	0.000004	1.37903	0.16789
ROIL.apha1	0.122578	0.016342	7.50081	0.00000
ROIL.beta1	0.876422	0.013313	65.83230	0.00000
RNSE30NIGERIA.mu	0.000078	0.000167	-0.46749	0.64015
RNSE30NIGERIA.omega	0.000009	0.000001	16.86634	0.00000
RNSE30NIGERIA.alpha1	0.709078	0.030529	6.96221	0.00000
RNSE30NIGERIA.beta1	0.709078	0.034429	6.96221	0.00000
Dcca1	0.002731	0.005623	0.48565	0.62722
Dccb1	0.941165	0.028858	32.61401	0.00000

Oil prices and BMVIPC

The share market of Mexico, BMVIPC indicates the short-term presence of clustering of volatility of value 0.08 and is significant. The value of GARCH is 0.88, high and significant, providing evidence of clustering of volatili ty. The volatility spillover from the oil prices to the Mexican share market in the short-term is not significant, as p value is higher than 0.05. However, as indicated by the dccb1 parameter, the persistence of spillover in the lon g term is high at 0.76 and is significant.

Table 6 Oil prices and BMVIPC

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34099	0.733107
ROIL.omega	0.000006	0.000004	1.37998	0.167594
ROIL.apha1	0.122578	0.016339	7.50219	0.00000
ROIL.beta1	0.876422	0.013346	65.67110	0.00000
RBMVIPCMEX.mu	0.000140	0.000159	0.88264	0.377433
RBMVIPCMEX.omega	0.000003	0.000002	1.63881	0.101252
RBMVIPCMEX.alpha1	0.089795	0.017032	5.27220	0.00000
RBMVIPCMEX.beta1	0.882293	0.020556	42.92197	0.00000
Dcca1	0.043210	0.041009	1.05366	0.292037
Dccb1	0.762649	0.341339	2.23428	0.025464

Oil Prices and MSM30

There is evidence of the ARCH effect in the share market of Oman, MSM30. The coefficient alpha1 parameter is 0.14 with a p-value of 0.02. Further, the equity market of Oman indicates a high and significant GARCH effect, as the beta1 parameter's value is 0.84, and is significant. The spillover between the crude oil prices in the short-term is low. Whereas, the dependence between the persistence of the volatilities is high and significant between the oil prices and the equity market of Oman.

Table 7 Oil Prices and MSM30

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34099	0.733108
ROIL.omega	0.000006	0.000004	1.37749	0.168361
ROIL.apha1	0.122578	0.016371	7.48062	0.00000
ROIL.beta1	0.876422	0.013338	65.70812	0.00000
RMSM30. Mu	-0.000007	0.000015	-0.000289	0.999770
RMSM30.omega	0.000002	0.000000	40.171885	0.000000
RMSM30.alpha1	0.142139	0.061891	2.296624	0.021640
RMSM30.beta1	0.842488	0.035671	23.618127	0.000000
Dcca1	0.016390	0.007123	2.300989	0.021392
Dccb1	0.896605	0.030385	29.508368	0.000000

Oil Prices and Bovespa

The ARCH effect shown by the oil prices is less than the persistence in the volatility of the share prices. The beta1 parameter's value is high 0.98, showing evidence of the volatility clustering in the series. The Brazilian stock market shows weak short-term volatility, whereas the volatility clustering persistence is higher. The short-term dependence between the oil prices and the Brazilian stock market is low. The value of dcca1 indicating the short-term spillover of volatility is 0.02. However, the long-term dependence between oil prices and the equity market is high and significant. The coefficient of dccb1, the GARCH parameter of dependence, is 0.92 and is significant.

Table 8 Oil Prices and Bovespa

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34099	0.733108
ROIL.omega	0.000006	0.000004	1.37749	0.168361
ROIL.apha1	0.122578	0.016371	7.48062	0.00000
ROIL.beta1	0.876422	0.013338	65.70812	0.00000
RBOVESPABRAZIL. Mu	0.000000	0.000015	-0.000289	0.999770
RBOVESPABRAZIL.omega	0.000000	0.000012	0.000000	1.000000
RBOVESPABRAZIL.alpha1	0.005159	0.002465	2.093229	0.036329
RBOVESPABRAZIL.beta1	0.987445	0.005545	178.068013	0.000000
Dcca1	0.023457	0.012390	1.89318	0.058333
Dccb1	0.926205	0.045310	20.44163	0.000000

Oil Prices and Oslo Stock Exchange

There is evidence that volatility in short and long-run is significant in the Oslo stock market. The parameters alpha1 and beta1 are 0.09 and 0.87 respectively, and are significant. Further, the spillover between the oil prices and the share market of the Norway is found in the short-run, and is significant, but low. The spillover of the persistence is not significant between the oil prices and the stock market of Norway, as the p-value of the dccb1 parameter is higher than 0.05.

Table 9 Oil Prices and Oslo Stock Exchange

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.3404	0.733554

ROIL.omega	0.000006	0.000004	1.3793	0.167803
ROIL.apha1	0.122578	0.016288	7.5257	0.00000
ROIL.beta1	0.876422	0.0133289	65.9534	0.00000
OSEN.mu	0.000004	0.000175	3.0204	0.002525
OSEN.omega	0.000004	0.000025	0.1472	0.882972
OSEN.alpha1	0.093171	0.035826	2.6007	0.009304
OSEN.beta1	0.876200	0.132942	6.5908	0.000000
Dcca1	0.035265	0.018481	1.9082	0.056364
Dccb1	0.490914	0.266288	1.8435	0.065250

Oil Prices and ISX60

The ISX60, the stock market of Iraq, indicates volatility in short-run, and volatility clustering in the long-run. The values of the parameter, alpha1 and beta1 are 0.12 and 0.87 respectively. The persistence of volatility is 0.87, also similar to the oil prices. The short-term dependence is low, but significant. The spillover of volatility clustering from oil prices to the stock market is 0.03, whereas it is high in the case of persistence of volatility.

Table 10 Oil Prices and ISX60

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	0.000116	0.000340	0.34054	0.73303
ROIL.Omega	0.000006	0.000004	1.37857	0.16803
ROIL.apha1	0.122578	0.016349	7.49772	0.00000
ROIL.beta1	0.876422	0.013306	65.86886	0.00000
RISX60.Mu	-0.000026	0.000029	-0.90584	0.36502
RISX60.omega	0.000002	0.000000	62.54926	0.00000
RISX60.alpha1	0.122266	0.030463	4.01364	0.00006
RISX60.beta1	0.876734	0.016934	51.77244	0.00000
Dcca1	0.034479	0.001815	18.99518	0.00000
Dccb1	0.964058	0.001878	513.21020	0.00000

Oil Prices and Toronto Stock Exchange

The equity market of Canada, the S&P Toronto Stock Exchange shows a significant ARCH effect of 0.18, indicating the presence of volatility clustering. Similarly, the GARCH term, representing the persistence of volatility is also high and significant. The spillover of volatility clustering from oil to the share market of Canada is not significant, however, high and significant spillover of persistence of volatility is noticed. The value of parameter β is 0.93.

Table 11 Oil prices and Toronto Stock Exchange

	Estimate	Std.Error	t-value	Pr(>|t|)
ROIL. Mu	O.000116	0.000340	0.34066	0.733356
ROIL.omega	0.000006	0.000004	1.37248	0.169914
ROIL.apha1	0.122578	0.016495	7.43135	0.000000
ROIL.beta1	0.876422	0.013264	65.07677	0.000000
RSPTSX.mu	0.000439	0.000115	3.82251	0.000132
RSPTSX.omega	0.000002	0.000002	1.30815	0.190822
RSPTSX.alpha1	0.182912	0.030001	6.09687	0.000000
RSPTSX.beta1	0.787861	0.033684	23.38952	0.000000
Dcca1	0.026937	0.05452	1.74332	0.081278
Dccb1	0.938484	0.057137	16.42509	0.000000

Discussion

The empirical results reveal limited evidence of volatility spillovers between oil prices and financial markets across the selected oil-exporting countries, indicating a relatively weak transmission of oil price uncertainty to stock markets in several cases. Specifically, the absence of volatility spillovers in the DFM, Moscow Exchange, NSE30, BMVIPC, Oslo Stock Exchange, and Toronto Stock Exchange suggests that these markets exhibit a degree of resilience or insulation from oil price volatility. This finding may reflect differences in market structure, effective risk management practices, diversification of economic activity, or the presence of stabilizing fiscal and monetary frameworks that mitigate the transmission of oil-related shocks to financial markets.

In the case of major oil-exporting economies such as Norway and Canada, the lack of pronounced volatility spillovers can be attributed to well-developed financial markets, strong institutional quality, and sovereign wealth fund mechanisms that help smooth the effects of oil price fluctuations on domestic financial systems. Similarly, for emerging oil-exporting markets such as Mexico, India, and the UAE, the results suggest that oil price volatility does not automatically translate into heightened stock market volatility, possibly due to capital market segmentation, regulatory buffers, or a growing role of non-oil sectors in these economies.

An important exception emerges in the persistence of volatility between oil prices and the Oslo Stock Exchange, where long-lasting volatility transmission is observed. This indicates that while immediate spillovers may be limited, oil price shocks can have prolonged effects on financial market volatility in economies with a strong dependence on the oil and gas sector. Given Norway's significant exposure to energy exports, sustained oil price uncertainty is likely to influence investor expectations and risk perceptions over extended periods, reinforcing volatility persistence rather than short-lived shocks.

Overall, these findings suggest that the oil–financial market relationship in oil-exporting countries is more nuanced than often assumed. Rather than exhibiting uniform and strong volatility spillovers, the transmission mechanisms appear to be country-specific and dependent on structural characteristics, economic diversification, and policy frameworks. The results underscore the importance of adopting dynamic modeling approaches, such as DCC-GARCH, to capture evolving volatility interactions and highlight the need for policymakers and investors to consider heterogeneity across oil-exporting economies when assessing exposure to oil price uncertainty.

Conclusion and Implications

This study investigated the dynamic volatility interactions between oil prices and stock markets in selected oil-exporting countries using the DCC-GARCH framework. The empirical findings indicate that volatility spillovers from oil prices to equity markets are not widespread across oil-exporting economies. For most of the examined stock markets—namely the DFM, Moscow Exchange, NSE30, BMVIPC, Oslo Stock Exchange, and Toronto Stock Exchange—oil price volatility does not significantly transmit to stock market volatility. These results suggest that equity markets in several oil-exporting countries are relatively insulated from short-term oil price uncertainty, potentially due to economic diversification, institutional strength, and effective macro-financial stabilization mechanisms.

Nevertheless, evidence of persistent volatility transmission between oil prices and the Oslo Stock Exchange highlights that in economies with strong structural dependence on the oil sector, oil price uncertainty can exert prolonged effects on stock market volatility. This finding underscores the importance of distinguishing between short-term volatility spillovers and long-term volatility persistence when analysing oil–stock market linkages. Overall, the results reveal that the relationship between oil prices and stock markets in oil-exporting countries is heterogeneous and time-varying, shaped by country-specific economic structures and market characteristics.

The findings of this study have important implications for investors and policymakers in oil-exporting economies. From an investment perspective, the limited volatility spillovers between oil prices and stock markets suggest potential diversification benefits, as equity markets in several oil-exporting countries may not be immediately affected by oil price uncertainty. However, the presence of persistent volatility transmission in highly oil-dependent markets, such as Norway, indicates that investors should account for long-term risk exposure arising from sustained oil price fluctuations.

For policymakers, the results highlight the role of economic diversification, sound fiscal management, and robust financial institutions in mitigating the impact of oil price volatility on equity markets. Strengthening stabilization mechanisms—such as sovereign wealth funds and countercyclical fiscal policies—can further reduce the sensitivity of stock markets to oil price shocks. Moreover, financial regulators should closely monitor markets with strong oil dependence, where prolonged volatility may pose risks to market stability and investor confidence.

Finally, the study underscores the relevance of dynamic modelling approaches such as DCC-GARCH in capturing time-varying volatility interactions that static methods may fail to identify. Future research may extend this framework by incorporating asymmetries, structural breaks, or sectoral stock indices to provide deeper insights into oil–stock market dynamics in oil-exporting countries.

References

Ahmed, H. (2025). From Integration to Strategy: Deep Learning Insights into Turkey's Global Financial Linkages.

Ahmed, H. (2025). Is It Getting Green? Insights into Green Bond Influence on Stock Markets of Major Oil-Exporting Countries. Insights into Green Bond Influence on Stock Markets of Major Oil-Exporting Countries (September 01, 2025).

Ahmed, H., & Kaur, R. (2025). Dynamic Connectedness Among Oil Prices, Exchange Rate and Consumer Inflation: New Evidence from India. IIM Kozhikode Society & Management Review, 22779752251346247.

Ahmed, H., Siddiqui, T. A., & Naushad, M. (2025). Navigating global economic turmoil: The dynamics of oil prices, exchange rates, and stock markets in BRICS. Investment Management & Financial Innovations, 22(1), 94.

Akoum, I., Graham, M., Kivihaho, J., Nikkinen, J., & Omran, M. (2012). Co-movement of oil and stock prices in the GCC region: A wavelet analysis. The Quarterly Review of Economics and Finance, 52(4), 385-394.

Arouri, M., & Rault, C. (2010). Oil prices and stock markets: what drives what in the Gulf Corporation Council countries? http://dx.doi.org/10.2139/ssrn.1549536

Asaolu, T. O., & Ilo, B. M. (2012). The Nigerian stock market and oil price: A cointegration analysis. Arabian Journal of Business and Management Review (Kuwait Chapter), 1(6), 109-118.

Atif, M., Rabbani, M. R., Jreisat, A., Al-Mohamad, S., Siddiqui, T. A., Hussain, H., & Ahmed, H. (2022). Time Varying Impact of Oil Prices on Stock Returns: Evidence from Developing Markets. International Journal of Sustainable Development & Planning, 17(2).

Atif, M., Raza Rabbani, M., Bawazir, H., Hawaldar, I. T., Chebab, D., Karim, S., & AlAbbas, A. (2022). Oil price changes and stock returns: Fresh evidence from oil exporting and oil importing countries. Cogent Economics & Finance, 10(1), 2018163.

Basher, S. A., Haug, A. A., & Sadorsky, P. (2012). Oil prices, exchange rates and emerging stock markets. Energy economics, 34(1), 227-240.

Berument, M. H., Ceylan, N. B., & Dogan, N. (2010). The impact of oil price shocks on the economic growth of selected MENA countries. The energy journal, 149-176.

Bhar, R., & Nikolova, B. (2009). Oil prices and equity returns in the BRIC countries. World Economy, 32(7), 1036-1054.

Bhunia, A., & Das, A. (2012). Association between gold prices and stock market returns: Empirical evidence from NSE. Journal of Exclusive Management Science, 1(2), 1-7.

Bjørnland, H. C. (2009). Oil price shocks and stock market booms in an oil exporting country. Scottish journal of political economy, 56(2), 232-254.

Bodenstein, M., Erceg, C. J., & Guerrieri, L. (2011). Oil shocks and external adjustment. Journal of international economics, 83(2), 168-184.

Chang, H. W., & Chang, T. (2023). How oil price and exchange rate affect stock price in China using Bayesian Quantile_on_Quantile with GARCH approach. The North American Journal of Economics and Finance, 64, 101879.

Cong, R. G., Wei, Y. M., Jiao, J. L., & Fan, Y. (2008). Relationships between oil price shocks and stock market: An empirical analysis from China. Energy Policy, 36(9), 3544-3553.

Filis, G., Degiannakis, S., & Floros, C. (2011). Dynamic correlation between stock market and oil prices: The case of oil-importing and oil-exporting countries. International review of financial analysis, 20(3), 152-164.

Kaur, A., & Mittal, P. (2023). Wavelet based analysis of oil price shocks, exchange rate and stock market behaviour: Evidences from emerging markets. OPEC Energy Review.

Lee, Y. H., Huang, Y. L., & Yang, H. J. (2012). The asymmetric long-run relationship between crude oil and gold futures. Global Journal of Business Research, 6(1), 9-15.

Lescaroux, F., & Mignon, V. (2009). Measuring the effects of oil prices on China's economy: a factor-augmented vector autoregressive approach. Pacific Economic Review, 14(3), 410-425.

Liu, F., Umair, M., & Gao, J. (2023). Assessing oil price volatility co-movement with stock market volatility through quantile regression approach. Resources Policy, 81, 103375.

Masih, R., Peters, S., & De Mello, L. (2011). Oil price volatility and stock price fluctuations in an emerging market: Evidence from South Korea. Energy Economics, 33(5), 975-986.

Mensi, W., Hkiri, B., Al-Yahyaee, K. H., & Kang, S. H. (2018). Analyzing time–frequency co-movements across gold and oil prices with BRICS stock markets: A VaR based on wavelet approach. International Review of Economics & Finance, 54, 74-102.

Omag, A. (2012). An observation of the relationship between gold prices and selected financial variables in Turkey. Muhasebe ve finansman dergisi, (55).

Park, J., & Ratti, R. A. (2008). Oil price shocks and stock markets in the US and 13 European countries. Energy economics, 30(5), 2587-2608.

Philips, A. S., Akinseye, A. B., & Oduyemi, G. O. (2022). Do exchange rate and inflation rate matter in the cyclicality of oil price and stock returns?. Resources Policy, 78, 102882.

Rahman, S. (2022). The asymmetric effects of oil price shocks on the US stock market. Energy Economics, 105, 105694.

Samadi, S., Bayani, O., & Ghalandari, M. (2012). The relationship between macroeconomic variables and Liu and Social Sciences, 2(6), 559.

Siddiqui, T. A., Ahmed, H., & Naushad, M. (2020). Diffusion of COVID-19 impact across selected stock markets: a wavelet coherency analysis. Investment Management and Financial Innovations, 17(4), 202-214.

Siddiqui, T. A., Ahmed, H., Naushad, M., & Khan, U. (2023). The relationship between oil prices and exchange rate: a systematic literature review. International Journal of Energy Economics and Policy, 13(3), 566-578.

Šimáková, J. (2011). Analysis of the relationship between oil and gold prices. Journal of finance, 51(1), 651-662.

Syed, Q. R., & Bouri, E. (2022). Spillovers from global economic policy uncertainty and oil price volatility to the volatility of stock markets of oil importers and exporters. Environmental Science and Pollution Research, 1-11.

Declaration

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