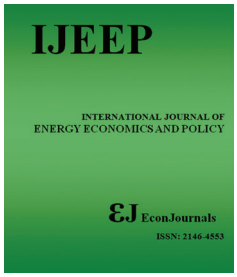

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2023, 13(6), 381-387.

Oil Volatility and Economic Growth: Evidences from Top Oil Trading Countries

Salim Bagadeem*

Arab Open University, Saudi Arabia. *Email: bagadeem@arabou.edu.sa

Received: 08 July 2023 **Accepted:** 11 October 2023 **DOI:** https://doi.org/10.32479/ijeep.14841

ABSTRACT

The research attempts to delve further into the relationship of oil volatility and economic growth of top oil exporting and importing countries. Annual time series data on oil prices and economic growth (1987-2022) has been considered for top 5 exporting and importing countries. Basic statistical techniques and VAR regressions have been used to analyze data. The relationship between volatility and economic activity was found to be more significant for exporting countries rather than importing countries and a lag effect on 6 years is observed as optimal in this relationship. The global financial crisis was observed as an insignificant event on oil volatility (contrary to Ftiti et al., 2016). One of the significant finding of the study is that Japan's economic growth is positively associated with the long term oil price volatility.

Keywords: Oil Volatility; Oil Prices; Economic Growth; Var; Time Series
JEL Classifications: Q31, F43, Q32, C13

1. INTRODUCTION

Crude oil is a crucial input in various sectors of the economy, particularly transportation, manufacturing, and energy production. When oil prices rise, it can increase production costs for businesses, leading to higher prices for goods and services. This can potentially dampen economic growth as businesses face increased expenses. Countries with significant oil production and exports can experience a direct impact on their GDP when oil prices fluctuate. Higher oil prices can lead to increased government revenue, investment, and economic growth in these countries. Conversely, lower oil prices can strain their economies and hinder growth. The relationship between crude oil prices and economic growth is a common rationale about the impact of energy on the economic activity of a country. It is a commonly understood fact that an increase in oil requirement signifies a positive trend in economic growth of a country. However the research provides varied findings. Narayan et al. (2014) found greater predictability in economic growth for developed countries rather than for developing countries. Ghalayini (2011) observed a unidirectional relationship between oil prices and economic growth for G-7 countries. Gbatu et al. (2017) found little or no effect while Hamilton (1996) found a negative effect. Berument et al. (2010) found mixed results in a similar study for Middle East and North Africa countries. Ftiti et al. (2016) demonstrated that oil price shocks during the period of financial turmoil affected the relationship between oil and economic growth in Organisation of the Petroleum Exporting Countries (OPEC). A study by Hamilton (1983) enhanced the interest of researchers on the interactions of oil prices and economic activity.

Countries that are net importers of oil may experience a negative impact on their trade balance and current account when oil prices rise. Higher oil prices increase the cost of imports, leading to a larger trade deficit and potentially affecting economic growth. Conversely, lower oil prices can improve the trade balance and support economic growth in oil-importing nations. Oil-exporting countries heavily rely on oil revenues to support government spending and investment. Higher oil prices can increase their fiscal capacity and stimulate economic growth through increased

government spending and investment in various sectors. Conversely, lower oil prices can constrain their budgets and investment capabilities, potentially impacting economic growth. The relationship between crude oil prices and economic growth is not always linear or immediate. Other factors such as geopolitical events, supply and demand dynamics, monetary policy, and market sentiment can also influence the relationship which may be nonlinear and demonstrate effects with a time lag. Additionally, the impact of oil price changes on economic growth can vary across different countries and regions, depending on their level of oil dependence, economic structure, and policy responses.

The importance of raw petroleum in the overall financial system and the effects of oil prices instability on financial development have captured huge attention. The crude oil is not one of the most traded items around the globe but it provides 33% of global energy resources. The vehicle sector uses just 9% of the total oil usage (Wachtmeister et al., 2018). Studies such as (Muhammad et al., 2022) reported that crude oil prices are more important than other mineral resources and have not shown much weakness in forecasting. Oil prices may increase joblessness while devaluating money for oil importing economies (Awerbuch and Sauter, 2003). Hooker (1996) found that there was no association between oil costs and macro-economic factors throughout 1986 and afterward. Miamo and Achuo (2022) reexamine the resource curse hypothesis by examining the nexus between crude oil price and economic growth. The oil costs may affect the monetary activity. It is argued that oil costs may decline and elevate the weakness concerning toward oil importer countries. The manipulation in the oil cost will be adjusted by lesser yield levels owing to raised weakness. Bashar et al. (2013) found almost no impact toward economic activity for Canada.

This research contributes to the literature in two ways. First, it focuses on a comparison of top importing and exporting countries. Secondly, it is an attempt to understand the impact of oil prices and its two derivatives, short term and long term volatility on macroeconomic activity.

2. LITERATURE REVIEW

There are researches focus on different aspects of the relationship between oil prices, oil volatility and economic growth. Samuelson (1985) in one of his research holds the opinion that the economic growth is determined principally by production which further depends on energy. On the contrary, Hamilton (1983) and Hooker (1986) hypothesizes the existence of a significant negative relation between oil price hikes and GDP growth. Furthermore, Herrera et al. (2015) are of the opinion that the direct-supply effect of an increase in crude oil price is symmetric although its sign is ambiguous for oil-exporting countries depending on the size of the oil sector to the country's GDP. The dynamics between crude oil price and economic growth is acknowledged by the renaissance growth theory wherein Lee and Ratti (1995) who differentiate between oil price volatility and oil price changes. In their research the effect of oil prices on economic growth is felt after a 1 year lag but is immediate for oil price volatility. Rahman and Serletis (2012) reported that an increase in uncertainty in real oil prices rice of oil is associated with a lower average growth rate of real economic activity in Canada. Cologni and Manera (2007) applied a basic VAR model that has been measured for the G-7 nations to contemplate the immediate impact of oil value. Miamo and Achuo (2022) found evidence of a significant positive effect of crude oil price on economic growth both in the short run and long run. However, after splitting the panel into net oil exporters and importers, the results for net oil importers remain consistent with those obtained for the whole panel, unlike those for net oil exporters revealing a positive and negative effect of crude oil price on economic growth in the short-run and long-run periods. They also found evidence of a bidirectional causality between crude oil price and real GDP. Wang et al. (2022) found that oil price volatility negatively affect the financial development and economic growth of oil importer and exporter countries. Additionally, they observed that the oil exporter countries are affected by oil cost vulnerability.

Samimi and Shahryar (2009) apply the Structural VAR model on annual data for six OPEC member states (Saudi Arabia, Iran, Kuwait, Nigeria, Venezuela and Indonesia) and found a positive long run effect of oil shocks on the real GDP for all countries, except Kuwait where the impact was, respectively, positive and negative in the short and long run. Qazi (2013) adopted a similar model on the same countries and found varying effects for different countries. Berument et al. (2010) employed the VAR model for the Middle East and North Africa (MENA) zone and varying results were found for net oil exporters and importers. While they found a significant positive effect of oil price increases on output growth for net oil exporters, the effect was insignificant on the output growth of net oil importers. Similar results have been reported for net oil exporters like Venezuela (Mendoza and Vera, 2010) and Azerbaijan (Mukhtarov et al., 2020). Conversely, Ftiti et al. (2016) opine that this relation is negative in a study conducted on four OPEC countries which is in concurrence with the findings by Aziz and Dahalan (2015).

Yoshino and Taghizadeh-Hesary (2014) investigate the impact of crude oil price fluctuations on GDP growth rate and inflation in China, Japan and the United States (US) and assert that while an oil price increase negatively impacts Chinese GDP growth, the effect is positive on the GDP growth of Japan and the US. Hence, they conclude that the impact of oil price changes on the GDP growth rate are much slower for developed net oil-importing economies like the US and Japan than on an emerging economy like China.

Researches on similar theme have applied different research methodologies and techniques. Bagadeem and Ahmad (2020) applied VAR on macroeconomic data in the context of Saudi Arabia on an annual data set of 15 years (2000-2015). Cologni and Manera (2007) applied a basic VAR model on the oil prices of the G-7 nations. Rahman and Serletis (2012) also studied the relationship between oil price volatility and the level of economic activity. Narayan et al. (2014) worked on a sample of 17 developing and 28 developed countries while Ftiti et al. (2016) worked on a sample of the Organisation of the Petroleum Exporting Countries (OPEC).

3. RESEARCH METHODOLOGY

As a research objective, the research attempts to understand the relationship between oil pices, oil volatility and economic growth by analyzing data for the top five oil exporting and importing countries.

Miamo and Achuo (2022) worked on a panel data for 32 Sub-Saharan Africa countries from 1980 to 2017 and used the panel vector auto regression estimation technique. Wang et al. (2022) studied a dataset of 30 years from 1990 to 2019. Wang et al. (2022) studied variables such as oil price volatility, inflation rate, and economic growth There are similar studies (Rahman and Serletis, 2012; Narayan et al., 2014) using quarterly data and annual data (Bagadeem and Ahmad, 2020). The research relies on annual data considering the rationale that the relationship between oil prices and economic activity is better represented in annual data. This is a cross country study on a sample of FIVE largest importer/exporters of oil.

An annual data set (time period: 2003-2021) has been used in the study which was extracted from the World Bank database "databank.worldbank.org". The study variables used are Europe Brent Spot Price (Dollars per Barrel) and Gross Development Product (GDP) per capita (current US$). Natural logarithm are used for oil price and GDP per capita. The sample countries taken are the five largest exporters and importers of crude oil as per the information on www.oec.world. IBM SPSS version 21 and GRETL software have been used for data analysis. The descriptive statistics, correlations, Ordinary Least Squared (OLS) regressions and Vector Auto Regressions (VAR) have been used as the statistical techniques to analyze and interpret data.

The top five exporting countries of crude petroleum along with their total oil export value are, Saudi Arabia ("SA", USD 138 Bn), Russia ("Rs", USD 113 Bn), Canada ("Can", USD 81.2 Bn), Iraq ("Iq", USD 72 Bn) and the United States of America ("USA", USD 67.6 Bn). The global top five importing countries are China ("Cn", USD 208 Bn), United States of America ("USA", USD 120 Bn), India ("In", USD 93.5 Bn), South Korea ("SK", USD 60.6 Bn) and Japan ("Jp", USD 54.9 Bn).

Analyzing the time series data, high price fluctuations were observed during the time period 2008-2009 and 2019-2021 where the former includes the subprime crisis time period and the later includes the COVID-19 pandemic. Considering the data availability constraint, an event study (difference of means 't' test) is also conducted to validate the significance of the global financial crisis (year 2008) on the volatility in the oil prices. Accordingly, null and alternative hypothesis are formulated.

Null Hypothesis (H0): There is no significant difference between the means of the paired measurements. (Event is not significant).

Alternative Hypothesis (H1): There is a significant difference between the means of the paired measurements. (Event is significant).

Most of the similar empirical studies (such as Wang et al., 2022) have used standard deviation (SD) of the moving log values of oil prices to represent oil price volatility. Here also, the research uses a similar technique to measure volatility. Short to medium term volatility (STV) is measured as the standard deviation of oil prices(log values) for the last five time periods while the long term volatility (LTV) is measured as the standard deviation of the last ten time periods as moving averages. Granger causality test (Granger, 1969) was applied to test for causality between variables. The null hypothesis of "no causality" has to be rejected by variables to demonstrate causality.

The VAR equation is used as in equation 1 for each country. Here, Y indicates the economic growth for while X indicates the volatility in oil prices. The counters "t", "i" and "j" are used to represent the time periods.

$$Y = \alpha + \sum_{i=1}^{k} \beta_i Y_{t-i} + \sum_{i=1}^{k} \beta_i X_{t-j} + \acute{\varepsilon}_{it} \quad (1)$$

4. DATA ANALYSIS

In the analysis, the prefix "I" for a country indicates importing countries while "E" indicates exporting countries. Analyzing the coefficient of variation (CV) of the study variables (Table 1). It is observed that CV is highest for the oil prices (19.3%), highest for China (8.4%) amongst the importing countries and highest for Iraq (7%) amongst the exporting countries.

Karl Pearson's correlation measures have been used for correlation analysis. Here, "**" indicates significance at 99% level of confidence and "*" indicates significance at 95% level of confidence. Analyzing the correlation coefficients for oil importing countries (Table 2), it is observed that long term volatility is positive and significantly correlated (0.69) with the oil prices while the short term volatility is not. Long term volatility is positive and significantly (0.56) correlated with Japan's economic growth.

Analyzing the correlation coefficients for oil exporting countries (Table 3), it is observed that the long term volatility is positive and significantly correlated with Canada's (0.55) and Russia's (0.54) economic growth.

The impact of the 2008 global financial crisis on the long-term volatility was tested by using a paired 't' test (Table 4). Thus, the

Table 1: Descriptive analysis of variables

Variables	Mean	CV
Oil prices	1.584	0.193
I.GDP.Cn	3.696	0.084
I.GDP.In	3.111	0.059
I.GDP.Jp	4.600	0.009
I.GDP.SK	4.398	0.024
I.GDP.USA	4.721	0.015
E.GDP.Can	4.643	0.016
E.GDP.Iq	3.575	0.070
E.GDP.Rs	3.973	0.048
E.GDP.SA	4.261	0.028
E.GDP.USA	4.721	0.015

Table 2: Correlations for top 5 importing countries

Volatility	Oil.P	STV	LTV	I.GDP.Cn	I.GDP.In	I.GDP.Jp	I.GDP.SK	I.GDP.USA
STV	−0.048	1	0.195	−0.008	0.042	−0.246	0.068	0.065
LTV	0.692**	0.195	1	0.029	0.068	0.563*	−0.032	−0.091

STV: Short to medium term volatility, LTV: Long term volatility

Table 3: Correlations for top 5 exporting countries

Volatility	STV	LTV	E.GDP.Can	E.GDP.Iq	E.GDP.Rs	E.GDP.SA	E.GDP.USA
STV	1	0.195	−0.023	0.028	0.012	−0.019	0.065
LTV	0.195	1	0.548*	0.436	0.538*	0.301	−0.091

STV: Short to medium term volatility, LTV: Long term volatility

Table 4: Results from the paired T-test

Variable	Mean	SD	SEM	P-value
Before event-after event	−0.066	0.06	0.028	0.076

SD: Standard deviation, SEM: Standard error of mean

Table 5: Regression results

Independent variable: Oil prices			
Dependent variable	**R^2 (%)**	**P**	**β**
I.GDP.Cn	11.2	0.161	0.624
I.GDP.In	11.8	0.149	0.380
I.GDP.Jp	36.2	0.006	0.148
I.GDP.SK	10.9	0.167	0.212
I.GDP.USA	3.5	0.444	0.077

null hypothesis (H01) was not accepted and the results indicated that the 2008 crisis did affect the volatility in crude oil prices.

Analyzing the regression of oil prices on the economic growth of importing countries (Table 5), only the linear relationship with Japan was observed as significant (P=0.006) with the highest R-squared value (36%) amongst all countries.

Analyzing the regression of oil prices on the economic growth of exporting countries (Table 6), only the linear relationship with USA was observed as insignificant (P=0.44) amongst all the countries. The R-squared value (73%) was the highest for Canada amongst the top exporting countries. The impact of oil prices on the economic growth of a country was observed more for the exporters than the importers.

Analyzing the regression of short to medium term volatility (Table 7) on the economic growth of importing countries, none of the countries indicated a significant relationship and thus low R-squared value were also reported. For China (−0.064) and Japan (−0.26), a negative beta coefficient was observed.

Analyzing the regression of short to medium term volatility (Table 8) on the economic growth of exporting countries, none of the countries indicated a significant relationship and thus low R-squared value were also reported. For Canada (−0.042) and South Africa (−0.057), a negative beta coefficient was observed.

Analyzing the regression of long term volatility (Table 9) on the economic growth of importing countries, only Japan indicated a significant relationship (P=0.012) and thus the highest R-squared

Table 6: Regression results

Independent variable: Oil prices			
Dependent variable	**R^2 (%)**	**P**	**β**
E.GDP.Can	72.7	0.000	0.371
E.GDP.Iq	53.4	0.000	1.093
E.GDP.Rs	68.3	0.000	0.954
E.GDP.SA	49	0.001	0.498
E.GDP.USA	3.5	0.444	0.077

Table 7: Regression results

Independent variable: Short term volatility			
Dependent variable	**R^2 (%)**	**P**	**Beta**
I.GDP.Cn	0.000	0.974	−0.064
I.GDP.In	0.002	0.865	0.195
I.GDP.Jp	0.061	0.310	−0.257
I.GDP.SK	0.005	0.783	0.183
I.GDP.USA	0.004	0.793	0.112

Table 8: Regression results

Independent variable: Short term volatility			
Dependent variable	**R^2 (%)**	**P**	**β**
E.GDP.Can	0.001	0.926	−0.042
E.GDP.Iq	0.001	0.911	0.174
E.GDP.Rs	0.000	0.963	0.056
E.GDP.SA	0.000	0.939	−0.057
E.GDP.USA	0.004	0.793	0.112

Table 9: Regression results

Independent variable: LTV			
Dependent variable	**R^2 (%)**	**P**	**β**
I.GDP.Cn	0.001	0.905	0.206
I.GDP.In	0.005	0.782	0.283
I.GDP.Jp	0.317	0.012	0.523
I.GDP.SK	0.001	0.896	-0.078
I.GDP.USA	0.008	0.710	-0.142

LTV: Long term volatility

Table 10: Regression results

Independent variable: LTV			
Dependent variable	**R^2(%)**	**P**	**β**
E.GDP.Can	0.300	0.015	0.899
E.GDP.Iq	0.190	0.062	2.460
E.GDP.Rs	0.289	0.018	2.340
E.GDP.SA	0.091	0.210	0.807
E.GDP.USA	0.008	0.710	−0.142

LTV: Long term volatility

Table 11: VAR results

Dependent variables	R^2(%)	AIC value
Independent variable: Oil prices		
Importing country: Japan	100	−97.48
Exporting country: Canada	100	−77.72
Exporting country: Iraq	100	−94.41
Exporting country: Russia	100	−91
Exporting country: South Africa	100	−94.31
Independent variable: LTV		
Importing country: Japan	100	−97.9
Exporting country: Canada	100	−99.37
Exporting country: Iraq	100	−110.79
Exporting country: Russia	100	−106.18

LTV: Long term volatility, VAR: Vector auto regression

value (31.7%) were also reported. For South Korea (-0.078) and USA (-0.14), a negative beta coefficient was observed.

Analyzing the regression of long term volatility (Table 10) on the economic growth of exporting countries, Canada, Iraq and Russia indicated a significant relationship. The R-squared was observed highest for Canada (30%). For USA (−0.14), a negative beta coefficient was observed.

The statistically significant relationship relationships identified in the regression analysis (Tables 5-10) were considered for further Vector Auto Regression (VAR) analysis (Sims, 1980). The results from the VAR analysis are presented in Table 11 which indicates a perfect fit (R-squared=100%) for all the given relationships at a lag of 6 time periods (Akaike, 1981).

The causality of long term volatility was checked with the income growth of importing and exporting economies at different lags. For exporting countries, it is observed that at lag 2, 4, and 5, neither the long term volatility nor the respective GDP of the exporters indicated causality with each other. However at lag 3, the economic activity for Canada (P=0.04), Iraq (P=0.01), Russia (P=0.02) and South Africa (P=0.03) is observed to Granger cause the long term volatility in global oil prices. For importing countries, it is observed that at lag 2, 3, 4, and 5, neither the long term volatility nor the respective GDP of the importing countries indicated causality with each other.

5. DISCUSSION

The objective of the research is to understand more about the relationship between oil price volatility and the economic growth of a country with a focus on top five largest exporters and importer countries across the globe. The highest coefficient of variation (CV) for standalone variables was observed for oil prices (CV=19.3%) implying that the oil prices have been volatile during the study time period (1987-2022) and that this is an apt time period for a volatility study. The long term volatility was derived more significantly than short term volatility as a significant positive correlation was observed (0.69) between them.

Chinese economic growth (CV=8.4%) amongst the importing countries indicated highest volatility and while Iraq economy (CV=7%) amongst the exporting countries indicated highest volatility. Thus, on average the economic growth of exporters indicated a lower volatility than importing countries (Table 1). Long term volatility is observed as positive and significantly (0.56) correlated with Japan's economic growth while it is observed positive and significantly correlated with Canada's (0.55) and Russia's (0.54) economic growth. This further underlines the relationship between volatility and economic growth for Japan, Canada and Russia.

Miamo and Achuo (2022) found evidence of a significant positive effect of crude oil price on economic growth both in the short run and long run. Contrary to Herrera et al. (2015) the results indicate a positive relationship between oil prices and economic activity for oil exporting countries. This is validated by our findings also (Tables 5-10) as most of the dependent variables indicated a positive relationship with oil prices, short term and long term oil volatility. On categorizing the sample as oil exporters and oil importers, the results were found to be more significant with long term volatility in oil prices. This finding was observed more strongly in oil exporting countries rather than oil importing countries. The findings of the study are in contrast to Wang et al. (2022) where they found that oil price volatility negatively affect the financial development and economic growth of oil importer and exporter countries. However we found more of a positive relationship between oil volatility and economic growth. This implies that to predict the economic growth, the long term volatility should be used in relevant forecasting models.

An event study is conducted to validate the significance of the 2008 global financial crisis on the volatility in oil prices. The said event was observed as not significant on this relationship, indicating a consistency in the volatility of oil prices irrespective of the global financial crisis which is contrary to Ftiti et al. (2016). Thus, the null hypothesis was rejected.

Analyzing the regression of long term volatility (Table 10) on the economic growth of exporting countries, Canada, Iraq and Russia indicated a significant relationship underlining the importance of the relations for these countries. The R-squared was observed highest for Canada (30%). The Vector Auto Regression (VAR) analysis indicates a perfect fit (R-squared=1) for all the given relationships at a lag of 6 time periods implying that economic growth can be best predicted at a lag of 6 years. This is contrary to Lee and Ratti (1995) where they found an immediate impact of oil price volatility. This also implies that the changes in oil prices and volatility may take 6 years to effect an economy.

Analyzing the regression of oil prices on the economic growth of exporting countries (table), only the linear relationship with USA was observed as insignificant (P=0.44) amongst all the countries. The R-squared value (73%) was the highest for Canada amongst the top exporting countries which explains majority of the variance in economic growth. The impact of oil prices on the economic growth of a country was observed to be more for the exporters than the importers. Analyzing the regression of oil prices on the economic growth of importing countries (table), only the linear relationship with Japan was observed as significant (P=0.006) with the highest R-squared

value (36%) amongst all countries. The findings with Japan are contrary to common rationale and thus needs to be probed further understanding of this relationship.

The long term volatility in global oil was observed to be caused by the world's four largest exporters (Canada, Iraq, Russia and South Africa) highlighting the significance of these countries to the global energy dynamics.

6. CONCLUSION

The research attempts to delve further into the relationship of oil volatility and economic growth of top oil exporting and importing countries. The relationship was found to be significant more for exporting countries rather than importing countries. The VAR analysis indicated a lag effect on 6 years into this relationship. Difference in behavior of the GDP was observed for importers and exporters. The global financial crisis was observed insignificant in an event study on price volatility indicating a consistency in the relationship irrespective of the global financial crisis.

The highest coefficient of variation (CV) was observed for oil prices which resulted into a significant long term volatility in oil prices. This long term volatility was significantly and positively correlated for Japan (importer), Canada (exporter) and Russia (exporter). This relationship is logical for the exporting countries but need to be further probed for importing countries. The increase in oil price volatility is increasing the economic growth (for Japan) may indicate that the country is using alternative energy means to sustain the economy. The study found a positive relationship between oil volatility and economic growth which is in concurrence with the common rationale.

The explained variance in linear regressions indicate that oil prices and volatility does not largely contribute to economic growth and there may be an impact of other macroeconomic variables also. The VAR results indicate that if lag value are used, the oil volatility can forecast economic growth efficiently. Overall, the study was able to add to the understanding of the relationship between the oil price volatility and economic growth of a country. Additionally, the exporter countries were found to be causing long term volatility in the global oil prices.

Managerial implications and future scope: The future studies should also test for the COVID-19 crisis as an event on the relationship between oil prices and economic growth. The study has a limitation of limited sample size but is relevant in the context of the research objective. The study can be extended by including a larger sample of countries.

REFERENCES

Akaike, H. (1981), Likelihood of a model and information criteria. Journal of Econometrics, 16(1), 3-14.

Available from: https://www.databank.worldbank.org/source/world-development-indicators [Last accessed on 2023 May 13].

Available from: https://www.in.investing.com/commodities/brent-oil-historical-data?end_date=1685556619&interval_sec=monthly&st_date=1012415400 [Last accessed on 2023 May 13].

Available from: https://www.oec.world/en/profile/hs/crude-petroleum [Last accessed on 2023 May 13].

Awerbuch, S., Sauter, R. (2006), Exploiting the oil-GDP effect to support renewables deployment. Energy Policy, 34(17), 2805-2819.

Aziz, M.I.A., Dahalan, J. (2015), Oil price shocks and macroeconomic activities in Asean-5 countries: A panel VAR approach. Eurasian Journal of Business Economics, 8(16), 101-120.

Bagadeem, S.A., Ahmad, M.U. (2020), Healthcare expenditure and economic growth: How important is the partnership? Research and World Economy, 11(5), 297-307.

Bashar, O.H., Wadud, I.M., Ahmed, H.J.A. (2013), Oil price uncertainty, monetary policy and the macroeconomy: The Canadian perspective. Economic Modelling, 35, 249-259.

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, 31(1), 149-176.

Cologni, A., Manera, M. (2008), Oil prices, inflation and interest rates in a structural cointegrated VAR model for the G-7 countries, Energy Economics, 30(3), 856-888.

Ftiti, Z., Guesmi, K., Teulon, F., Chouachi, S. (2016), Relationship between crude oil prices and economic growth in selected OPEC countries. Journal of Applied Business Research, 32(1), 11-22.

Gbatu, A.P., Wang, Z., Wesseh, P.K. Jr., Tutdel, I.Y.R. (2017), The impacts of oil price shocks on small oil-importing economies: Time series evidence for Liberia. Energy, 139, 975-990.

Ghalayini, L. (2011), The interaction between oil price and economic growth. Review Middle Eastern Finance and Economics, 13(21), 127-141.

Granger, C.W.J. (1969), Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3), 424-438.

Hamilton, J.D. (1983), Oil and the macroeconomy since World War II. Journal of Political Economy, 91(2), 228-248.

Hamilton, J.D. (1996), This is what happened to the oil price-macroeconomy relationship. Journal of Monetary Economics, 38, 215-220.

Herrera, A.M., Lagalo, L.G., Wada, T. (2015), Asymmetries in the response of economic activity to oil price increases and decreases? Journal of International Money and Finance, 50, 108-133.

Hooker, M.A. (1996), What happened to the oil price-macroeconomy relationship? Journal of Monetary Economics, 38(2), 195-213.

Lee, S.K., Ratti, R.A. (1995), Oil shocks and the macroeconomy: The role of price variability. The Energy Journal, 16(4), 39-56.

Mendoza, O., Vera, D. (2010), The asymmetric effects of oil shocks on an oil-exporting economy. Cuadernos De Economía, 47(135), 3-13.

Miamo, C.W., Achuo, E.D. (2022), Can the resource curse be avoided? An empirical examination of the nexus between crude oil price and economic growth. SN Business Economics, 2, 5.

Muhammad, I., Ozcan, R., Jain, V., Sharma, P., Shabbir, M.S. (2022), Does environmental sustainability affect the renewable energy consumption? Nexus among trade openness, CO_2 emissions, income inequality, renewable energy, and economic growth in OECD countries. Environmental Science and Pollution Research, 29(60), 90147-90157.

Mukhtarov, S., Aliyev, S., Zeynalov, J. (2020), The effects of oil prices on macroeconomic variables: Evidence from Azerbaijan. International Journal of Energy Economics and Policy, 10(1), 72-80.

Narayan, P.K., Sharma, S., Poon, W.C., Westerlund, J. (2014), Do oil prices predict economic growth? New global evidence. Energy Economics, 41, 137-146.

Qazi, L.T. (2013), The effects of oil price shocks on economic growth of oil exporting countries: A case of six OPEC economies. Business Economics Review, 5(1), 65-87.

Rahman, S., Serletis, A. (2012), Oil price uncertainty and the Canadian economy: Evidence from a VARMA, GARCH-in-Mean, asymmetric BEKK model. Energy Economics, 34(2), 603-610.
Samimi, A.J., Shahryar, B. (2009), Oil price shocks, output and inflation: Evidence from some OPEC countries. Australian Journal of Basic Applied Sciences, 3(3), 2791-2800.
Samuelson, P. (1985), Succumbing to keynesianism. Challenge, 27, 4-11.
Sims, C.A. (1980), Macroeconomics and reality. Econometrica, 48(1), 1-48.
Wachtmeister, H., Henke, P., Höök, M. (2018), Oil projections in retrospect: Revisions, accuracy and current uncertainty. Applied Energy, 220, 138-153.
Wang, G., Sharma, P., Jain, V., Shukla, A., Shabbir, S.M., Tabash, M., Chawla, C. (2022), The relationship among oil prices volatility, inflation rate, and sustainable economic growth: Evidence from top oil importer and exporter countries. Resources Policy, 77C, 102674.
Yoshino, N., Taghizadeh-Hesary, F. (2014), Economic impacts of oil price fluctuations on developed and emerging economies. IEEJ Energy Journal, 9(3), 58-75.