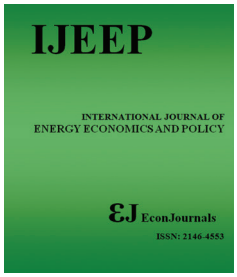

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2024, 14(4), 324-328.

Effects of Fluctuations in oil Prıces on G7 Country Stock Exchanges

Aktolkin Abubakirova[1]*, Lyazzat Kudabayeva[2], Aizhan Omarova[3], Zhanargul Taskinbaikyzy[3], Bibigul Saubetova[3]

[1]Khoja Akhmet Yassawi International Kazakh-Turkish University, Turkestan, Kazakhstan, [2]Taraz Regional University named after M.Kh.Dulaty, Taraz, Kazakhstan, [3]Yessenov University, Aktau, Kazakhstan. *Email: aktolkin.a@outlook.com

Received: 14 February 2024 **Accepted:** 01 June 2024 **DOI:** https://doi.org/10.32479/ijeep.16185

ABSTRACT

The aim of the study is to analyze the effects of changes in oil prices, which have an important place among energy resources, on the stock market indices of G7 countries. Since they can be considered as a barometer of the macroeconomic indicators of the G7 countries, the stock market indices of these countries were included in this study and their impact on the fluctuations in oil prices was examined. G7 countries produce 85% of the world's production and constitute 66% of the world's population. 75% of international trade is carried out by the member countries of this group. The share of these countries in international investment is 80%. In this study, the impact of oil price changes on G7 country stock market indices was investigated with monthly frequency data between January 2010 and December 2023. This effect was tried to be found by applying Granger causality test and cointegration test. According to the findings obtained in this study, it was understood that there was no cointegration and the variables did not balance in the long run. On the other hand, according to the Granger causality test, it was determined that the crude oil price was the cause of the stock markets of G7 countries with a significance of 10%.

Keywords: Oil Prices, Stock Market Index, G7 Countries, Panel Cointegration, Panel Causality
JEL Classifications: C23, G15, Q401

1. INTRODUCTION

Oil prices are considered an important indicator in understanding macroeconomic fluctuations. Especially the oil shock experienced in the 1970s caused researchers to focus on the impact of oil prices on the economy. However, shocks in oil prices also reflect uncertainty about the market. Therefore, it is necessary to implement risk management strategies aimed at mitigating the negative impact of oil price shocks and to develop policies aimed at improving international financial regulation activities. In addition, it is important for investors to take into account the effects of the pass-through of shocks affecting the international oil market and the global economy on the portfolios they create, in order to protect themselves from risk.

Oil prices are one of the leading variables affecting stock prices. Unexpected changes that may occur in the factors affecting oil prices may cause fluctuations in oil prices and therefore risk. Fluctuation in oil prices increases uncertainty, which has a negative impact on wealth and investment (Maghyereh and Al-Kandari, 2007). For this reason, many macroeconomic variables can be affected by the change in oil prices.

Although it is considered an important factor for understanding changes in oil prices and stock market index value, there is no definitive consensus on the relationship between oil prices and stock market index value. The diversity of results from different studies further encourages many researchers to analyze the relationship between oil prices and stock market index value. The aim of this study is to analyze the effects of changes in oil

prices, which have an important place among energy resources, on the stock market indices of G7 countries. G7 countries consist of Germany, the United States, the United Kingdom, France, Italy, Japan and Canada and hold approximately 65% of net global assets. According to World Bank data, Germany imports approximately 60% of the total energy it uses, the United States 9%, the United Kingdom 40%, France 43%, Italy 75%, and Japan 94%. Canada is an important energy exporter with approximately 68% (World Bank, 2022).

2. LITERATURE REVIEW

Although many studies have been conducted in the literature, a clear consensus has not been reached on the existence of an economically meaningful relationship between stock returns and changes in energy prices. Another problem is that variables that have significant relationships in explaining stock returns are unstable and change over time. More specifically, the impact of energy price changes on stock returns can be positive if price changes are caused by demand shocks and negative if price changes are caused by supply shocks (Kilian, 2008; Kilian and Park, 2009).

Apergis and Miller (2009) examined how the change in oil prices affected stock returns using data from eight countries (Australia, Canada, France, Germany, Italy, Japan, the United Kingdom and the USA). In the study where the authors used VAR and VEC models, it was revealed that stock returns did not react very strongly to the change in oil prices. The authors also stated that stock prices react asymmetrically to changes in oil prices.

Wang et al. (2013) evaluated the relationship between oil price shocks and stock markets separately for oil exporting/importing countries using the structural VAR model. The authors concluded that the magnitude, duration and even direction of the reaction of stock prices vary depending on whether the country to which it is linked is an oil exporter or importer and whether the price shock originates from demand/supply. Additionally, it was found that the explanatory effect of oil prices on the change in stock returns is stronger for oil-exporting countries. The study also investigated the effect of uncertainty in oil prices on stock market returns. As a result, it has been observed that oil supply uncertainty for both oil-exporting countries and importing countries decreases the stock markets. It has been stated that demand uncertainty also has a negative impact on stock market returns. It is also noted that the effect of demand uncertainty is stronger and more permanent for oil-exporting countries.

Managi and Okimoto (2013) applied MarkovSwitching VAR (MS-VAR) analysis to detect the existence of a relationship between oil, energy company stocks and interest in the USA between 2001 and 2010. As a result of the analysis, they found a positive relationship between oil prices and stocks.

Dhaoui and Khraief (2014) used the EGARCH method to examine the effect of stock returns of the USA, Switzerland, France, Canada, England, Japan, Singapore and Australia on oil shocks between January 1991 and September 2013. As a result of the analysis, they found that the returns were significantly affected, the returns decreased and the volatility increased. They stated that this situation was due to the risk of increase in oil prices and uncertainty in the market.

Mohammed et al. (2016) investigated the impact of oil prices on macroeconomic fundamentals, monetary policy and stock markets for eight oil exporting and non-oil exporting countries in the Middle East and North Africa region: Algeria, Egypt, Iran, Kuwait, Morocco, Saudi Arabia, Tunisia and Turkey. Using panel-ARDL and quarterly data for the period 1994-2015, author concluded that, firstly, there are short-term dynamic cross-sectional relationships between oil prices and macroeconomic variables such as growth rate and consumer price index, and secondly, oil prices. In the long run, dependent variables such as consumer price index and market stock exhibited a cointegration relationship with oil prices. However, a cointegration relationship could not be established between oil price variations, monetary policy and growth rate. In this context, they applied a multivariate VAR model to examine the responses of all variables to shocks in oil prices. We find that economic growth in oil-exporting countries other than Kuwait has a relatively high elastic response and, conversely, in the oil-importing economy, the GDP response to oil prices appears to be reasonably stable, being close to zero. Similarly, the market reaction to the oil price in the initial period resulting from the financial crisis contagion can yield the same results for every oil importing and exporting country. The next macroeconomic variable, CPI, shows a positive response to oil. Additionally, oil prices appear to have a negligible response on money market rates in the Middle East and North Africa, except for Turkey and Egypt.

Ho and Huang (2016) used nonlinear models to examine Threshold Autoregressive (TAR)/Momentum-Threshold Autoregressive (MTAR) cointegration and causality relationships. The January breakpoint test and the Quandt Andrews unknown breakpoint test were used to examine structural changes. It has been concluded that there is no causality relationship between the stock market index and the stock index. It has been understood that there are long-term cointegration relationships between BRIC and WTI spot prices and stock indices.

Bai and Koong (2018) used dynamic impulse response functions as well as the Diagonal BEKK model. It investigated time-varying tripartite relationships between real oil prices, exchange rate changes, and stock market returns in China and the United States from February 1991 to December 2015. A few important observations are listed; (i) Oil prices respond positively and significantly to aggregate demand shocks; (ii) positive oil supply shocks negatively and significantly affect the Chinese securities market; (iii) shocks in oil prices negatively affect the permanent and trade-weighted US dollar index. (iv) US and Chinese stock markets are positively correlated, as are the dollar index and exchange rate. (v) There is a significant parallel inverse relationship between the US stock market and the dollar and between the Chinese stock market and the exchange rate. (vi) In recent years, the Chinese stock market has been found to be more volatile and sensitive to shocks in oil prices as well as total demand compared to the US stock markets.

In their study, Adediran and Masih (2018) investigated the relationship between oil prices and stock markets, focusing especially on Islamic and traditional global stock indices. They find that oil prices have a short-term asymmetric effect on both types of stock markets, but a long-term asymmetric relationship exists only for Islamic stocks. In her study, Syzdykova (2018) analyzed the relationship between crude oil price shocks and stock prices in CIS countries with the ADL test. Empirical results have shown that crude oil price shocks and stock price fluctuations are cointegrated. The results also showed that the rebalancing process is asymmetric in the long run. In their study, Kurtar et al. (2019) examine the relationship between oil prices and stock markets in Russia, Canada, the USA and Japan. They found significant and mostly positive relationships between Russian stock market indices and crude oil prices, but did not find a significant long-term relationship between Japanese stock market indices and crude oil prices, except for TOPIX 17 Steel Non-Ferrous Metals.

Alsufyani and Sarmidi (2020) examined it with the GARCH-X method to determine the relationship between commodity energy prices and the stock market in Saudi Arabia in the period between 2007 and 2017. As a result of the analysis, they determined that energy prices do not affect the stock market and that there are other macroeconomic factors that affect the stock market. Abubakirova et al. (2021) In this study, the relationship between oil prices and stock prices of BRICS-T countries was examined with the Hatemi-J asymmetric causality test (2012), considering the period January 2010-December 2019. The authors used Hatemi (2012) asymmetric causality test, which takes into account the existence of asymmetric information in financial markets by distinguishing between positive and negative shocks. Accordingly, hidden relationships that could not be detected with the symmetric causality test were revealed with the help of the asymmetric causality test.

Cevik et al. (2021) found a bidirectional causality relationship between crude oil prices and stock market returns in Saudi Arabia Dec. Crawford et al. (2021) stated that the research does not document the relationship between oil prices and stock prices Decently. Chien et al. Dec (2021) analyzed the relationship between the Covid-19 pandemic, oil prices, the US geopolitical risk index, stock market indices in the USA, Europe and China by applying the Granger causality test. As a result of the analysis, they found that a 1% severity of the pandemic caused a decrease of about 10% in the productivity index, 0.9% in oil demand, 0.67% in the stock market, 1.12% in GDP growth and 0.65% in the electricity demand index.

Sraieb et al. (2022) discussed the impact of COVID-19 on the stock markets of oil-exporting countries and found that these markets became less sensitive to fluctuations in oil prices during the pandemic. Pruchnicka-Grabias (2022) stated in his study that the crude oil market significantly affects the stock market in the short term, but does not give a clear answer as to whether this effect is affected only by oil prices or the GBP/USD exchange rate. The article does not discuss the inverse relationship in which the stock market affects the oil market. Suoth and Rumengan (2023) found a positive relationship between stock prices in the energy sector and fluctuations in world oil prices.

3. DATA SET AND ECONOMETRIC METHOD

In this study, monthly frequency data covering the period from January 2010 to December 2023 was used to investigate the impact of oil price fluctuations on the stock markets of G7 countries. For the variables used in the study, logarithmic values were taken and tested first with the panel unit root test. Then, panel Granger causality test was performed and panel cointegration test was also applied. Additionally, the model obtained with the panel autoregressive model was interpreted. The research subject covers 7 countries, consisting of G7 countries, and DAX30 for Germany, S&P500 for the USA, FTSE for the UK, MIB for Italy, TOPIX for Japan, CAC40 for France, and S&P/TSX stock market index for Canada were used. Data on stock market indices are taken from Bloomberg database. The variables used in the study are as follows.

Y: *Stock Market Index* (*Dependent Variable*)

X: *Oil Price* (*Independent Variable*)

4. ANALYSIS OF FINDINGS

4.1. Unit Root Test Results

The stationarity of the variables included in this study was tested separately by performing a root test. Unit root test results for the variables are presented in Table 1.

When Table 1 is examined, the "*Oil Price*" is not stationary at the level value of the unit root test logarithmic series according to the constant and trend-free model ($P > 0.05$). Accordingly, when the unit root test was reapplied by taking the first difference of the "*Oil Price*" variable, it was seen that the series became stationary. Since the test statistic values are greater than the table values in absolute terms, it can be concluded in the study that

Table 1: Unit root test results

Test	Oil price				Stock market index			
	Level		1st difference		Level		1st difference	
	Test statistics	P	Test statistics	P	Test statistics	P	Test statistics	P
Levin, Lin and Chu	0.60479	0.8946	−217.087	0.0000*	2.76349	0.48935	−254.608	0.0000*
Im, Pesaran and Shin W- stat	14.2469	0.7364	−1270.74	0.0000*	6.70479	0.37964	290.99	0.0000*
ADF - Fisher Chi-square	12.1379	1.3024	0.47838	0.0000*	7.73186	0.70369	687.087	0.0000*

the "*Oil Price*" variable is stationary at the first difference. The stationarity of the "*Stock market Index*" constant and trend-free unit root test logarithmic series was tested and it was understood that they were not stationary (P > 0.05). Accordingly, when the unit root test was reapplied by taking the first level difference of the "*Stock market Index*" variable, it was seen that the series became stationary. The stationarity condition of the series required for panel data analysis is met for both variables.

4.2. Cointegration Test Results

According to the cointegration test model selection criterion, a trend-free model with a linear constant term was proposed. Vector autoregressive model cointegration test was performed with the level values of the series and the results obtained are given in Table 2.

Since the trace statistic and maximum eigenvalue test statistic values calculated as a result of the cointegration test are less than the critical value at the 5% significance level, it can be interpreted that the crude oil price and G7 country stock market indices are not cointegrated and they do not reach equilibrium in the long run. Since there is no cointegration relationship between the variables, the series were not included in the VECM error correction model. Since there is no cointegration relationship, the series were included in the vector autoregressive model in their stationary form with first-order differences.

4.3. Causality Test Results

Granger causality test is used to test the existence and direction of a causal relationship between two variables. Granger defined causality as follows: "If the prediction of Y is more successful when the past values of X are used than when the past values of X are not used, then X is the Granger cause of Y." If the definition is correct, the causality relationship is shown as X→Y. First, the logarithm of the Stock Exchange index and the crude oil price were taken separately and the Granger causality test was applied with their first differences. Granger causality test results for the panel VAR model equation are shown in Table 3.

Table 2: Cointegration test results

Cointegration test according to trace statistics				
Hypothesis	**Eigen value**	**Trace statistics**	**5% critical value**	**P**
R=0	0.001734	1.469723	15.39746	0.9601
R≤1	2.364203	0.024697	3.723697	0.6031
Cointegration test according to maximum eigenvalue statistics				
Hypothesis	**Eigen value**	**Maximum eigenvalue statistics**	**5% critical value**	**P**
R=0	0.001769	1.403617	14.20976	0.7680
R≤1	2.301497	0.024769	3.731495	0.7734

Table 3: Granger causality test results

Causality between variables	Chi-square test	P
Oil prices does not granger casue the stock market index	5.783109	0.0701*
Stock market index does not granger cause the oil price	4.733682	0.8807

*Significance at the 10% level

When Table 3 is examined, according to the Granger causality test result, crude oil prices are the cause of the change in G7 country stock market indices at a 90% reliability level. No causality relationship has been found from stock market indices to oil prices in G7 countries.

5. CONCLUSION

In this study, the impact of oil prices, which affect the prices of many products, on the stock markets of G7 countries was investigated. Before performing panel data analysis, it was investigated whether the series were stationary or not. In the tests conducted for this purpose, the logarithm of the variables was taken and it was determined that they were stationary when the first level differences were taken, but they were not stationary at the level values. According to the panel cointegration test model selection criterion, it was seen that a trend-free model with a linear constant term should be selected. In this context, according to Johansen panel cointegration tests, it has been revealed that crude oil price and stock market index variables are not cointegrated and there is no long-term relationship between them. However, it has been determined that changes in crude oil prices are the Granger cause of stock market index variables. Thus, according to the results of the Panel causality test, it was determined that crude oil prices were the cause of the change in G7 country stock market indices at a 10% significance level. Stock market indices and oil prices do not move in parallel in the long run, but in terms of causality, there is a causality from oil prices to stock market indices.

REFERENCES

Abubakirova, A., Syzdykova, A., Dosmakhanbet, A., Kudabayeva, L., Abdulina, G. (2021), Relationship between oil prices and stock prices in BRICS-T countries: Symmetric and asymmetric causality analysis. International Journal of Energy Economics and Policy, 11(3), 140-148.

Adediran, I.O., Masih, M. (2018), Oil Price and the Global Conventional and Islamic stock Markets: Is the Relationship Symmetric or Asymmetric? Evidence from Nonlinear ARDL. MPRA Paper No. 91558. Available from: from: https://mpra.ub.uni-muenchen.de/91558

Alsufyani, M., Sarmidi, T. (2020), The inter-relationship between commodity energy prices and stock market volatility in Saudi-Arabia. Journal of Nusantara Studies (JONUS), 5(1), 270-293.

Apergis, N., Miller, S.M. (2009), Do structural oil-market shocks affect stock prices? Energy Economics, 31(4), 569-575.

Bai, S., Koong, K.S. (2018), Oil prices, stock returns, and exchange rates: Empirical evidence from China and the United States. The North American Journal of Economics and Finance, 44, 12-33.

Cevik, E.I., Dibooglu, S., Awad Abdallah, A., Al-Eisa, E.A. (2021), Oil prices, stock market returns, and volatility spillovers: evidence from Saudi Arabia. International Economics and Economic Policy, 18, 157-175.

Chien, F., Sadiq, M., Kamran, H.W., Nawaz, M.A., Hussain, M.S., Raza, M. (2021), Co-movement of energy prices and stock market return: Environmental wavelet nexus of COVID-19 pandemic from the USA, Europe, and China. Environmental Science and Pollution Research, 28(25), 32359-32373.

Crawford, S., Markarian, G., Muslu, V., Price, R. (2021), Oil prices, earnings, and stock returns. Review of Accounting Studies, 26(1),

218-257.
Dhaoui, A., Khraief, N. (2014), Empirical linkage between oil price and stock market returns and volatility: Evidence from international developed markets. Economics, 20(2), 218-257.
Ho, L.C., Huang, C.H. (2016), Nonlinear relationships between oil price and stock index-evidence from Brazil, Russia, India and China. Romanian Journal of Economic Forecasting, 19(3), 116-126.
Kilian, L. (2008), The economic effects of energy price shocks. Journal of Economic Literature, 46(4), 871-909.
Kilian, L., Park, C. (2009), The impact of oil price shocks on the US stock market. International Economic Review, 50(4), 1267-1287.
Kurtar, H., Kapusuzoğlu, A., Ceylan, N.B. (2019), Oil prices and stock markets: An empirical analysis from Russia, Canada, USA and Japan. İşletme Araştırmaları Dergisi, 11(1), 558-574.
Maghyereh, A., Al-Kandari, A. (2007), Oil prices and stock markets in GCC countries: New evidence from nonlinear cointegration analysis. Managerial Finance, 33(7), 449-460.
Managi, S., Okimoto, T. (2013), Does the price of oil interact with clean energy prices in the stock market? Japan and the World Economy, 27, 1-9.
Mohammed, K., Benhabib, A., Maliki, S. (2016), The impact of oil prices on macroeconomic fundamentals, monetary policy and stock market for eight Middle East and North African countries. Topics in Middle Eastern and North African Economies, 18(2), 26-44.
Pruchnicka-Grabias, I. (2022), Interdependence between WTI crude oil prices and the us equity market. International Journal of Energy Economics and Policy, 12(2), 226-232.
Sraieb, M., Jreisat, A., Rabbani, M.R., Al-Mohamad, S., El-Kanj, N., Khaki, A.R. (2022), Oil Prices and the Stock Market: How COVID-19 Impacts Oil-Importing Countries? In: 2022 International Conference on Decision Aid Sciences and Applications (DASA). United States: IEEE. p1173-1177
Suoth, C.M., Rumengan, F.C.T. (2023), The relationship between oil prices and energy sector stocks in the global recession issue. The Contrarian: Finance, Accounting, and Business Research, 2(2), 36-40.
Syzdykova, A. (2018), The relationship between the oil price shocks and the stock markets: The example of commonwealth of independent states countries. International Journal of Energy Economics and Policy, 8(6), 161-166.
Wang, Y., Wu, C., Yang, L. (2013), Oil price shocks and stock market activities: Evidence from oil-importing and oil-exporting countries. Journal of Comparative Economics, 41, 1220-1239.
World Bank. (2022), Energy Use (kg of Oil Equivalent per Capita). Available from: https://data.worldbank.org/indicator/eg.use.pcap.kg.oe?locations=xd [Last accessed on 2024 Jun 02].