Research Article

The Impact Of Changes In Oil Prices On The Stock Market: Evidence From Jordan

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Abstract

Purpose: The purpose of this study is to determine the impact of oil prices shocks on the stock market return of Jordan.

Research Methodology/ Design: This study has adopted quantitative design in which the data has been gathered from the Investing.com from 2015 to 2020. The variables which were considered in the study include exchange rate, cotton prices, oil prices, and stock market returns. In terms of the analysis, the vector autoregression (VAR) and granger causality test has been applied.

Findings: The results of this study identified that there is no effect of oil prices, cotton prices and exchange rate over the stock market returns in Jordan.

Limitations/ Implications: The findings of the study are delimited to Jordanian stock market returns and the data has been considered from 2015 to 2019 which also adds to the limitation of the study

Keywords: *Oil price (OP), Stock market returns (SMR), Jordan*

1. Introduction

The oil is regarded as the most significant fuel all over the world while the global market of oil is of significant importance to the world energy marketplaces (Muhtaseb and Al-Assaf, 2017). In recent times, the prices of oil have shown great instability which is caused by geopolitical, financial and economic factors. On the other hand, the fluctuations in the prices of oil have a huge influence on the overall economy, exchange rates, inflation, economy, corporate retributions and other economic variables. It is due to the wide-ranging use in the production practise and as the consumption of final goods. The study of Meo et al. (2018) argued that incredible effects of the oil prices fluctuations especially in the particular economies have made it essential for the studies to explore the association among macroeconomics variables and oil price changes. Pertaining to the recent financial and economic crisis all over the world, scholars have

become more interested in terms of determining the association among stock market variations and oil prices fluctuations (Bouri, 2015; Degiannakis, Filis and Arora, 2018; Abuoliem et al., 2019). These economic and financial crisis has caused huge influence over the prices of oil in the global market.

On the other hand, the stock market performance also plays a vital role in the development of a country's economy. It is due to the reason that the stock market returns for the country have positive and long term association with the economic growth of the country. It has been argued in the study of Pradhan (2018) that there is a positive long-run association among the economic growth and stock market for the country. In this method, it is imperative for Jordan to ensure the stability of the stock market return in order to have a positive influence over its economy. The economy of Jordan depends heavily over the oil as it is net-oil importing country. However, the country is exposed directly to the recent development in the crude oil market (Muhtaseb and Al-Assaf, 2017). In this manner, comprehending the type of association among stock returns and oil prices variations along with its policy insinuations is of essential prominence for the investors and policymakers in Jordan. Therefore, this study has focused on determining the effect of changes in oil prices over the stock market which is the evidence from Jordan. The findings of this study are significant for the policymakers and investors in Jordan to determine the effect of shocks in oil prices over the stock market returns.

2. Literature Review

The change in prices of crude oil causes a huge change in the operating and production cost of products manufactured. It is due to the reason that oil is used as fuel for the generation of energy which provides assistance to the production sector of any country. It has also been argued in the study of Zhang and Tu (2016) that the fluctuations in oil prices distress the production process for most of the companies in the country as oil is used as means to generate energy in the production sector. In this manner, with the change in prices of oil, the prices of products are also changed which cause influence over the stock market of any country. It has also been stated in the study of Al-hajj, Al-Mulali and Solarin (2018) that the oil price shocks influence the returns of the stock market as it influences the prices of goods produced. Another study of Le and Chang (2015) argued that the fluctuations in prices of oil significantly influencer the returns of the stock market. Therefore, the effect of changes in oil prices has been tested over the stock market of Jordan and for that purpose, the first hypothesis of the study has been developed. This hypothesis has been provided below:

H₁: Crude oil significantly influence the stock market returns in Jordan.

On the other hand, the fluctuations in prices of commodities also have a huge influence on the prices of goods produced in the country. It is due to the reason that most of the products involve cotton as the raw material for the purpose of carrying out the manufacturing process. The study of Vasile et al. (2016) stated that the changes in prices of commodities have significantly change the prices of goods produced. Pertaining to the change in prices of goods, the stock market prices are also influenced as the increased cost of the company reduces the returns of investors. The study of Zhang and Qu (2015) stated that the fluctuations in oil prices have a huge influence over the stock market returns in the country as investors are attracted to other commodities like cotton. On the other hand, the study of Jiang et al. (2019) argued that the stock market returns are significantly influenced by the cotton prices as the fluctuations in oil prices

lead the investors to pull their investment from the oil sector. In this manner, the control effect of cotton prices has been tested over the oil prices fluctuations and SMR of Jordan.

Moreover, exchange rates also control the prices of oil all over the world. In this manner, it is essential for the country to stabilise the exchange rate in terms of minimising the oil prices shocks. It has been argued in the study of Yang, Cai and Hamori (2017) that the exchange rate could influence the prices of oil in the country. If the exchange rate is declining against the dollar, the country would have to buy oil at an increased price. In this manner, it leads to the lack of investment in the oil sector which also influences the SMR in the country. It implies that there is a control effect of the ER over the oil prices shocks and stock market returns in the country. It has been stated in the study of Jain and Biswal (2016) that exchange rate controls the prices of oil as the fluctuations in the prices of oil have a huge influence over the stock market returns in the country. The other study of Bai and Koong (2018) also argued that the oil price fluctuations also depends on the exchange rate of the country has a huge influence over the stock market returns. In this manner, the control effect of the ER over the oil price fluctuations and SMR of Jordan has been tested in this study.

3. Data Sources and Model Specification

This study has involved the quantitative design in terms of assessing the effect of oil prices shocks over the stock market returns in Jordan. The variables which have been considered in this study include crude oil prices, SMR along with controlled variables cotton prices and exchange rate. Pertaining to the approach of the study, the deductive approach has been adopted due to the reason that the hypothesis has been tested in the context of Jordan stock market (Razzaqi, Bilquees and Shahbaz, 2011). The method adopted for the data collection is secondary in which the historical data with respect to crude oil prices (OP), SMR, cotton prices (CP) and changes in exchange rates (EXR) has been gathered from Investing.com, (2020). With respect to the time frame, 6 years have been considered starting from (2015 to 2020) on monthly basis. The analysis of the data is carried out on Stata in which the presence of unit root has been tested as it is essential to test the unit root due to the presence of random trends in the data (Gerrard and Johnson, 2015). The unit root has been tested with the help of Dickey-Fuller (ADF) (Al-Smadi, 2020c, Al-Smadi, Al-Smadi and Ali (2020)). After testing the unit root in the data, the regression is identified with respect to the consequence of oil prices shocks over SMR in Jordan. Thus, based on the empirical literature could be form the regression equation is provided as in Equation (1):

$$SMR_t = \alpha + \beta_1 \Delta OP_t + \beta_2 \Delta CP_t + \beta_3 \Delta EXR_t + \varepsilon_t \qquad (1)$$

The above equation denotes the regression model of the study in which SMR refers to the stock market return of Jordan. On the other hand, α refers to the constant while Δ refers to the change in prices of oil, exchange rate and commodities. Moreover, ε_t is the error term.

4. Econometric Framework

Since this study has focused on determining the consequence of oil prices shocks over the SMR in Jordan, therefore, the rational expectations theory has been employed. The study of Baele et al. (2015) argued that the rational expectations theory is the modelling technique or concept which is widely adopted in macroeconomics. In this manner, the theory posits that the decisions of individuals are based on three primary factors including past experiences, information available to them and human rationality. On the

other hand, the rational expectations theory states that decisions of individuals are based on information available to them in the market and try to learn from this information. It relates to the shocks in oil prices as the fluctuations in oil prices are available as information to every investor on the basis of which the decision of investment is taken. It has also been stated in the study of Ni, Wang and Xue (2015) that it is imperative for the investors to consider all the information available prior to making an investment in the stock market.

Many studies argued that, the regression analysis would not be true or spurious regression if the time series data are not stationary (Al-Smadi, 2020a; Bekhet and Al-Smadi, 2015; Gujarati and Porter, 2009). Moreover, in the current study the augmented Dickey-Fuller (ADF) [1979,1981] statistical test is used to detect the level of stationarity either at I(0), I(1) or I(d) to selected the appropriate time-series model (Al-Smadi, 2020b; Bekhet and Al-Smadi, 2017).

The vector autoregressive (VAR) model proposed by Sims (1980) is considered one of the most important techniques to identify the relationship and causality directions among the variables (Bekhet and Othman, 2011; Pesaran, 2015). Thus, to achieve the objectives of the current study, the (VAR) model is used to examine the relationship between the SMI and the other variables. VAR model was employed by many researchers; for example Pradhan, (2018) examined the relationship between SMR and economic growth in G-20 countries using VAR model. Also, Arcabic, Globan, and Raguz (2013) investigated the relationship between foreign direct investment (FDI) and the SMR in Croatia using quarterly time series data for the (2010-2011) period. The results showed that there is a relationship between FDI and SMR. Mushtaq *et al.* (2014) examined the causality directions between SMR and FDI in Pakistan including consumer price index (CPI), EXR, using quarterly time series data for the (2000-2010) period. Thus, to determine the impact of oil prices shocks on the stock market return of Jordan VAR model could be formulated as in Equation. (2).

$$
\begin{bmatrix} \Delta SMR \\ \Delta OP \\ \Delta CP \\ \Delta EXR \end{bmatrix}_t = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{bmatrix} + \sum_{s=i}^{K} \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} & \beta_{14} \\ \beta_{21} & \beta_{22} & \beta_{23} & \beta_{24} \\ \beta_{31} & \beta_{32} & \beta_{33} & \beta_{34} \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} \end{bmatrix}_s \begin{bmatrix} \Delta SMR \\ \Delta OP \\ \Delta CP \\ \Delta EXR \end{bmatrix}_{t-s} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{bmatrix}_t \qquad (2)
$$

where, Δ is the first difference operator, α_is denote intercepts, β_{ij}s represent the coefficients, which are used to test the causality among the variables, ε_is represent the error terms, k is the lag length and s is the lag order and i,j = 1,......,4.

5. Results

5.1. Descriptive Statistics

The below Table 1 shows the descriptive statistics with respect to the variables used to measure the effect of oil price shocks over the SMR in Jordan. In this method, it can be determined from the below Table 1 that mean value for the stock return in Jordan is -0.005 which demonstrates that the average SMR in Jordan for the considered time period is -0.5%. Though the standard deviation is computed to be 0.029 which posits that the SMR will diverge from 2.9%. On the other hand, the mean for oil prices is 0.00 which shows that the average change in the oil prices for considered years is 0.00% although the deviation is obtained to be 0.154 which demonstrates that the oil amounts will diverge from 15.4%. In addition to this, the mean for the ER is resolute to be 0.00 which illustrates that the average for the exchange rate in comparison to USD is 0.00%. This exchange rate is expected to diverge from 0.1%. Lastly, the mean for

cotton prices is resolute to be 0.003 which posits that the average cotton price during considered years is 0.3% while the standard deviation is calculated to be 0.061 which portrays that the cotton prices are expected to diverge from 6.1%.

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Stock Returns	71	-0.005	0.029	-0.113	0.070
Oil Prices	71	0.000	0.154	-0.782	0.633
Exchange Rate	71	0.000	0.001	-0.002	0.003
Cotton Prices	71	0.003	0.061	-0.189	0.140

5.2. Augmented Dickey-Fuller (ADF)

Based on the historical patterns, the assessment of unit root is considered as substantial aspect for the purpose of computing the results and making predictions on the base of it. As per the study conducted by Paparoditis and Politis (2018), the evaluation of forthcoming values based on historical data using traditional inferential statistics is challenging. In this manner, the Augmented Dickey-Fuller (ADF) has been employed in terms of analyzing the unit root presence in the statistics.

Table 2 Augmented Dickey-Fuller (ADF)

ADF test statistic	t-Statistic	Prob.*
Stock Returns	-7.678	0.000
Oil Prices	-7.195	0.000
Exchange Rate	-13.851	0.000
Cotton Prices	-9.419	0.000

Table 2 presents the results of Augmented Dickey-Fuller (ADF) for the variables which have been espoused in this study. The alternative hypothesis of the ADF suggests that there is no occurrence of unit root while the null hypothesis depends over the occurrence of unit root. In this manner, it is evident for Table 2 that sig value for all the variables in the study is below the threshold of 0.05 when tested through ADF. Therefore, the alternative hypothesis has been accepted which suggests that there is no presence of unit root in the data. Pertaining to no presence of unit root in the historic data, the VAR approach has been adopted for the purpose of determining the effect.

5.3. Vector Autoregression (VAR)

The below Table 3 shows the association among the variables with respect to the equation of each variable. Therefore, on the basis of the below Table 3, it can be determined that there is no association among the variables considering the equation of Stock returns. It is due to the reason that the p-value for stock returns equation is calculated to be 0.241 which is above the verge of 0.05. Conversely, it can be recognized that there is a significant association among the variables considering the equation of oil prices as p-value is calculated to be 0.005 which is underneath the verge of 0.05. Additionally, the association among the variables with respect to the equation of exchange rate is also firm to be significant as sig value was calculated to be 0.00 which is beneath the verge of 0.05. Lastly, the association among the variables was determined to be insignificant with respect to the equation of cotton prices as the p-value is computed to be 0.553 which is above the threshold of 0.05.

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Table 3 Vector Autoregression Equations

Equation	Parms	RMSE	R-sq	F	P>F
Stock Returns	9	0.028	0.135	1.342	0.241
Oil Prices	9	0.142	0.269	3.172	0.005
Exchange Rate	9	0.001	0.361	4.863	0.000
Cotton Prices	9	0.062	0.091	0.863	0.553

On the other hand, Table 4 shows the vector autoregression with respect to stock market return as the dependent variable. As follows, it can be recognized from Table 4 that there is a significant effect of cotton rates on the stock market returns of Jordan as B= 0.130, p= 0.031< 0.05. However, the stock market return is dependent on the second lag of cotton rates.

Table 4 Vector Autoregression (Stock Market Returns)

	Coef.	Std. Err.	t	P>|t|
Stock Returns				
L1.	0.020	0.118	0.17	0.866
L2.	-0.210	0.120	-1.76	0.084
Change in Oil Prices				
L1.	0.000	0.024	-0.01	0.994
L2.	0.016	0.024	0.67	0.505
Change in Exchange Rate				
L1.	6.264	5.023	1.25	0.217
L2.	9.329	4.940	1.89	0.064
Change in Cotton Prices				
L1.	0.070	0.059	1.19	0.237
L2.	0.130*	0.059	2.2	0.031
_cons	-0.006	0.003	-1.73	0.090

5.4. Granger Causality Test

The below Table 5 shows the Granger Causality test. As follows, it can be firm that there is a substantial effect of oil prices in the short run while excluding the stock market returns as B= 5.941, p= 0.004< 0.05. It posits that the stock market returns do not granger the oil prices. On the other hand, the significant short term consequence of oil returns was also resolute excluding all the variables as B= 2.841, p= 0.016< 0.05. It depicts that all the variables do not granger cause the oil prices.

Table 5 Granger Causality

Equation	Excluded	F	df	df_r	Prob>F
Stock Returns	OilRet	0.225	2	60	0.798

Stock Returns	ExRet	1.819	2	60	0.170
Stock Returns	CottonRet	2.635*	2	60	0.08
Stock Returns	ALL	1.562	6	60	0.173
Oil Returns	StockRet	5.941***	2	60	0.004
Oil Returns	ExRet	0.2973	2	60	0.743
Oil Returns	CottonRet	2.660	2	60	0.078
Oil Returns	ALL	2.841**	6	60	0.016

***: indicating significance at 1%; **: at 5%; *: at 10%

6. Discussion and Hypothesis Assessment

Based on the above analysis, it has been identified that there is an insignificant effect of the oil prices on the SMR. In this manner, the hypothesis that crude oil prices significantly affect the SMR of Jordan has been rejected. It contradicts with the study of Al-hajj, Al-Mulali and Solarin (2018) which stated that the oil price shocks influence the returns of the stock market as it influences the prices of goods produced. The other study of Le and Chang (2015) also determined a similar effect. The possible reason for the insignificant effect would be that the reduction in oil prices may affect the oil-producing companies, however, the oil marketing companies would enhance their performance due to the increased demand of oil (Bjørnland, 2009). Therefore, this reduction is offset by the increase in performance of oil marketing companies. On the other hand, the effect of the exchange rate was also determined insignificant over the stock market returns. It contradicts with the findings of Jain and Biswal (2016) that exchange rate controls the prices of oil as the fluctuations in the OP have a huge influence over the SMR in the country. Finally, the effect of cotton prices is also identified to be significant over the stock market returns. However, it is dependent on its second lag. It contradicts with the findings of Zhang and Qu (2015) that the fluctuations in prices of oil have a huge influence over the stock market returns in the country.

7. Conclusion and Recommendations

The demand for oil has increased over the years due to its extensive use in the production process. However, the shocks in the prices of oil create adverse effects over the economy of countries. In this manner, the effect of oil price shocks has been determined in this study over the stock market returns of Jordan. The variables which have been considered are oil prices, stock market returns, along with controlled variables cotton prices and exchange rate. The data has been gathered from secondary sources with respect to the monthly frequency ranging from 2015 to 2020. The analysis showed that there is an insignificant effect of oil prices, cotton prices and exchange rate over the SMR. In this way, it is suggested for the policymakers to emphasis on other commodities besides cotton and try to stabilise the exchange rate. The major limitation of this study is that the results of this study are limited to Jordan SMR. In this way, it is advised for future researchers to include data from other countries as well.

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