Oil Price Fluctuation and Firm Performance in Developing Economy: Evidence from Oman

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ABSTRACT

The study aims to investigate how oil continues to be the driving force of the Omani economy. Accordingly, changes in oil prices will have positive or negative impacts on all economic sectors. This study investigates the impact of oil prices on firm performance in 74 industrial and services companies listed on the Muscat Stock Exchange (MSM) from the years 2010 to 2018. This study’s econometric model uses panel data regression since comprising time-series and cross-sectional data. The paper examines the effects of oil price fluctuations on the sampled firms’ performance. The statistical analysis indicates that oil prices have a significant positive impact on financial performance (as measured by return on assets - ROA) with the exception of the interest rate. Moreover, all fixed effects are highly significant for the five sectors. This result contributes to the literature by highlighting the impact of oil price on firm performance in Oman’s industrial and service sectors. Both sectors are highly exposed and sensitive to oil price fluctuations. All regression coefficients in all sectors are highly significant, with the exception of interest rate, which has no impact on the profitability performance of the cement, oil, and textile industries. Moreover, both fixed and effects models are highly significant.

Keywords: Oil Price, Firm Performance, ROA, Panel Data, Industrial and Service Sectors, Oman
JEL Classifications: E44, F31, F37, B25

1. INTRODUCTION

Many researchers have studied the effect of oil prices on the economy. Filis et al. (2011) concluded that oil prices affect the economy in many ways and that the effects differed for oil-exporting and oil-importing countries (Bjørnland, 2009). Increases in oil prices affect oil-exporting countries positively while affecting oil-importing countries adversely. According to Mongi and Rejeb (2016), oil prices have a negative coefficient for market risk. Elyasiani et al. (2011) found that oil price fluctuations constitute a systematic asset price risk at the sectoral level. Wattanatorn and Kanchananpoom (2012) studied the impact of oil prices on the profitability of various sectors using data from the stock exchange of Thailand from 2001 to 2010. They found that there is a significant impact on profit in the food and energy sector. Arouri (2011) also found that increased oil prices had an asymmetric effect on selected oil and gas sectors, and a negative effect on the food and beverage sector. In short, there is consensus that changes in the price of crude oil affect the economy (Kilian, 2009). Oman is an oil-exporting country, with oil and gas driving its economy. In 2014, it produced nearly 943,000 barrels of crude oil a day while gas production reached 24.3 trillion cubic feet (The Report, Oman 2014, Oxford Business Group). Limited research has explored the impact of changes on oil prices on profitability and firm performance in Oman. The present study examines the influence of oil prices on firm performance in Oman’s industrial and services sectors, which are highly sensitive to oil price fluctuations. The results support managing cost structures in short- and long-term planning in the event of rising oil prices.
2. LITERATURE REVIEW

According to Yan (2012), oil and gas are significant drivers of economic development globally. As such, fluctuations in oil prices are a global measure of global economic development. Changes in the prices of oil have significant effects on politics and economics. To illustrate this relationship, Hughes et al. (2008) estimate that the short-run price of gasoline demand in absolute terms were in the range of 0.21-0.34. According to Hamilton (2009), global oil prices fell over 57% from June 2014 to January 2015, thereby reducing the revenues for oil-exporting countries significantly. Since the Middle East is heavily dependent on oil exports, revenue losses due to lower prices of oil resulted in severe budget pressure and reduced trade balance for Saudi Arabia, Kuwait, UAE, and Iran.

2.1. Impact of Oil Price on Profitability Performance

Hamilton (1983) is a pioneer study which studied the impact of crude oil prices on the US recession. Subsequent studies examined the impact of changes in oil prices on macroeconomic variables. These studies covered the impact of macroeconomic factors and oil prices on firms’ operational costs and revenues. Concerning the effect of oil price shocks on firm performance, Sadorsky (2011) studied the volatility of real stock prices due to changes in oil prices. For GCC countries, Mohanty et al. (2011) found that, with the exception of Kuwait, the remaining five GCC countries reacted positively to changes in oil prices. With the decline in oil prices, there were negative effects on the stock returns. Using the GARCH and EGARCH models, Janor et al. (2013) concluded that that oil price volatility had a significant effect on firms for the period from January 1986 to December 2011. Studying the same variables, Dadashi et al. (2015) sampled firms listed on the Tehran Stock Exchange from 2003 to 2013 and concluded that oil prices significantly affected firm value based on Tobin’s Q.

Demiralay (2013) studied the relationship between crude oil prices and sectoral returns in Borsa Istanbul and found a direct relationship between oil prices and chemical, petroleum, and plastic industries. Ganguli (2016) analysed the impact of oil price shocks on the GCC economy and found no fundamental differences across GCC countries. However, the drop in oil price affected the fiscal vulnerabilities of these economies. Osamah and Ali (2017) surveyed non-performing loans in 2310 commercial banks across 30 oil-exporting counties during a period of reduced oil prices from 2004 to 2014. The paper concluded that the oil price shocks had a macro-economic impact on the financial stability of oil-exporting countries. This impact affected not only bank performance but also economic activities and social welfare. A recent study conducted by (Nguyen et al., 2020). They investigate the effect of oil price and exchange rate on the two Vietnamese stock market indices the findings show that the oil price has a significant positive effect on the two Vietnamese stock market indices. In terms of the stock index volatility. In the same view, El-Chaarani (2019) analysed the impact of oil price fluctuations on the financial performance of the banking sector in eight oil-producing and exporting countries in the Middle East from 2012 and 2017. The results reveal a significant direct impact of oil prices on the financial performance of banking sector in Bahrein, Oman and Iran. In Jordan, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates, the results do not reflect any direct impact of oil price fluctuations on the financial performance of the banking sector.

On the other hand, Sadorsky (1999) drew attention to a negative relationship between shocks in oil prices and real stock returns for the US economy and a negative impact of shocks to real stock returns on interest rates and industrial production. Poghosyan and Hesse (2009) studied the relationship between oil price shocks and bank profitability. They collected data for 145 banks in 11 non-exporting MENA countries for the period from 1994 to 2008 and concluded that there was an indirect effect of oil prices on the banks’ profitability, while the direct effect is insignificant. Similarly, Hawaldar et al. (2017) studied the financial performance of selected banks in the Kingdom of Bahrain using financial measures: profitability, efficiency, capital adequacy and liquidity ratios in the backdrop of oil shocks. The pre and post crisis periods was adopted. The results conclude that the financial performance of the banks is similar in the pre-crisis and crisis period.

2.2. Firm Performance Indicators

Janor et al. (2013) studied the relationship between the effects of oil prices and firm performance based on ROA, ROE, leverage and other factors. Wattanatorn and Kanchanapoorn (2012) measured the ratio of net profit to total equity. Leverage refers to the company’s total debt divided by its total assets or total debt/total equity, which shows the percentage of financing that comes from banks or stockholders. The profitability from such activities can be analysed as profit before tax or after tax, ROE, EPS, DPS, net profit ratios, etc (Tailab, 2014).

Also, it is worth noting that research in the area of oil prices has been a subject of interest for many researchers. However, more empirical studies, especially in developing countries, are needed to investigate its implications and influence on firm performance.

Flowing (Nguyen, 2020) and Qayyum and Noreen (2019) Return on Assets (ROA) is used to measure the profitability performance of firms in the industrial and service sectors in Oman. This area has hitherto been inadequately addressed. ROA is a form of Return on Investment (ROI) and measures the profitability of a business in relation to its total assets. The ROA formula is:

\[ \text{ROA} = \frac{\text{Profit before tax}}{\text{Total assets}} \]

\[ \text{ROE} = \frac{\text{Net profit}}{\text{Shareholder equity}} \]

\[ \text{Leverage} = \frac{\text{Total debt}}{\text{Total assets}} \]

\[ \text{Net profit ratio} = \frac{\text{Net profit}}{\text{Revenue}} \]

\[ \text{EPS} = \frac{\text{Net profit}}{\text{Share count}} \]

\[ \text{DPS} = \frac{\text{Dividend}}{\text{Share count}} \]
3. RESEARCH METHOD

3.1. Model for Oil Prices and Profitability Performance

This study seeks to determine the influence of crude oil price, interest rate and exchange rate on profit for companies listed on the Stock Exchange of Oman. The variables are presented in Table 1. The econometric model is developed using panel data regression comprising time series and cross-sectional data. To alleviate the inherent problems of heteroscedasticity and autocorrelation associated with panel data, we apply the generalised least squares (GLS) instead of the ordinary least squares (OLS) method to model the relationship between oil price, interest rate, exchange rate and the return on assets as the dependent variable. That is,

\[
\text{ROA}_i = \alpha_0 + \alpha_1 \text{oilprice}_i + \alpha_2 \text{interestrate}_i + \alpha_3 \text{exchangerate}_i + \alpha_4 \logasset_i + \epsilon_i
\]

We employ both fixed effects and random effects models of estimation as a remedial measure for the endogeneity problem that may occur due to fixed effects. Specifically, the adopted models are:

Fixed effects model

\[
\text{ROA}_i = \alpha_0 + \alpha_1 \text{oilprice}_i + \alpha_2 \text{interestrate}_i + \alpha_3 \text{exchangerate}_i + \alpha_4 \logasset_i + \epsilon_i
\]

Random effects model

\[
\text{ROA}_i = \alpha_0 + \alpha_1 \text{oilprice}_i + \alpha_2 \text{interestrate}_i + \alpha_3 \text{exchangerate}_i + \alpha_4 \logasset_i + v_i + \epsilon_i
\]

Where, 
\(\alpha_i\) represents firms’ fixed effects and, \(v_i\) represents firms’ random effects, \(i\) is the cross section/firm and \(t\) is the time.

3.2. Impact of Industry Size on Profitability Performance

The literature revealed a negative relationship between industry size and profitability (Hall and Weiss, 1967; Ballantine et al., 1993; and Rajeev, 2001). Many researchers considered the volume of total assets as a measure of the firm’s size. In this study, since the ROA is a function of total assets, we adopt the log of the total assets as a measure of the firm’s size to reduce the co-linearity effect between the dependent and independent variables.

3.3. Hypothesis Development

This study seeks to determine the influence of crude oil price, interest rate, and exchange rate on firm performance in the industrial and service sectors in the Muscat Stock Exchange. Most studies pointed out that changes in oil prices have a significant impact on firm performance (Janor et al., 2013; Mohanty et al., 2011).

In the Sultanate of Oman, no study has examined the relationship between oil price, interest rate, exchange rate and firm profitability. To address this issue, we used ROA as an indicator to measure the profitability performance of each industry. To this end, we formulate the following hypotheses:

\(H_1\): The change in oil prices has a significant influence on financial performance in terms of ROA

\(H_2\): The change in interest rate has a significant influence on financial performance in terms of ROA

\(H_3\): Fixed effects model is the most appropriate model to study this phenomenon.

3.4. Sample Selection and Data Collection

This study tested the impact of oil prices on firm financial performance as measured by ROA. The financial data were collected from the financial statements of five sectors listed on the Muscat Securities Market (MSM) in the Sultanate of Oman. The panel data consists of five industries (cross-sections), namely cement, chemical, electrical, textile and oil sectors. For each industry, ROA, oil price, interest rate, exchange rate, and the log of total assets are measured over 7 years (2010-2018). The stock prices were converted to US dollar using the daily exchange rate reported by the Omani Central Bank. Monthly data on Brent and West Texas Intermediate nominal spot crude oil prices are taken from the Energy Information Administration (EIA) website (www.eia.gov).

4. DATA SUMMARY

Table 2 presents the descriptive statistics. The average oil price was $ US 84.93 per barrel. The average oil price and ROA in this

| Variable          | Mean  | Median | Min.   | Max    | Std. Dev. | Obs. |
|-------------------|-------|--------|--------|--------|-----------|------|
| ROA for set (%)   | 8.43  | 3.5    | -0.00054| 32.36  | 10.06     | 45   |
| Oil price (US$/Barrel) | 79.50 | 76.64  | 40.14  | 109.61 | 25.40     | 45   |
| Interest rate (%) | 5.88  | 5.88   | 5.08   | 6.84   | 0.47      | 45   |
| Exchange rate (%) | 38.45 | 38.45  | 38.45  | 38.45  | 0.00      | 45   |

Table 1: Variables description

| Variable | Description                                      |
|----------|--------------------------------------------------|
| ROA      | Return on asset                                  |
| Oil price| Average of OPEC Countries Spot Price             |
| Interest rate | One day Bilateral Repurchase rate              |
| Exchange rate | Exchange rate Omani Riyal/US          |
| Logasset | Log of total asset                               |
study showed large variation that ranges between 40.14 and 109.61 for oil price and 0.08% and 33.19% for ROA. Oil price showed the highest variation among the independent variables, followed by ROA. The interest rate is the least variable, with a standard deviation of 0.54. Exchange rate (OMR/US$), being a constant in the case of the Sultanate of Oman, has zero variance.

Table 3 reports the descriptive statistics for the ROA in the five industries that were considered in the study. The cement industry exhibited the highest average ROA (27.02%), followed by the electrical sector (17.41%). The textile industry showed the lowest average ROA (0.21%). As for the variation, the electrical sector showed the highest variation with a standard deviation of 6.67, followed by the cement sector that reported a standard deviation of 5.38. Oil and textile sectors showed the lowest variation.

5. EMPIRICAL RESULTS

In this section, Tables 4-6 present the results of panel data analysis of the ROA equation using the three models considered in this study. Table 7 offers a summary of the statistical significance of each independent variable in the three models.

Table 3: Descriptive statistics for ROA categorised by industry

| Industry | Mean | Median | Min. | Max | Std. Dev. | Obs. |
|----------|------|--------|------|-----|-----------|------|
| Cement   | 21.29| 24.36  | 0.40 | 11.11| 2364.296  | 9    |
| Chemical | 2.60 | 3.00   | 0.68 | 1.00 | 14.00     | 9    |
| Electrical | 15.16| 14.00 | 6.89 | 25.09| 730.066937| 9    |
| Oil      | 2.93 | 2.87   | 1.54 | 4.27 | 11125.08  | 9    |
| Textile  | 0.18 | 0.20   | -0.00054 | 0.31 | 6491.14587 | 9    |

Table 4: GLS regression coefficients

| ROA | Coefficient | Std error | z     | P>|z| | 95% confidence |
|-----|-------------|-----------|-------|-----|----------------|
| Price | 0.4119027 | 0.01317251 | 3.13 | 0.002 | 0.1537262 | 0.6700792 |
| Interest rate 1 | 13.97577 | 8.16503 | 1.71 | 0.087 | 2.027393 | 29.97894 |
| Exchange rate 1 | 0 | (omitted) | (omitted) | (omitted) | (omitted) | (omitted) |
| Log assets | 730.066937 | 266.2633 | 2.74 | 0.006 | 208.2004 | 1251.933 |
| Industry | Cement | 6491.14587 | 2364.296 | 2.75 | 0.006 | 1857.21 | 11125.08 |
| Electrical | 4629.167 | 2451.349 | 1.89 | 0.059 | 0.1753898 | 9433.722 |
| Oil | 6484.513 | 2364.277 | 2.74 | 0.006 | 1850.614 | 11118.41 |
| Textile | 6456.169 | 2364.215 | 2.73 | 0.006 | 1822.394 | 11089.95 |
| Industry/Price | Chemical | -0.4238004 | 0.1336927 | -3.17 | 0.002 | -0.6858332 | -0.1617676 |
| Electrical | -0.4921069 | 0.1336927 | -3.17 | 0.002 | -0.6858332 | -0.1617676 |
| Oil | -0.4613564 | 0.2351384 | -1.96 | 0.061 | -0.945633 | 0.0229203 |
| Textile | -0.4093513 | 0.1158684 | -3.53 | 0.002 | -0.6479865 | 0.1707155 |
| Industry/Interest rate 1 | Chemical | -14.57816 | 8.417548 | -1.73 | 0.096 | 31.91443 | 2.758101 |
| Electrical | -11.28588 | 8.183549 | -1.38 | 0.180 | -28.14021 | 5.568455 |
| Oil | -14.71147 | 10.42521 | -1.41 | 0.171 | -36.18259 | 6.759638 |
| Textile | -13.90662 | 6.815194 | -2.04 | 0.052 | -27.94277 | 1.295371 |
| Industry/Log assets | Chemical | -733.6398 | 183.6825 | -3.99 | 0.001 | 1111.941 | 3.353387 |
| Electrical | -516.5551 | 204.3698 | -2.53 | 0.018 | -917.4623 | 95.64794 |
| Oil | -732.3255 | 191.1156 | -3.83 | 0.001 | -945633 | 33.7156 |
| Textile | -730.2294 | 198.7918 | -3.67 | 0.001 | -1139.649 | 320.81 |
| Constants | -6455.486 | 2364.202 | -2.73 | 0.006 | -11089.24 | -1821.735 |

All fixed effects in the above table are highly significant with P-values (0.005, 0.029, 0.005, and 0.005) for the five sectors. That is, the cross-section (industry/company) heterogeneity or effect on ROA is highly significant. Thus, every company has its significant intercept. It is worth noting that both R-squared and the adjusted R-squared are well above 90%, as reported above. This indicates that the assumed model is good.

The statistical significance of the regression coefficients for each independent variable in each sector for the three models of the study is summarised in Table 7.

The results of the random effects model are almost similar to the fixed effects model. The random effects model reports R-squared of 98.61, as depicted above. The log of total asset as a measure of the firm’s size is highly significant with a negative sign for all industries,
as expected. This result is concurring with the evidence obtained from the literature review that showed a negative relation between the industry size and profitability (Hall and Weiss, 1967; Ballantine et al., 1993; and Rajeev, 2001). The same result can also be seen in Tables 4 and 5 above for the GLS model and the fixed effects model.

Table 7 summarises the statistical significance of the regression coefficients for the five industries and the three models considered above. It presents a summary of all results. All regression coefficients in all sectors are highly significant with the exception of interest rate that showed P-values of 0.156; 0.103; and 0.160 in the base industry (cement), oil and textile industries respectively. All fixed effects in the above table are highly significant with P-values (0.005, 0.029, 0.005, and 0.005) for the five sectors. The results of the random-effects model are almost similar to the fixed-effects model. The random-effects model reports R-squared of 98.61, as depicted above.
6. TESTING: FIXED OR RANDOM EFFECTS MODEL?

Here, we use the Hausman test to test the hypotheses:

$H_0$: The random-effects model is the appropriate model to use

$H_1$: The random-effects model is not the appropriate model to use.

The result of the test is depicted in Table 8.

The test fails to reject the null hypothesis, as the P-value (Prob>Chi square=0.7803) is greater than 5%. Hence, we select the random-effects model as the appropriate model. The tests imply that the random-effects model’s estimators are consistent and efficient.

7. CONCLUSION

This study investigated the impact of oil prices on the financial performance of five sectors in Oman, namely: cement, chemical, electrical, energy and textile. The data were collected from the Oman Exchange Market (MSM) the unique capital market in the country. The panel data consists of five sectors (cross-sections). For each sector, ROA, oil price, interest rate, exchange rate, and the log of total assets are measured over 7 years (2010-2018).

The current study assessed the relationship between oil prices and financial performance through ROA measures. In addition, the researchers adopted the fixed-effect model, which has rarely been adopted. The hypotheses are tested using panel data regression. All regression coefficients in all sectors are highly significant, with the exception of interest rate, which has no impact on the profitability performance of the cement, oil, and textile industries. Moreover, both fixed and effects models are highly significant. All in all, the study finds that oil prices positively and significantly affect financial performance (as represented by ROA). Thus, all the hypotheses of the study are accepted. The results concluded that, all fixed effects are highly significant for the five sectors. The results of the random-effects model are similar to the fixed-effects model. Therefore, this study demonstrates that oil prices influence firm profitability for all the sampled sectors.

This study shed lights on the impact of oil prices on the financial performance of five sectors in Oman. The study presented the importance of oil prices fluctuation on financial performance of the firms in different sectors. Therefore, the leaders of the companies should be aware about this influence and build their strategy upon the same. The paper suffers from several limitations. ROA was used as the sole measure for financial performance. Future research...
could include other financial measures such as ROE and leverage. Additional sectors could also be covered.

7.1. Limitations and Future Research Directions
The current study examines impact of oil prices on the financial performance of five sectors in Oman. This study used RIOA as a measure for financial performance and there are other financial measures that can be adopted in the future research, as well as increasing the sampling area in GCC and size for more representative results.

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