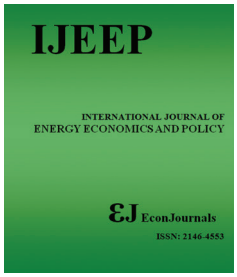

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Modeling and Mediating the Interaction between Oil Prices and Economic Sectors Advancement: The Case of Middle East

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ABSTRACT

This paper analyzes the impact of international oil price influence on the different economic sectors and GDP in middle east region for the period 2007-2021. The study also empirically analysis the mediation role for oil price on various economic sectors and on GDP. The empirical analysis involved testing the direct effect for oil prices on sectors by correlation, simple and multiple regression through Ordinary Least Square (OLS) in addition to screen graphically this effect on all sectors including GDP. The main findings may be summarized as follows: Employing the causality examination for the interaction among oil prices and economic sectors growth confirmed the significant adverse effect for oil prices on all sectors and total GDP. On other hand outcomes of multiple regression fail to discover the adverse influence of oil values on the combined impact of all sectors on GDP. The results of multiple regression revealed that the major sectors that only contributes significantly to GDP are; the agriculture, industrial, trading and real estate sectors.

Keywords: Oil Prices, Economic Sectors, Gross Domestic Product, Economic Advancement, Mediation Effect
JEL Classifications: F43, H29, H60

1. INTRODUCTION

Prices of imported oil are assumed to be the most basic part that impacts the worldwide economy. In spite of the rising discussion around the best substitute sustainable wellsprings of energy, for example, water, sun based and atomic power, oil actually plays a focal part for a tremendous piece of the world's nations. Consequently, oil value shocks could have impressive macroeconomic ramifications for both oil importing in and oil exporting out nations. From the deferent sources of energy classifications, oil is suggested as the most significant source of energy that create costs and for many countries its considered the last option for government to use for operating its economy sectors. Further, variances in oil costs influence almost all economic costs, increasing private bills and transportation costs. This fluctuation in oil price produces vulnerability about the outcomes for the world economy. This may likewise urge financial backers to defer their creating choices and redistribute work and capital from escalated petrol areas to non-concentrated petrol areas (Sill, 2007). It is contended that oil cost changes have caused instability for numerous macroeconomic totals in both oil-exporters and oil-importers (Brini et al., 2016).

The continuous volatilities in oil costs extensively affect full scale economy of both developed and emerging countries. These volatilities can influence financial development through influencing countries costs for production, spending, and any industry relies on oil prices. The middle east region similar to other worldwide countries greatly suffers from the inconsistences in oil prices whether these countries are exporters or importers. Therefore, the instability of oil prices caused an endless instability in return for all economic sector and thus overall national income. The deficiencies in economic sectors capabilities for production that referred to increase in oil prices has greatly mirrored in

community wealth decrease, minimization of public welfare and increase in unemployment in addition to other economic and social problems.

Since 1970s oil crises, the oil prices witnessed a tremendous global changes both on internal and external level, many countries, particularly oil exporters, have widely benefited from the increase and enhancement of oil prices in market; the ascend in domestic revenue as a result of the growth in oil revenues was focused to recover their local economics in addition to support their local industry with low cost of oil. Instead, the nations that imports oil were unpleasantly influenced by extraordinary oil prices which in turn triggered proliferation in essentials of production.

The current paper is targeted to investigate the consequences of oil prices and how its inconsistencies impacted the deferent economic sectors output and how the petroleum costs deviations effected the overall national income in emerging economics. This paper attempt to adds to past examinations in various perspectives. To begin with, it investigates the offensive effect of both oil cost and exposure of oil cost on various productive and service sectors; as far as anyone is concerned, no past review thought about this point previously. Second, it investigates how much the impact of unbalanced oil costs distorts economy output. The results of this study is predicted to enrich the information of policy makers about the side effects of oil prices on national income and how to utilize such information in forming policies of financial development.

The following section in the paper is organized as follows: Section 2 represents the related literature, section 3 outlines the methodology, data, and experimental examination, section 4 presents the results and the proper discussion and finally, section 5 for the conclusions and suggestions.

2. LITERATURE REVIEW

As a general rule, there has been a several undertaken investigations and studies about the results of worldwide oil market instability on different macroeconomic, microeconomic, and monetary areas of the world's economies. It is vital to take note of that Hamilton (1983) is quite possibly of the most noticeable originator for exploring the effects of verifiable oil costs on the US economy. Hamilton investigates the reaction of key US macroeconomic factors to oil price volatility since The Second Great War and presumes that oil shocks were liable for seven out of eight US downturns, in which higher oil costs prompted lower monetary growth.

With such extent of oil cost unbalances, many studies have raised a questionable debate on the significances of oil price variations on key full scale, small, and monetary factors for both developed and less developed economies. For instance, a portion of the several observational examinations and surveys that took place for the influence of oil prices as a mean for financial development (for example Hooker, 1996; Kilian, 2008; Al Rasasi and Yilmaz, 2016), expansion (for example Bachmeier and Cha, 2011), trade rates (Chen and Chen, 2007; Al Rasasi, 2018), exchange (Le and Chang, 2013), financial strategy (for example El Anshasy and Bradley, 2012), securities exchanges (for example Bachmeier, 2008; Naser and Alali, 2017; Alali, 2017), financial policies (for example Hamilton and Herrera, 2004), and business advances (Davis and Haltiwanger, 2001).

The association amongst oil prices and financial development has drawn the attention in numerous scientists after the pioneer work of Hamilton (1983), who pointed out the adverse consequence of oil costs on the financial growth. In this example, it is contended that oil cost changes notably affect government agencies ability to assist its various economic sectors (Mgbame et al., 2015). Nonetheless, another different works guarantee that the activities of monetary arrangements can retain the impact of oil cost instabilities on the economic enhancement (Vespignani et al., 2019; Gershon et al., 2019). Further, Odhiambo (2020) suggested that the impact of oil cost instabilities on economic development varies between deferent countries based on their dependability on oil prices as a source of energy.

There was a continual discussion in the literature about the bearing of oil cost impact on financial development. While certain examinations contend that for exporting countries, oil cost builds lead to upgrading the degree of pay and afterward thus both production and public utilization, and that implies more elevated levels of Gross domestic product development; to be sure, higher oil prices lead to higher profits, which suggest higher earnings in oil-producing countries (Akpan, 2009; Foudeh, 2017; Jahangir and Dural, 2018; Dabachi et al., 2020). However, another argument was proposed by few scholars suggesting that oil cost changes could have an adverse effect on Gross domestic product development, especially for countries that import oil, where the oil cost is viewed as one of the most basic elements of economic production (Arouri and Nguyen, 2010; Filis et al., 2011; Murshed and Tanha, 2020; Rahman and Majumder, 2020). As per this view, the rise in world oil costs brings down funds for oil-importing nations. In such manner, this decrease in income relies upon the level of oil cost flexibility and the persevering change in the oil value (Ghalayini, 2011; Bibi et al., 2021). Further, national banks could embrace problematic arrangements to reduce the domestic cost increments and this likewise welcomes more limitations on the economic development side. In the same vein, Papapetrou (2001) and Miguel et al. (2003) reported an adverse consequence of changes in oil costs on Gross domestic product development in Greece and Spain, separately. Similarly, Bouzid (2012) after investigating the Tunisian environment reported that a 10% higher expansion in the global oil prices led to a 3.4% decline in Gross domestic product development.

Other studies shed the light on the impact of oil price volatility on monetary advancements. (Lee et al., 1995; Mork, 1989) conclude that, the impact of changes in energy costs, particularly oil, have a similar negative change on productivity. These finding highlighted the probable effect for both increase and decrease of oil prices on economy; they also notified that the continuous increase in oil costs adversely affected monetary development of state. The aftereffects of the uneven effect of oil cost changes on the financial development and the economic expansion in middle east emerging countries and in third world countries couldn't reject in this point of view (Du et al., 2010; Farzanegan and Markwardt, 2009). Recent

evidence suggested that oil prices rise effects just about all market producing channels; the accumulated evidence approved the great connection between the cost of oil and macroeconomic movement since the oil emergency of the 1970 s (Anuar et al., 2021; Sinha et al., 2022; Żywiołek et al., 2022).

The ambiguous link between oil prices and national income continued to have the attention and focus of many researchers. Okonju (2009) reported that oil prices with higher instability brings an adverse consequence on the economic growth. Likewise, El Anshasy and Bradley (2012) also suggested that the instability of oil income adversely affects Gross domestic product development. (Kandemir, 2020) also reached the same conclusion in Mexican context after approving that the extraordinary increase in oil prices caused a great depression in economy.

The asymmetric influence of oil price volatility on economic advancement particularly on sectorial level was the focus of some recent studies such as the Mexican Rodríguez-Benavides et al. (2022); his results showed that the oil costs effect on sectorial level effected only the second level sectors not the primary sectors of economic, therefore, policy makers must mitigate the effect of uncertainty in oil market in order to avoid any economic instabilities. The same conclusion also was approved in MENA countries by (Abdelsalam, 2020; Ahmed, 2016) after examining the speculated effects of oil prices on MENA countries, the results of his study supported the proposed expectation for the negative impact of oil prices on economic growth. In middle east region such as Jordan (Al Nsour and Malkawi, 2019; Tahtamouni et al., 2017; Bash, 2015) and Lebanon (Ghalayini, 2011) approved the negative impact of oil prices on GDP, they found that as long as the oil importing costs decrease the GDP arise. The gulf countries and middle east were also targeted by the study of (Al Rasasi et al., 2018, Ghalayini, 2011) that shown also similar results to studies of MENA countries. In India, after conducted a study for the same reason Sarmah and Bal (2021) asserted that the Indian economy growth reacted significantly negative to any changes that rise the price of oil and thus instability was witnessed in Indian economy for approximately about 25 years. contrary results were found in middle Asia, particularly Indonesian environment, the results of Artami and Hara (2018) provide evidence for the relationship between oil price and the gross domestic product (GDP) the asymmetric impact found that when oil prices decrease the GDP is decreased, whereas the increases for oil prices does not necessarily affects GDP. Similarly, Awunyo-Vitor et al. (2018) provide evidence from Ghana asserted that, oil price changes have no effect on economic growth and hence policy makers should control for other elements that effect economy depression. Idrisov et al. (2015) results in Russian environment was found in line to other results found in exporting countries for the insignificant long term impact of oil prices on economic growth. In European countries another empirical evidence was found for the distortion of oil price to economic growth for instance, Van Eyden et al. (2019) found a critical adverse consequence on oil cost unpredictability on Gross domestic product development and these consequences was previously found and affirmed by (Bjornland, 2000; Saddiqui et al., 2018) for the positive effect of oil costs on unpredictability of Gross domestic product.

3. MODEL AND METHODOLOGY

The research conveys analytical and empirical methodology by establishing indications for the impact of oil prices on both economic sectorial level and aggregate level of Gross domestic product (GDP). The data of the study was assembled from the quarterly issued information of deferent sectors and from the published oil prices worldwide. The numerical data covered the period from the first quarter of 2005 up to the second quarter of 2021. The literature of the study was selected from various related works that convey the exploration of the association amongst advancement of economic and variations in oil price.

3.1. Sample

The sample comprised of all quarterly data concerning oil prices for 8 important selected sectors that significantly participate in GDP in addition to all quarterly data about GDP. The total number of years under study was 26 years and the total number of observations were 104.

3.2. Method, Model and Variables

As the purpose of the study is to address and investigate the interaction between oil prices and economic sectors and oil price effect on the whole national income; the study method followed the following steps:

- First: Descriptive statistics will be conducted to overview the various variables of the study
- Second: A graphical illustration screens the relationship between oil prices, economic sectors and GDP
- Third: A test of correlation between all variable to explore the direction of relationship among them
- Fourth: To examine the direct effect of oil prices on each economic sector and on GDP; and also to find the mediating role for oil price effect on the relationship between each sector and GDP; simple regression was used 2 times one time to identify the contribution of sector to GDP and another time when the oil price joints the contribution of sector on GDP.
- Fifth: A multiple regression test follows the simple regression in order to examine the joint impact of sectors on GDP without the effect of oil prices; the examination will be implemented over after including the oil price effect on the model.

Equation 1 represent the simple regression model for testing the direct impact of oil prices on economic sectors:

$$X_t = \alpha + \beta_1 OP_t + E_t \quad (1)$$

Where; X is the dependent variable that used for each sector when apply the simple regression. OP is the independent oil price lagged for three quarters; t is the time period measured quarterly; The same simple regression will be applied eight times for all dependent variables that effected by oil price.

The proposed regression models for identifying the mediating role of oil prices on the relationship between sectors and GDP:

$GDP_t = \alpha + \beta_1 X_t + E_t$... the impact of sector on GDP excluding oil prices. (2)

$GDP_t = \alpha + \beta_1 X_t + \beta_1 OP_t + E_t$... the impact of sector on GDP including oil prices. (3)

Where; GDP is the Gross domestic product the dependent variable; OP is oil price lagged for three quarters; t is the time period measured quarterly; X is the independent variable that used for each sector.

To identify the importance of the mediating role of oil prices on the linkage between the joint effect of all sectors and GDP; a OLS regression will be employed 2 times to examine this effect. Once with oil price effect and a second without the inclusion of oil prices in the formula, thus the following are the two assumed models:

$GDP_t = \alpha + \beta_1 AGR_t + \beta_2 MIN_t + \beta_3 INDS_t + \beta_4 ENRG_t + \beta_5 CONST_t + \beta_6 TORSM_t + \beta_7 RELST_t \beta_8 NPO_t + \beta_9 SOCS_t + E_t$... the joint impact of all sectors on GDP excluding oil prices. (4)

$GDP_t = \alpha + \beta_1 AGR_t + \beta_2 MIN_t + \beta_3 INDS_t + \beta_4 ENRG_t + \beta_5 CONST_t + \beta_6 TORSM_t + + \beta_7 RELST_t \beta_8 NPO_t + \beta_9 SOCS_t + \beta_{10} OP_t E_t$... the joint impact of all sectors on GDP including oil prices. (5)

Where; GDP is Gross domestic product; AGR, agriculture sector; MIN, minerals sector; INDS, industrial sector; ENRG, energy sector; CONS, construction sector; TORSM, tourism sector; RELST, real estate sector; NPO, non-profit organization sector; SOCS, social service sector.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 1 represent the descriptive statistics for the variables of this study. The real state sector was the sector that have the highest contribution to GDP with 24.2%. The second sector with great contribution to GDP is the industrial sector; as for tourism and social sectors both participated in in about 18% of GDP. All other sectors have <10% contribution to GDP collectively.

Table 1: Descriptive statistics

Variable	Minimum	Maximum	Mean	Mean contribution of sectors to GDP (%)
AGR	88.000	657.000	277.982	4.3
MIN	73.000	252.000	145.631	2.2
INDS	663.000	1659.000	1175.210	18.3
ENRG	44.000	181.000	106.491	1.6
CONST	78.000	294.000	189.157	2.9
TORSM	355.000	972.000	610.614	9.5
REIST	636.000	1553.000	1121.140	24.2
NPO	21.000	70.000	45.087	0.07
SOCS	262.000	749.000	510.596	8
GDP	3525.000	8626.000	6402.526	100
N	104			

*Amounts in billions JD. GDP: Gross domestic product, AGR: Agriculture sector, MIN: Minerals sector, INDS: Industrial sector, ENRG: Energy sector, CONS: Construction sector, TORSM: Tourism sector, RELST: Real estate sector, NPO: Non-profit organization sector, SOCS: Social service sector

In order to have more overview for the relationship between oil prices and deferent economic sectors and GDP we illustrated this relationship by the Figures from 1 to 11. As the Figure 1 show the agriculture sector until the year 2014 have a constant negative volatility following the changes in oil prices; in Figure 2 the mineral sector output also volatile negatively by

Figure 1: Interaction between agriculture sector and oil prices

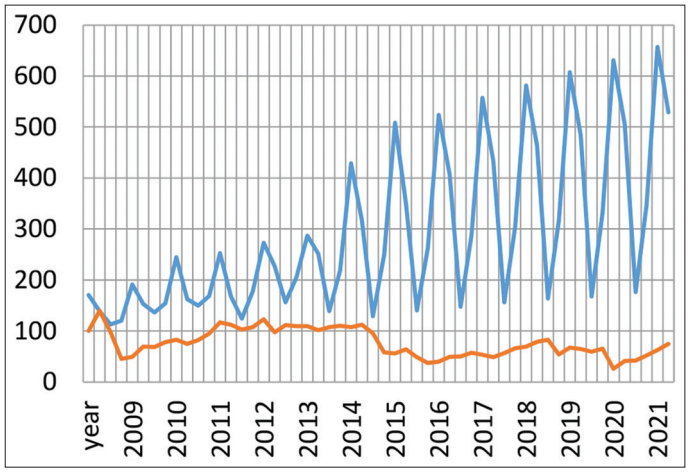


Figure 2: Interaction between Minerals sector and oil prices

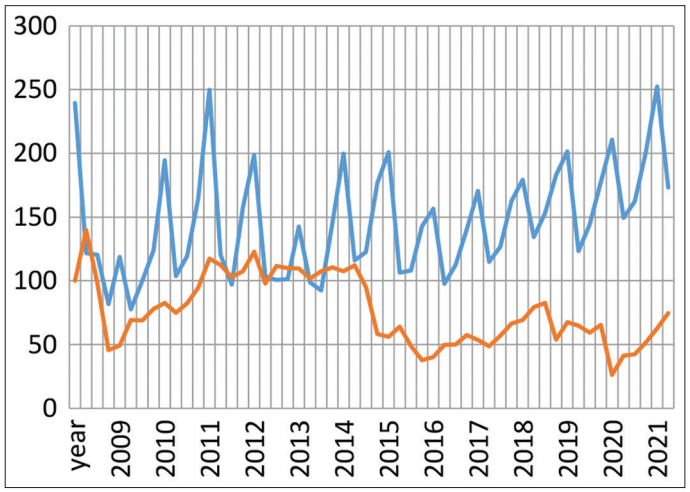


Figure 3: Interaction between industrial sector and oil prices

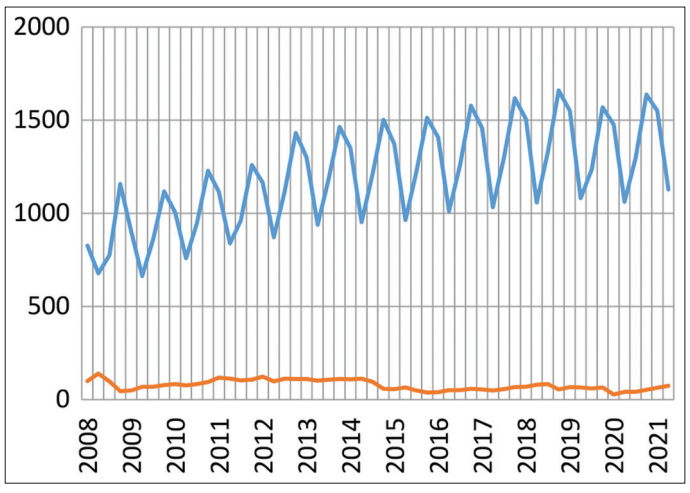


Figure 4: Interaction between Energy sector and oil prices

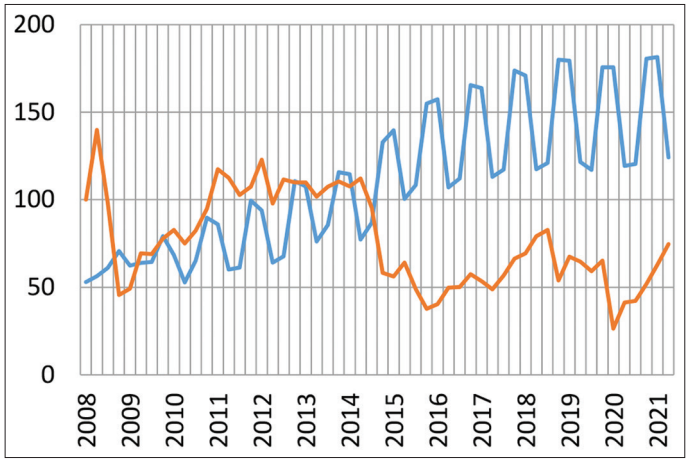


Figure 5: Interaction between construction sector and oil prices

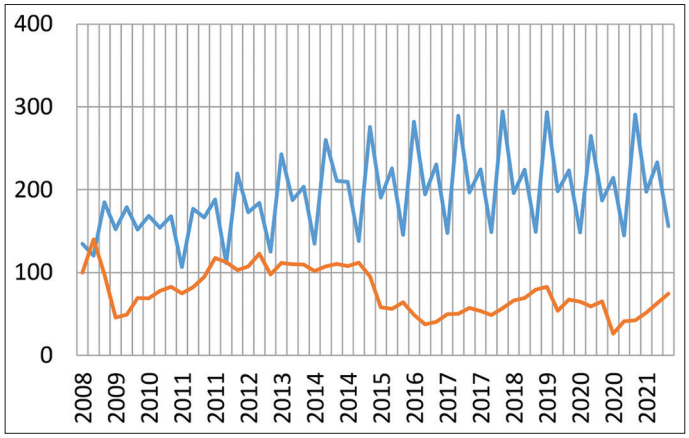
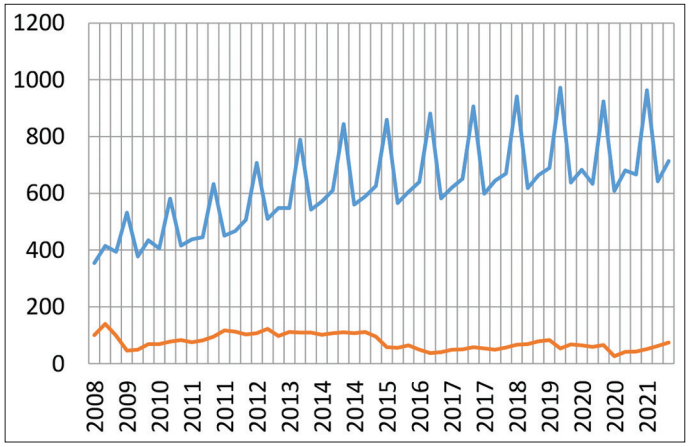


Figure 6: Interaction between tourism sector and oil prices



the changes in oil prices for all examined period. the industrial, social, trading, real estate and tourism sectors in addition to total GDP from 2008 to 2021 the output characterized by continuous upward increase despite of the little volatility of oil prices. On the other hand, the energy and non-profit sectors showed unstable volatility in their output due to changes in oil prices. However, the close observation to the majority of these sector indicate that oil prices has negative effect on the productivity of these sectors.

Figure 7: Interaction between trading sector and oil prices

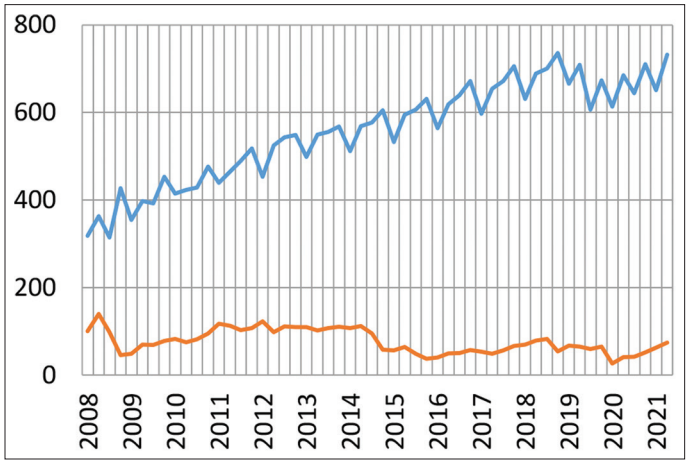


Figure 8: Interaction between real estate sector and oil prices

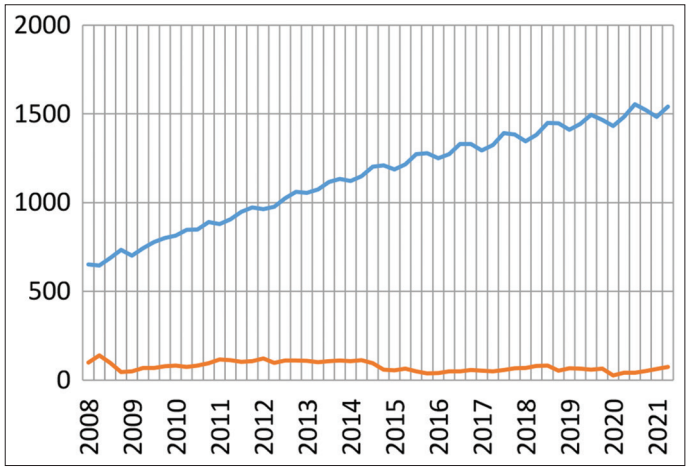
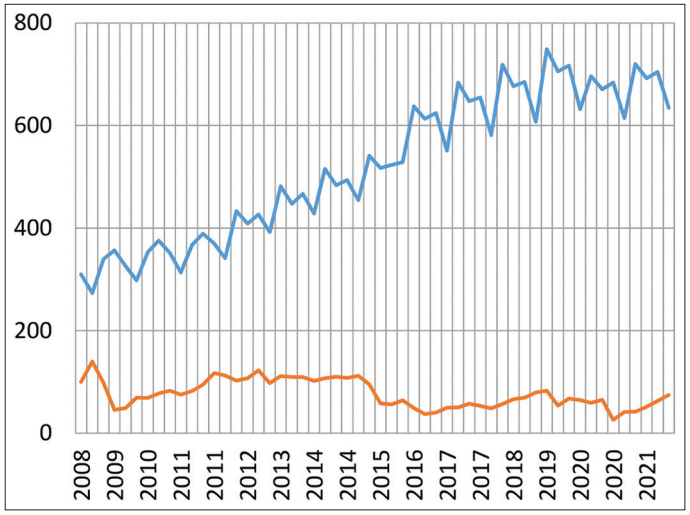


Figure 9: Interaction between social service sector and oil prices



4.2. Correlation

Table 2 shows the correlation test for the impact of oil prices on sectorial level and on GDP. The correlation results suggest that, oil prices have significant negative effect on all sectors in addition to GDP, except for mineral sector. The influence of oil prices starts its impact after 3 months and hits it maximum effect

of productivity of sectors after 9 months. This result provides a preliminary evidence for the negative impact of oil price increase on sectors and GDP.

4.3. Simple Regression

Numerous of studies in deferent environment reported that there is a direct negative impact of oil prices on economic sectors output and these studies also suggested that there is a possible impact for oil prices on the relationship between each sector and GDP. Therefore, a simple regression was conducted to investigate these propositions on our area. The simple regression results for each sector will be discussed separately. Table 3 show the impact of oil prices on agriculture sector. The results in the Table 3 proves the direct negative relationship between oil price and agriculture sector as the coefficient and t-value show. The table also show that the role of oil prices on agriculture contribution to GDP was positive the coefficient increased from 4.58 to 5.54 and t-value increased from 5.12 to 6.34.

Figure 10: Interaction between non-profit sector and oil prices

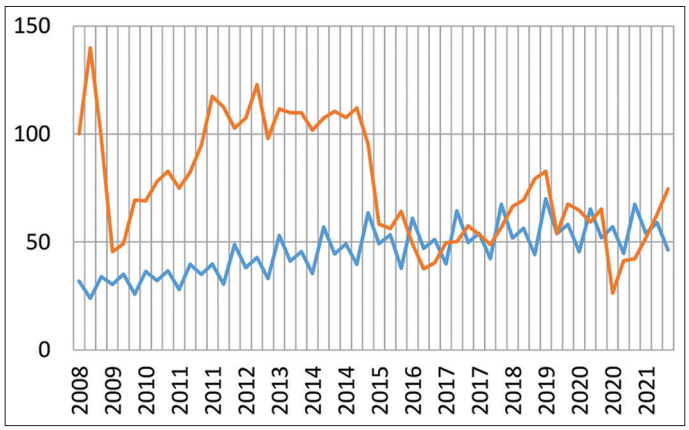


Figure 11: Interaction between social gross domestic product and oil prices

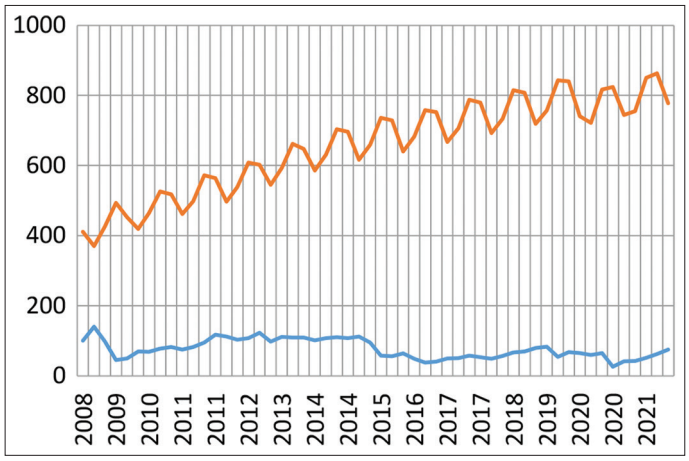


Table 4 show the impact of oil prices on minerals sector. The results in the Table 4 only proves the direct negative relationship for oil price on minerals sector as the coefficient and t-value show. But this impact was insignificant. Despite of insignificant direct impact of oil prices on minerals sector; the role of oil prices for the relationship between minerals sector on GDP showed mixed results; the coefficient was decreased from 13.21 to 12.31 and t-value was increased from 3.45 to 3.76. however, it seems that the mediating role of oil prices was effective because the explanatory power was increased from 0.171 to 0.396.

The results in the Table 5 suggests the direct negative relationship for oil price on industrial sector where both the coefficient and t-value are negative. This means that whenever oil prices decrease the output of this sector increases. Furthermore, the effect of oil prices on the contribution of industry to GDP was also negative; the coefficient was decreased from 4.27 to 3.88 and the t-value also declined from 12.58 to 11.38.

The reported data in the Table 6 involves there is a direct negative relationship for oil price on energy sector this evidenced by the negative coefficient and t-value similar to previous sectors. The impact of oil prices on the contribution of energy sector to GDP seems to be constant because there is only a slight increase in coefficient it increased from 30.56 to 30.72. On the other hand, the t-value was decreased from 19.29 to 16.06; thus this decrease is attributed to the oil price effect on energy sector.

The observations in the Table 7 assumes the direct negative relationship for oil price on construction sector where both the coefficient and t-value are negative. This suggests that whenever oil prices decrease the output of this sector increases. Further evidence was accumulated from the table for the negative role of oil price on construction sector contribution to GDP. Both of coefficient and t-value were decreased; the coefficient decreased from 13.00 to 10.32 and the t-value also dropped from 4.03 to 3.46.

Table 2: Correlation results for the sectorial impact of oil prices

Correlation	Corr. after 3 months	Sig.	Corr. after 6 months	Sig.	Corr. after 9 months	Sig.
Oil price and Agriculture	−0.349	0.008	−0.312	0.020	−0.391	0.003
Oil price and mineral	0.037	0.186	0.070	0.609	−0.061	0.661
Oil price and industrial	−0.244	0.033	−0.318	0.018	−0.378	0.005
Oil price and energy	−0.476	0.000	−0.510	0.000	−0.548	0.000
Oil price and construction	−0.256	0.057	−0.291	0.031	−0.244	0.075
Oil price and tourism	−0.298	0.026	−0.350	0.009	−0.345	0.011
Oil price and trading	−0.429	0.001	−0.465	0.000	−0.475	0.000
Oil price and real state	−0.503	0.000	−0.524	0.000	−0.532	0.000
Oil price and social sector	−0534	0.000	−0.572	0.000	−0.582	0.000
Oil price and non-profit org	−0391	0.003	−0.408	0.002	−0.381	0.004
Oil price and GDP	−0432	0.001	−0.473	0.000	−0.507	0.000

Source: Calculation of authors

The reported data in the Table 8 supports the assumption for the negative direct impact of oil prices on tourism sector; both of coefficient and t-value where negative. And this agrees with the suggestions of many scholars that whenever oil prices decrease the output of many economic sector increases. Additional indication also was accumulated from the Table 8 for the negative role of oil price on tourism sector contribution to GDP. Both of coefficient and t-value of tourism sector were decreased when oil prices included in the regression; the coefficient decreased from 6.67 to 5.89 and the t-value also fallen from 9.19 to 8.25.

Similar to previous sectors results the reported data in the Table 9 convey also a negative direct impact for oil prices on real estate sector output; the values of coefficient and t-value where shown negative in the table. Another sign also added from Table 9 for is the negative role of oil price on real estate sector contribution to GDP. Both of co efficient and t-value of real estate sector were diminished when oil prices mediate the contribution of real estate to GDP. The coefficient was decreased from 4.59 to 3.57 and the t-value also fall down from 20.12 to 16.79.

Table 10 show the impact of oil prices on trading sector. The results in the Table 10 verifies the direct negative relationship for oil price on trading sector as the coefficient and t-value show; the role of oil prices for the relationship between trading sector on GDP also was negative; the coefficient decreased from 10.66 to 9.14 and t-value too decreased from 16.33 to 13.82.

Screening the values in Table 11 confirms the negative direct impact of oil prices on social sector similar to other sectors; both of coefficient and t-value shown negative values. As for the mediating role of oil prices Table 11 also confirmed the negative impact for oil price on social sector contribution to GDP; the coefficient and t-value of social sector were reduced after oil prices included in

Table 3: Bivariate regression results for the impact of oil price on agriculture sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on AGR	0.137	9.381	0.003	−2.290	−3.063	0.003
AGR and OP on GDP	0.425	40.245	0.000	5.547	6.344	0.000
AGR on GDP	0.490	26.491	0.000	4.582	5.121	0.000

AGR: Agriculture sector, GDP: Gross domestic product

Table 4: Simple regression results for the impact of oil price on minerals sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on MIN	−0.015	0.195	0.661	−0.098	−0.441	0.661
MIN and OP on GDP	0.396	18.371	0.000	12.311	3.763	0.000
MIN on GDP	0.171	11.927	0.001	13.214	3.454	0.001

Source: Calculation of authors. MIN: Minerals sector, GDP: Gross domestic product

Table 5: Simple regression results for the impact of oil price on industrial sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on INDS	0.127	8.681	0.005	−3.775	−2.946	0.005
INDS and OP on GDP	0.782	96.119	0.000	3.886	11.386	0.000
INDS on GDP	0.748	158.423	0.000	4.276	12.587	0.000

Source: Calculation of authors. INDS: Industrial sector, GDP: Gross domestic product

Table 6: Simple regression results for the impact of oil price on energy sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on ENRG	0.287	22.343	0.000	−0.826	−4.727	0.000
ENRG and OP on GDP	0.873	182.660	0.000	30.726	16.068	0.000
ENRG on GDP	0.875	372.293	0.000	30.567	19.295	0.000

Source: Calculation of authors. ENRG: Energy sector, GDP: Gross domestic product

Table 7: Simple regression results for the impact of oil price on construction sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on CONS	0.041	3.293	0.075	−0.451	−1.815	0.075
CONS and OP on GDP	0.375	16.909	0.000	10.324	3.462	0.000
CONS on GDP	0.224	16.289	0.000	13.007	4.036	0.000

Source: Calculation of authors. CONS: Construction sector, GDP: Gross domestic product

Table 8: Simple regression results for the impact of oil price on tourism sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on TORSM	0.102	7.009	0.011	−1.997	−2.647	0.011
TORSM and OP on GDP	0.670	54.760	0.000	5.895	8.259	0.000
TORSM on GDP	0.612	84.479	0.000	6.679	9.191	0.000

Source: Calculation of authors. TORSM: Tourism sector, GDP: Gross domestic product

Table 9: Simple regression results for the impact of oil price on real estate sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on REIST	0.269	20.477	0.000	−5.353	−4.525	0.000
REIST and OP on GDP	0.882	198.752	0.000	3.573	16.795	0.000
REIST on GDP	0.884	405.029	0.000	4.598	20.125	0.000

Source: Calculation of authors. REIST: Real estate sector, GDP: Gross domestic product

Table 10: Simple regression results for the impact of oil price on trading sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on TRS	0.211	15.178	0.000	−2.006	−3.896	0.000
TRS and OP on GDP	0.838	137.593	0.000	9.143	13.829	0.000
TRS on GDP	0.834	266.740	0.000	10.662	16.332	0.000

Source: Calculation of authors. GDP: Gross domestic product

Table 11: Simple regression results for the impact of oil price on social sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on SOCS	0.326	26.684	0.000	−3.090	−5.166	0.000
SOCS and OP on GDP	0.875	186.552	0.000	7.995	16.247	0.000
SOCS on GDP	0.875	372.624	0.000	8.683	19.303	0.000

Source: Calculation of authors. SOCS: Social service sector, GDP: Gross domestic product

Table 12: Simple regression results for the impact of oil price on non-profit sector

Variable	Adj. R^2	F	Sig.	Coef.	T	Sig.
OP on NPO	0.129	8.840	0.004	−0.164	−2.973	0.004
NPO and OP on GDP	0.576	73.069	0.000	87.153	8.548	0.000
NPO on GDP	0.625	45.098	0.000	76.170	7.339	0.000

Source: Calculation of authors. NPO: Non-profit organization sector, GDP: Gross domestic product

Table 13: Multiple regression results for the joint impact of sectors on GDP (excluding oil prices)

Model 1	Unstandardized coefficients		Standardized coefficients beta	t	Sig.
	B	Std. error			
(Constant)	308.205	99.258		3.105	0.003
AGR	1.618	0.214	0.193	7.544	0.000
MIN	0.135	0.319	0.004	0.423	0.674
INDUS	1.674	0.150	0.340	11.159	0.000
ENRG	0.762	1.494	0.023	0.510	0.613
CONS	0.965	0.850	0.036	1.135	0.263
TOURSM	0.441	0.323	0.052	1.363	0.180
TR	1.804	0.520	0.155	3.468	0.001
REAL	1.969	0.221	0.403	8.898	0.000
SOCS	−0.724	0.513	−0.078	−1.413	0.165
NPO	6.875	5.376	0.060	1.279	0.208
Adj. R^2			0.998		
F			2456		
Sig.			0.000		

Source: Calculation of authors. GDP: Gross domestic product, AGR: Agriculture sector, MIN: Minerals sector, INDS: Industrial sector, ENRG: Energy sector, CONS: Construction sector, TORSM: Tourism sector, RELST: Real estate sector, NPO: Non-profit organization sector, SOCS: Social service sector

the regression; the coefficient decreased from 8.86 to 7.99 and the t-value also dropped from 19.30 to 16.24.

Table 12 also has supported the view of the negative direct impact of oil prices on sectorial level output; the impact of oil prices on non-profit where also negative; but contrary to the expectation the mediating role of oil prices on the contribution of this sector to GDP was positive Both of coefficient and t-value of tourism sector were increased after the effect of oil prices mediates this relationship; the coefficient was increased from 76.17 to 87.15 and the t-value also grown from 7.33 to 8.54. This result can be attributed to the specialty of this sector since it's the only sector that not aimed for profit.

4.4. Multiple Regression

In order to accumulate a conclusive empirical evidence for the mediating role of oil prices changes on the joint effect of all sectors on GDP the multiple regression analysis was employed. The sectors effect on GDP is regressed in the equation when oil prices is excluded from the model. The reported results in Table 13 show that the major sectors that contributes significantly to GDP are; the agriculture, industrial, trading and real estate sectors. The explanatory power of all sectors contribution (Adj. R was 0.998) which suggests that the sectors included in the model justify almost all value of GDP. More over the score of F-value was 2456 and it was significant.

Table 14: Multiple Regression Results for the joint impact of sectors on GDP (including oil prices)

Model 2	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	299.455	103.185		2.902	0.006
AGR	1.614	0.217	0.192	7.443	0.000
MIN	0.101	0.335	0.003	0.303	0.763
INDUS	1.675	0.152	0.340	11.051	0.000
ENRG	0.800	1.513	0.025	0.529	0.600
CONS	0.962	0.859	0.036	1.120	0.269
TOURSM	0.436	0.327	0.051	1.334	0.190
TR	1.758	0.540	0.151	3.255	0.002
REAL	1.978	0.225	0.405	8.790	0.000
SOCS	−0.670	0.539	−0.072	−1.243	0.221
NPO	6.571	5.496	0.058	1.196	0.239
Oil price	0.168	0.466	0.003	0.360	0.721
Adj. R^2			0.998		
F			2187		
Sig.			0.000		

Source: Calculation of authors. GDP: Gross domestic product, AGR: Agriculture sector, MIN: Minerals sector, INDS: Industrial sector, ENRG: Energy sector, CONS: Construction sector, TORSM: Tourism sector, RELST: Real estate sector, NPO: Non-profit organization sector, SOCS: Social service sector

Since our aim is to detect the effect of oil prices on the collective contribution of all sectors on GDP growth, the same data were regressed after including the oil price in the model; Table 14 illustrate the new results. The reported results in the table failed to confirm significant difference in explanatory power for sectors impact on GDP growth (Adj. R was 0.998). Nevertheless, the value of F was decreased for the model from 2456 to 2187 with a percentage of 10% which can be attributed to the inclusion of oil price effect on the model.

All in all, the results of correlation and bivariate regression provided clear evidence for the direct negative impact of oil prices on sectorial level output, moreover, the inclusion of oil prices as a mediator on sectorial level effect on GDP was also approved negative. Despite of the accumulated evidence for the negative impact by correlation and simple regression the results of multiple regression failed to confirm the negative impact of oil prices on the joint impact of all sectors on GDP.

5. CONCLUSION

The work was an attempt to inspect the effect of oil prices volatility on economic sectors and on total Gross domestic product (GDP). The study was motivated by the few research studies that conducted on this topic in emerging middle east area. Quarterly revenues that inflow to the Jordanian economic sectors and to GDP was used as data for the study, the data covered the period from 2007 to 2021. The empirical methodology employed correlation, bivariate and multiple regression in addition to graphics to detect whether the changes of oil prices has direct and mediating effect in sectorial output and on GDP.

After conducting the proper examination on data, the results of correlation and simple regression tests submitted conclusive evidence for the direct negative impact of oil prices on sectorial

level output, moreover, the inclusion of oil prices as a mediator on sectorial level effect on GDP was also approved negative. The results of multiple regression were unsuccessful to confirm the negative impact of oil prices on the joint impact of all sectors on GDP. The results of multiple regression also revealed that the major sectors that only contributes significantly to GDP are; the agriculture, industrial, trading and real estate sectors. Such proven results ought to inspire policy makers to take action for several implications. More attention from government must be directed to those sectors that significantly contribute to GDP, as oil importing country government should form long-term relationship with oil exporters in order to acquire oil with competitive prices that reflected on the costs of production for all sectors. Setting long term plans that aim to search and discover local oil resources; seeking for new sources of energy such as solar energy that can substitute oil.

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