“Governance of public spending avenues by oil prices, oil revenues, and GDP in Saudi Arabia: proportionate sensitivity and trend analysis”

AUTHORS	Anis Ali https://orcid.org/0000-0001-7799-6043

ARTICLE INFO	Anis Ali (2020). Governance of public spending avenues by oil prices, oil revenues, and GDP in Saudi Arabia: proportionate sensitivity and trend analysis. *Investment Management and Financial Innovations*, *17*(4), 152-164. doi:10.21511/imfi.17(4).2020.15
DOI	http://dx.doi.org/10.21511/imfi.17(4).2020.15
RELEASED ON	Monday, 30 November 2020
RECEIVED ON	Monday, 02 November 2020
ACCEPTED ON	Monday, 30 November 2020

JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
42	1	11

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Anis Ali (Saudi Arabia)

GOVERNANCE OF PUBLIC SPENDING AVENUES BY OIL PRICES, OIL REVENUES, AND GDP IN SAUDI ARABIA: PROPORTIONATE SENSITIVITY AND TREND ANALYSIS

Abstract

Saudi Arabia is a petroleum resource-rich country, and half of the GDP of Saudi Arabia is based on the Oil Sector Revenue (OSR). The OSR is governed by the Oil Prices (OP), while GDP is also affected by the OSR in petroleum exporting companies. The volatility of OP governs the OSR and GDP positively and perfectly as the oil sector contributes approximately half of the GDP of Saudi Arabia. The study analyzes the governance of the Public Spending Avenues (PSA) by the OP, OSR, and GDP in the long and short run and based on the secondary data taken from the website of the Saudi Arabian Monetary Authority (SAMA). Coefficient of Variations (CV), Chain-based Index (CBI) numbers, Fixed-based Index (FBI) numbers, and Analysis of Variances (ANOVA) of OP and other dependent variables calculated to get the normality, sensitivity, trend, and significance difference among the sensitivity and trend of variables, while Pearson's correlations establish the cause-effect relationship among the variables. The study reveals that oil price volatility does not affect the OSR, GDP, and ultimately public spending in the long run. However, there is governance of volatility of OP that can be seen on OSR, GDP, and ultimately on PSA in the short run. Saudi Arabian government enhances its spending on PSA and especially on education while lowering the OP. There is a need to diversify the income resources to minimize the reliability of oil prices and budget deficit and consider the sensitivity of oil prices on the economy by the policymakers to formulate the policies to minimize the impact of volatility of OP on the economy.

Keywords oil prices, public spending, oil sector revenue, Saudi Arabia, proportionate governance, optional resources

JEL Classification Q40, Q41, I10, I20, I30

Received on: 2nd of November, 2020
Accepted on: 30th of November, 2020
Published on: 30th of November, 2020

Anis Ali, Assistant Professor, College of Business Administration, Prince Sattam Bin Abdulaziz University, Saudi Arabia.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

In Saudi Arabia, OSR constitutes more than 50% of the GDP (Saudi Arabia, facts and figures, 2020), and the export of the oil products and their prices governs the economy (Dreger et al., 2016; Nyangarika, 2018) and indirectly governs the PSA. The negative variations of OP lower the economy and obstacles in developing the oil-exporting economies (Ebrahim et al., 2014). In Saudi Arabia, it was found that the OP of the oil products lowering since 2014 and affects the OSR, and lowers the expected growth of the Saudi economy (Al Rasasi et al., 2019; Alharbi, 2020). The OSR and PSA govern employment in Saudi Arabia (Alkhteeb et al., 2017) that assures the balanced development and optimum utilization of human resources. For sustainable development in any nation, dependency or reliance on a specific resource is not appropriate for the economy in the long run. Saudi Arabia is opening its wings to attain the goals of Vision 2030 to make itself more self-reliant and opportunity to all the sectors of the economy. In achieving the goals of Vision 2030, the vitality of the OSR cannot be

http://dx.doi.org/10.21511/imfi.17(4).2020.15

underestimated as the Saudi economy is based upon the OSR, which is governed by the international OP. Lowering oil prices reduces the OSR and lowers the contribution to the GDP. However, as per Vision 2030, different sectors raise the private sector's contribution to the economy. To diversify the sources of income, the Saudi government plans to raise the non-oil exports to 50% of the GDP as it is based on the OSR. Like other developed nations, Saudi Arabia is much concerned about society's welfare by providing them with better education, medical facilities, residential facilities, social security, and other community services. However, the feasibility of spending on PSA, i.e., education, medical, housing, and social security services, depends on the revenue, based on the OSR up to a larger extent in Saudi Arabia. So, normally, it is expected that the PSA is based on the prosperity of the GDP, which is governed by the OSR and OSR ultimately governed by the OP in Saudi Arabia. So, there is a need to assure that the OP governs the OSR and GDP proportionately and finally its impact on the PSA in the long and short run.

1. LITERATURE REVIEW AND HYPOTHESES

Haque and Khan (2019) found that government expenditure and exports of oil products significantly affects the Human Development Index (HDI). Al-Qudair (2005) studied the relationship between government expenditures and revenues in the KSA and found a long-term equilibrium relationship. Akoum et al. (2012) examined the relationship between the Organization of the Petroleum Exporting Countries (OPEC) basket oil price and the stock market returns of Gulf Cooperation Council (GCC) countries from 2002 to 2011. They found that the OP and stock returns of GCC countries are not strongly correlated. Nusair (2016) found a positive relationship between the OP changes and the GDP in GCC countries and explained the efficacy of positive prices than the negative OP on GDP. Hemrit and Benlagha (2018) preferred non-oil GDP to oil GDP and explained the positive relationship between the government expenditure and growth of the non-oil GDP of Saudi Arabia. Sultan and Haque (2018) found a positive relationship between economic growth and exports and government expenditures and a negative relationship between the economic growth and imports of Saudi Arabia. Alsamara et al. (2017) analyzed and compared the effect of asymmetric OP on the GDP of Saudi Arabia and Turkey. They have seen the effects of OP shocks on economic growth positively and negatively. The positive OP shocks govern the economy more than the negative shocks in Saudi Arabia, while a reverse situation exists in Turkey. Al-Sasi et al. (2017) studied the impact of the demand for petroleum volatility on the economic growth of Saudi Arabia and found that the petroleum demand growth is doubled the economic growth rate and explored that crude oil accounts for 40.6% of globally produced energy. OP change governs the unemployment status and is influenced by the economic growth rate and explains government measures' efforts. Sarrakh et al. (2020) found that removing the subsidies from the energy sector would negatively affect the Saudi GDP. The suggested compensatory measures to cover the low-income households applying the social security network to face the oil price volatility. Mahalik et al. (2017) explored the relationship between energy consumption and financial development and found that financial development helps in energy demand in Saudi Arabia. Baumeister and Kilian (2016) studied lowering the OP and its impact on the US economy and found a very slow response of OP changes on the economy and that there is no negative impact of oil-related investment on non-oil related investment. Nyangarika et al. (2019) explored the impact of the OP shocks on the Russian economy. They found the world oil price is the main consideration while found the positive relationship between the OP and the Russian GDP. They suggested the low dependence on the energy resources and diversification of the economy by attracting foreign investments. Mohaddes and Pesaran (2017) stated that the recent lowering prices of the oil are good for the US and global economy. They found a stable negative relationship between OP and real dividends. The low price negatively affects the oil-producing economies and forces them to enhance oil production to compensate for the loss of low OP. Aregbeyen and Kolawole (2015) found no relationship between public spending and economic growth in Nigeria and suggested that the government should invest more in capital projects to enhance oil production to enhance the economy. Gazder (2017) explained that the oil sector of Saudi Arabia affects the other pillars of the economy as the traditional fossil-based energy sources are depleting fast. He studied energy con-

sumption and the factors affecting the energy consumption in Saudi Arabia and Pakistan and found that economic development, population, industries, and transportation factors affect energy consumption. He explained that energy consumption is driven by economic development in Saudi Arabia, while the population governs energy consumption in Pakistan. Jawad (2013) analyzed the OP volatility on the economic development of Pakistan and suggested that government should make a proper plan to maintain a balance between demand and supply to lower the impact of OP volatility on the economy. Jung and Park (2011) studied the impact of the OP changes on the Norwegian and Korean markets and found that small economies depend up to a larger extent on the oil-dependent technology and poor access in the global financial market. Basher et al. (2018) studied the OP shocks in the oil-exporting countries for domestic and international investors. They found that the OP shocks affect the stock market in Russia, Kuwait, Norway, Saudi Arabia, and the UAE. Eid (2015) found that the real lagged government expenditure positively impacts real non-oil private GDP, while the contemporary effect is negative. Demirbas et al. (2017) explained that the macroeconomic and geopolitical conditions influence the OP volatility. They indicated that the OP depends on the cost factors, ancillary factors, and external business environmental factors that can affect the oil price. But, the internal and external factors affecting the OP vary from country to country. Maji et al. (2017) examined the impact of the OP shocks on the Malaysian economy and found that recent price changes affect the economy and suggest diversification to save the economy. Ho et al. (2019) found the unidirectional relationship between energy consumption, population, and GDP and suggested Vietnam promotes the population and energy for economic growth. Majidli and Guliyev (2020) studied the relationship between real OP real non-oil GDP growth of Azerbaijan and found that the increase in OP also enhances the real GDP and exchange rates. Giri and Joshi (2017) found that the crude OP influenced the stock prices negatively and suggested the government to take some corrective steps to control the crude OP in India, and investors' trust can be boost by the appropriate policy formation. Nonejad (2020) found that short volatility in the crude OP in predictive regression and suggested considering the volatility of OP for the policymakers. Sarwar et al. (2017) studied the relationship between OP, economic growth, electricity consumption, gross fixed capital formation, and population. They obtained the bidirectional relationship between electricity consumption, OP, fixed capital formation, population, and GDP. The countries applying non-renewable energy sources negatively affect their economic growth. Van et al. (2019) investigated the results of the OP changes in the GDP of 17 OECD countries. The study of volatility is divided between two, i.e., pre and post-World War II, to measure the volatility of the world OP and found that the real oil volatility is negatively correlated with the aggregate economic activity. They supported and suggested that the improved monetary policy is the shield to face the OP volatility's negative impact. Balke and Brown (2018) found the less elastic impact of the OP changes on the economy. Based on all the above studies, the governance process of PSA by the OP, OSR, and GDP can be depicted as follows:

Figure 1 explains that the higher prices of the oil products directly and positively affect the GDP, while the lower prices negatively and indirectly affect the public spending as OSR is the major ingredient of the GDP of Saudi Arabia. The previous studies explored the relationship between OP and PSA, OP and GDP, OP, GDP, public spending, and other dependent variables. There is no study available to explain the proportionate contribution sensitivity and trend of OSR and GDP to PSA in Saudi Arabia. There is a need to consider the impact of OP shocks on OSR and GDP of Saudi Arabia and

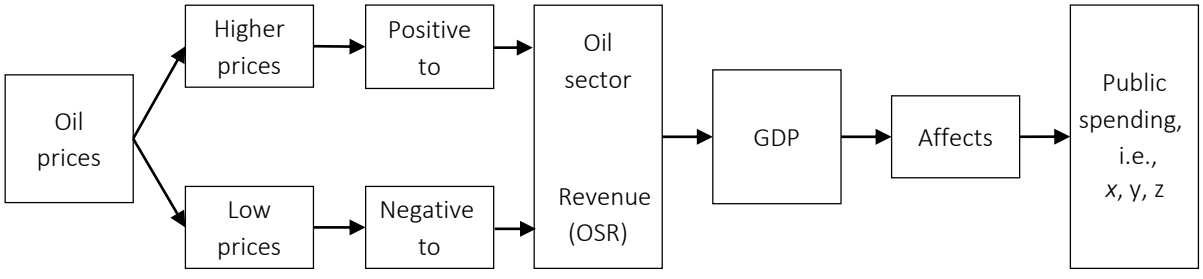

Figure 1. Process of governance of public spending by the oil prices

http://dx.doi.org/10.21511/imfi.17(4).2020.15

ultimately on PSA in the short and long run. To achieve the objectives of the study and based on the past relevant studies, the following hypotheses were developed:

1.1. Hypotheses

$H_0 1$: *There is no significant difference among the trend of OP, OSR, GDP, and PSA.*

$H_0 2$: *There is no significant difference in the sensitivity of OP, OSR, GDP, and PSA.*

$H_0 3$: *There is no positive governance of OSR and GDP by the OP.*

$H_0 4$: *There is no significant difference among the comparative governance of PSA sensitivity proportionate to OSR and GDP.*

$H_0 5$: *There is no significant difference among the comparative variability of the trend of PSA proportionate to OSR and GDP.*

$H_0 6$: *There is no significant difference among the comparative proportionate governance of sensitivity and trend of PSA proportionate to OSR and GDP.*

2. AIMS

The objective of the study is to get the comparative sensitivity and trend of the OP, OSR, GDP, and PSA and proportionate governance of PSA by the OSR and GDP in Saudi Arabia. The study also tries to find out the over- and under-allocation of PSA based on the proportional governance and explores the optional resources to reduce the dependency on OSR and hedge the economy from the shocks of the OP.

3. RESEARCH METHODOLOGY

Data available on the Saudi Arabian Monetary Authority (SAMA) website from 2011 to 2018 is the basis of study and analysis. Oil Prices (OP), Oil Sector Revenue (OSR), and GDP are considered independent variables, while Public Spending Avenues (PSA) is a dependent variable for analysis. The Coefficient of Variations (CV) is applied to get the normality of the variability of all variables to get mutual comparability (Ali, 2020b).

$$CV = \frac{\sigma}{Mean}, \tag{1}$$

where σ is the standard deviation and $Mean$ is the average of the distribution. Pearson's correlation coefficient was calculated to assure the cause and effect relationship among the OP, OSR, GDP, and PSA. Chain-based Index (CBI) numbers and Fixed-based Index (FBI) numbers of all variables and correlation coefficient between the CBI of OP, and dependent variables calculated to get the sensitivity impact of the variability of OP on the other dependent variables. Also, the correlation coefficient between the FBI of OP and dependent variables was calculated to get the long-term impact of OP's volatility on the other dependent variables (Ali, 2020a).

$$CBI = \frac{Value\ in\ the\ curruent\ year}{Value\ in\ the\ previous\ year} \cdot 100,$$

$$FBI = \frac{Value\ in\ the\ curruent\ year}{Value\ in\ the\ base\ year} \cdot 100.$$

Note: 2011 is the base year for the FBI calculation.

Pearson's correlation coefficient between CBI of the percentage of PSA to OSR and GDP and FBI of the percentage of public spending to OSR and GDP calculated to know the sensitivity and trend of PSA governance in the short run and long run. To know the similarity of the governance of the public spending avenues by the OSR and GDP, the proportionate contribution of the OSR and GDP to PSA calculated:

$$PSA\ to\ OS(\%) = \frac{Public\ spending\ avenues}{OS} \cdot 100,$$

$$PSA\ to\ GDP(\%) = \frac{Public\ spending\ avenues}{GDP} \cdot 100.$$

FBI and CBI between the proportionate contribution of the OSR and GDP to PSA calculated to get the symmetry in the contribution by the OSR and GDP to the PSA in the short and long run. To know the significant difference in the trend and sensitivity of OP, OSR, GDP, and the PSA, Fisher's ratio (F) is calculated and compared with the critical value $(F\alpha)$ (Ali, 2020a).

$$F = \frac{Bss/df1}{Wss/df2}, \text{ while } F \geq F\alpha, \text{ reject } H_0,$$

where F is Fisher's ratio, and Bss, Wss, $df1$, $df2$, are sum of squares between samples, sum of squares within samples, degree of freedom 1 and degree of freedom 2, respectively. The $df1$, $df2$ obtained as follows:

$$df1 = K - 1 \text{ and } df2 = N - K,$$

where K – number of samples, and N – number of all variables.

4. DATA ANALYSIS AND RESULTS

As per the objective of the study, the analysis of the OP, OSR, GDP, and PSA of Saudi Arabia can be divided into three categories, i.e., normality of variables, cause and effect relationship, and proportionate governance of OP on dependent variables and governance of GDP on the PSA in Saudi Arabia.

4.1. Normality of variables

The normality of variables facilitates comparison between the data and assures that the variables are unaffected by the abnormal factors, or the deviations of the variables are insignificant.

Table 2 shows that the variations in the OP, OSR, GDP, and PSA are normal and not driven by affected by any abnormal factor. OP and OSR variability are higher than the other variables from 2011 to 2018, comparatively. Overall, the variability of all variables is not affected by any abnormal factor. So, there is comparability among OP, OSR, GDP, and PSA of Saudi Arabia.

Cause and effect relationship between OP, OSR, GDP, and PSA.

The cause and effect relationship explains the effect of changes in the dependent variables on the other independent variables. The high degree correlation between the OP, OSR, GDP, and PSA explains the high impact of changes of OP on the GDP and public spending in Saudi Arabia, while low degree or no correlation reflects the negligible or no impact of price volatility on the GDP and public spending.

Table 2 explains that oil prices affect positively and perfectly OSR (r = 0.99) and GDP (r = .51) as the OSR contributes 50% approximately while PSA negatively. The negative governance of the OP and OSR varies from avenues to avenues of public spending. Education expenditures of the Saudi Arabia government are only highly and negatively (r = 0.61) governed by the OP and OSR, while other government spending avenues are negatively governed. The GDP of Saudi Arabia positively contributes to all the PSA but not absolutely while oil prices decrease. This refers to the shifting pattern of the economy from oil to the non-oil economy. The Saudi government contributes to public

Table 1. Variability of OP, OSR, GDP, and PSA in Saudi Arabia

Source: Own calculations based on data of National account statistics and oil statistics (annual statistics 2019) (available at http://www.sama.gov.sa/en-US/EconomicReports/Pages/YearlyStatistics.aspx).

Year	OP	OSR	GDP	PSA				
				Education	Health	Hous. and Commu. Ameni. Ser.	Soc. Secu. and Welf.	Oth. Commu. and Soc. Ser.
2011	107.46	1276416	2517146	141859	62663	24662	2039	9317
2012	109.45	1376576	2759906	159235	75752	26075	3210	10950
2013	105.87	1290789	2799927	186605	94479	39620	4300	12711
2014	96.29	1197414	2836314	199370	105826	42531	5221	15551
2015	49.49	659670	2453512	211716	101059	38093	4216	14722
2016	40.76	595493.6	2418508	189416	81573	30219	3022	11144
2017	52.43	735302.4	2582198	193419	81512	30643	3240	11923
2018	69.78	985899.8	2949457	222585	93971	34737	4203	14367
Mean	78.94	1014695	2664621	188025.6	87104.38	33322.5	3681.38	12585.63
SD	28.99	313899.8	197005.3	26396.91	14317.29	6475.84	989.97	2152.18
CV	0.37	0.3	0.07	0.14	0.16	0.19	0.27	0.17

http://dx.doi.org/10.21511/imfi.17(4).2020.15

Table 2. Cause and effect relationship among OP, OSR, GDP, and PSA in Saudi Arabia (2011–2018)

Source: Own calculations based on data of National account statistics and oil statistics (annual statistics 2019) (available at http://www.sama.gov.sa/en-US/EconomicReports/Pages/YearlyStatistics.aspx).

OP, OSR, GDP, and PSA	Oil prices	Oil sector Revenue	GDP	Education	Health	Hous. and Commu. Ameni. Ser.	Soc. Secu. and Welf.	Oth. Commu. and Soc. Ser.
Oil prices	1.00							
Oil sector	0.99	1.00						
GDP	0.51	0.59	1.00					
Education	–0.61	–0.56	0.27	1.00				
Health	–0.22	–0.20	0.38	0.83	1.00			
Hous. and Commu. Ameni. Ser.	–0.08	–0.08	0.38	0.71	0.96	1.00		
Soc. Secu. and Welf.	–0.01	0.02	0.57	0.73	0.97	0.94	1.00	
Oth. Commu. and Soc. Ser.	–0.22	–0.19	0.44	0.85	0.97	0.89	0.95	1.00

spending avenues while the oil prices are lowering and OSR is diminishing its contribution to the economy. There is a cause-and-effect relationship between the OP, OSR, GDP, and PSA.

4.2. The similarity of trend and sensitivity of OP, OSR, GDP, and PSA

The trend of variables reflects the long-term co-movement, and sensitivity indicates the variables' short-term variation. The similarity of trend and sensitivity of OP, OSR, GDP, and PSA of Saudi Arabia reveals the long term and short term variability.

Table 3 reveals that OP, OSR, GDP, and PSA movement in the long term are significantly different (Table 3, $H_0 1$) and no significant differences in the sensitivity of all variables (Table 3, $H_0 2$). This implies that the OP, OSR, and GDP do not affect the movement trend of PSA, and shocks of OP, and OSR, GDP yearly affect the PSA of Saudi Arabia.

4.3. Contribution of the oil sector to GDP of Saudi Arabia

It is evident that OSR is a major ingredient of GDP and plays a vital role in the Saudi economy. Low OP affects the OSR and finally decreases the contribution to GDP. There was a downfall in the absolute amount of oil sector contribution due to a heavy downfall in the OP in Saudi Arabia. As per the law of supply, the prices of the products govern the sales revenue positively and proportionately.

Table 4 explains the governance of the OSR by the OP positively and proportionately ($rx1$, $x2 = 0.99$). The OSR of Saudi Arabia governs the GDP positively and up to a great extent ($rx2$, $x3 = 69.78$). Hence, $H_0 3$ is rejected. Due to low oil prices, the OSR lowers its contribution to the GDP of Saudi Arabia year by year. Recently, it was seen that the contribution of the oil sector to GDP was enhanced last year. There is weak symmetry found in the sensitivity and movement trend of the oil sector and GDP of Saudi Arabia.

Table 3. Similarity among the oil prices, oil sector revenue, GDP, and PSA in Saudi Arabia (2011–2018)

Source: *F values (ANOVA) calculated based on the FBI ($H_0 1$) and CBI ($H_0 2$) of OP, OSR, GDP, and PSA (as given in Appendices A1 and A2) and **F taken from the F-table.

H_0. No.	Hypotheses	F*	$F\alpha$**	Decision: H_0 (If $F \geq F\alpha$, reject H_0)
$H_0 1$	There is no significant difference in the trend of OP, OSR, GDP, and PSA.	13.44479	2.178156	Reject H_0
$H_0 2$	There is no significant difference in the sensitivity of OP, OSR, GDP, and PSA.	0.436802	2.178156	Do not reject H_0

Note: (a): $F\alpha$** taken from the t-table at 5% significance level, (b): F* values are the Fisher's ratios values and calculated using EXCEL's calculation.

Table 4. Contribution of the oil sector to GDP and its sensitivity and trend (SR million)

Source: Own calculation based on data of oil prices, oil sector revenue, and GDP (https://www.stats.gov.sa/en/823 and http://www.sama.gov.sa/en-US/EconomicReports/Pages/YearlyStatistics.aspx).

Year	Oil prices, USD per barrel (x_1)	Oil sector revenue (x_2)	GDP (x_3)	Oil sector, % of GDP	FBI (x_4)	CBI (x_5)
2011	107.46	1276416	2517146	50.71	100	100
2012	109.45	1376576	2759906	49.88	98.36	98.36
2013	105.87	1290789	2799927	46.10	90.91	92.43
2014	96.29	1197414	2836314	42.22	83.25	91.58
2015	49.49	659670	2453512	26.89	53.02	63.69
2016	40.76	595493.6	2418508	24.62	48.56	91.58
2017	52.43	735302.4	2582198	28.48	56.15	115.65
2018	69.78	985899.8	2949457	33.43	65.92	117.39
	$r_{x1, x2}$ = 0.99		$r_{x2, x3}$ = 69.78		$r_{x4, x5}$ = 0.13	

Note: 1. GDP produces values at current price in SR million. 2. OSR as per GDP by institutional sectors at the current price.

4.4. Comparative sensitivity of PSA proportionate to OSR and GDP

The comparative sensitivity explains the variability impact of the independent variable on the dependent variables. The high degree of comparative sensitivity reveals the high dependency of dependent variables on independent variables and governance of the dependent variables by the independent variables in the short run.

Table 5 explains the sensitivity and governance of public spending avenues proportionate to OSR and the GDP of Saudi Arabia. The sensitivity of education spending of Saudi Arabia proportionate to the oil sector and GDI is positive and highly correlated, or the variations of oil sector contribution and GDP highly govern the education (r = 0.87) in the short run. The sensitivity of health (0.67), housing and community amenities services (r = 0.73), social security and welfare (r = 0.66), and other community and social services (r = 0.60) is positive and moderately correlated or governed by the oil sector or GDP of Saudi Arabia in the short run. Hence, $H_0 4$ is rejected. Overall, all the public spending is positively correlated, but the degree of relationship education with the oil sector and GDP is higher than the other public spending avenues, while other community and social services are the lowest in the long run.

Table 5. Comparative sensitivity of public spending proportionate to the oil sector and GDP

Source: Own CBI calculations of the percentage of public spending to OSR and GDP based on the proportionate percentage given in Appendices A3 and A4.

Year	Education - CBI		Health - CBI		Hou. and Commu. Amen. Ser. - CBI		Soc. Secu. and Welf.-CBI		Oth. Commu. and Soc. Ser. - CBI	
	% to OS	% to GDP	% to OS	% to GDP	% to OS	% to GDP	% to OS	% to GDP	% to OS	% to GDP
2011	100	100	100	100	100	100	100	100	100	100
2012	104.08	102.38	112.09	110.25	98.04	96.43	145.98	143.58	108.98	107.19
2013	124.98	115.51	133.01	122.94	162.04	149.77	142.86	132.04	123.80	114.42
2014	115.17	105.47	120.74	110.57	115.72	105.97	130.89	119.86	131.88	120.77
2015	192.76	122.76	173.34	110.39	162.58	103.54	146.58	93.35	171.84	109.44
2016	99.11	90.76	89.42	81.89	87.88	80.48	79.40	72.72	83.85	76.79
2017	82.70	95.64	80.93	93.59	82.12	94.97	86.83	100.42	86.65	100.21
2018	85.83 100.75		85.98	100.93	84.55 99.24		96.75	113.57	89.87	105.49
Mean	113.08	104.16	111.94	103.82	111.62	103.80	116.16	109.44	112.11	104.29
SD	35.07	10.43	30.65	12.56	33.04	20.11	28.27	22.62	29.75	13.10
CV	0.31	0.1	0.27	0.13	0.3	0.19	0.24	0.21	0.27	0.13
r	r = 0.87		r = 0.67		r = 0.73		r = 0.66		r = 0.6	

http://dx.doi.org/10.21511/imfi.17(4).2020.15

4.5. The comparative trend of PSA proportionate to OSR and GDP

The comparative movement reveals the variability impact of the independent variable on the dependent variables. The high degree of comparative movement reveals the high dependency of dependent variables on independent variables and governance of the dependent variables by the independent variables in the long run.

Table 6 explains the trend and governance of public spending avenues proportionate to the oil sector and GDP of Saudi Arabia. The movement of education spending of Saudi Arabia proportionate to the oil sector and GDI is positive and highly correlated, or the variations of oil sector contribution and GDP highly govern the education (r = 0.93) in the short run. The sensitivity of health (0.77), housing and community amenities services (r = 0.69), social security and welfare (r =0.69), and other community and social services (r = 0.77) is positive and moderately correlated or governed by the oil sector or GDP of Saudi Arabia in the long run. The proportionate governance of OSR and GDP to health and other community and social services is similar in the long run. Hence, H05 is rejected. Overall, all the public spending positively correlated, but the degree of relationship education with the OSR and GDP is higher than the other PSA, while housing and community amenities services are the lowest in the long run.

4.6. Summary of comparative sensitivity and trend of PSA proportionate to OSR and GDP

The comparative sensitivity and movement of public spending proportionate to OSR and GDP explain the short and long-term governance of the public spending by the OSR and GDP.

From Table 7, it can be summarized that the correlation between the CBI of PSA to OSR and PSA to GDP explains that the short-term variations in OSR and GDP govern the PSA positively. There is a high degree of symmetry between the governance of education by the OSR and GDP. It implies that the Saudi government is much concerned (r = 0.87) about the education comparatively other PSA while less (r = 0.60) concerned about the other community and social services in the short run.

Table 6. Comparative movement of public spending proportionate to OSR and GDP

Source: Own calculations of FBI of the percentage of public spending to OSR and GDP based on the proportionate percentage given in Appendices A3 and A4.

Year	Education - FBI		Health - FBI		Ho. and Com. Ame. Ser. -FBI		Soc. Secu. and Welf. -FBI		Oth. Commu. and Soc. Ser. - FBI	
	% to OSR	% to GDP	% to OSR	% to GDP	% to OSR	% to GDP	% to OSR	% to GDP	% to OSR	% to GDP
2011	100	100	100	100	100	100	100	100	100	100
2012	104.12	102.30	112.08	110.23	98.14	96.41	145.74	145.39	108.97	107.23
2013	130.12	118.17	149.07	135.52	159.04	144.39	208.21	191.97	134.90	122.70
2014	149.87	124.63	180.00	149.84	184.04	153.01	272.51	230.10	177.91	148.18
2015	288.88	153.00	312.01	165.42	299.20	158.43	399.44	214.79	305.72	162.17
2016	286.30	138.86	278.99	135.46	262.93	127.50	317.17	156.19	256.35	124.54
2017	236.77	132.81	225.77	126.77	215.93	121.09	275.40	156.84	222.12	124.79
2018	203.21	133.81	194.12	127.95	182.56	120.18	266.44	178.13	199.62	131.65
Mean	187.41	125.45	194.01	131.40	187.73	127.63	248.11	171.68	188.20	127.66
SD	77.48	18.13	75.52	20.70	71.18	23.02	95.14	41.43	72.45	20.19
CV	0.41	0.15	0.39	0.16	0.38	0.18	0.38	0.24	0.39	0.16
	r = 0.93		r = 0.77		r = 0.69		r = 0.69		r = 0.77	

Table 7. Summary of comparison of CBI and FBI between OSR and GDP of Saudi Arabia

Source: Based on calculations of Tables 6 and 7.

r between % of pub. spend. to OS and GDP	Public spending				
	Education	Health	Hou. and Commu. Ameni. Ser.	Soc. Secu. and Welf.	Oth. Commu. and Soc. Ser.
CBI (OSR and GDP)	0.87	0.67	0.73	0.66	0.6
FBI	0.93	0.77	0.69	0.69	0.77

In the long run, OS and GDP also govern public spending positively. OS and GDP govern the education highly (r = 0.93), while the housing and community amenities services and social security and welfare services moderately r = 0.69). Hence, $H_0 6$ is accepted, and there is no significant difference among the comparative governance of sensitivity and trend of PSA proportionate to OSR and GDP.

5. DISCUSSION

The OP governs the OSR and GDP positively and proportionately, while all the PSA govern them negatively (Maghrebi et al., 2018; Algahtani, 2016). The impact of OP can be seen in the economy of oil-importing and exporting countries (Alsamara et al., 2017; Ghalayini, 2011). Lowering OP (Baumeister & Kilian, 2016) was favorable for the US and global economy (Mohaddes & Pesaran, 2017). The OSR lowers its contribution to the GDP of Saudi Arabia every year (Vohra, 2017). Public spending on education is highly and negatively governed by the volatility of OP, while another public spending negatively but negligibly governed by the OP (Abdel-Latif et al., 2018). This indicates that the Saudi Arabian government is much concerned about the PSA, especially on education, and moderately on other PSA, while the OP is lowering. The movement trend of all the variables, i.e., OP, OSR, GDP, and PSA is significantly different while sensitivity is similar to all the variables. It reveals the OP shocks do not affect the OSR, GDP, and PSA in the long run but governs the OSR (Al-Qudair, 2005), GDP, and PSA in the short run in Saudi Arabia. The OP governs the OSR and GDP positively and perfectly. This refers to the stagnation of the demand or exports of oil while prices decrease. Also, the variations of OSR and GDP contribution highly govern education spending while the OSR and GDP positively and moderately govern other spending in the short and long run.

CONCLUSION

Based on all analyses, results, and discussion, it can be concluded that OP governs the OSR and GDP positively and perfectly as the oil sector contributes approximately half of the GDP of Saudi Arabia. However, there is a negative correlation between the OP variations and the PSA in Saudi Arabia. The impact of low OP can be seen on the OSR and GDP since 2014. Saudi Arabian government enhances its spending on public avenues and especially on education while there was a lowering of the OP. The volatility of OP does not affect the OSR, GDP, and ultimately public spending in the long run. However, there is governance of volatility of OP that can be seen on OSR, GDP, and ultimately on PSA in the short run. So, there is a need to change the oil-based economy pattern to a knowledge-based economy in Saudi Arabia. Education, employment, innovation, information and communication technology (ICT), human capital are the areas where the Saudi government can put additional efforts to change the pattern of the economy. The conventional source cannot be considered suitable for economic growth in the long run. In Saudi Arabia, opportunities can be explored in the field of renewable energy and innovative technologies by the research initiatives of the experts and scientists from the advanced countries. There is a need to diversify the income resources to minimize oil prices' reliability and the budget deficit. Solar, wind sources, nuclear power, and hydrogen fuel cell sources can be the alternatives to oil resources in the near future. The spending on unproductive education can be minimized to balance other spending and save the budget from negativity. There is a need to consider the sensitivity of OP on the economy by the policymakers to formulate the policies to minimize the impact of volatility of OP on the economy. The improved and appropriate monetary policy saves the economy from the negative impact of the OP. The study considers only quantitative data, and there should be consideration of other qualitative factors to get the variations in GDP and public spending in the short and long run. There is scope for further studies by considering the impact of OP and other qualitative factors on OSR, GDP, and PSA. There should be consideration of the number of oil products along with OP and OSR.

http://dx.doi.org/10.21511/imfi.17(4).2020.15

AUTHOR CONTRIBUTIONS

Conceptualization: Anis Ali.
Data curation: Anis Ali.
Formal analysis: Anis Ali.
Investigation: Anis Ali.
Methodology: Anis Ali.
Project administration: Anis Ali.
Resources: Anis Ali.
Software: Anis Ali.
Supervision: Anis Ali.
Validation: Anis Ali.
Visualization: Anis Ali.
Writing – original draft: Anis Ali.
Writing – review & editing: Anis Ali.

ACKNOWLEDGMENT

The author would like to thank the Deanship of Scientific Research, Prince Sattam Bin Abdulaziz University, Saudi Arabia.

REFERENCES

1. Abdel-Latif, H., Osman, R. A., & Ahmed, H. (2018). Asymmetric impacts of oil price shocks on government expenditures: Evidence from Saudi Arabia. *Cogent Economics & Finance, 6*(1), 1512835. https://doi.org/10.1080/23322039.2018.1512835
2. Akoum, I., Graham, M., Kivihaho, J., Nikkinen, J., & Omran, M. (2012). Co-movement of oil and stock prices in the GCC region: A wavelet analysis. *The Quarterly Review of Economics and Finance, 52*(4), 385-394. https://doi.org/10.1016/j.qref.2012.07.005
3. Al Rasasi, M., Qualls, J., & Alghamdi, B. (2019). Oil revenues and economic growth in Saudi Arabia. *International Journal of Economics and Financial Research, 5*(3), 49-55. https://doi.org/10.32861/ijefr.53.49.55
4. Algahtani, G. J. (2016). The effect of oil price shocks on economic activity in Saudi Arabia: econometric approach. *International Journal of Business and Management, 11*(8), 124-133. https://doi.org/10.5539/ijbm.v11n8p124
5. Alharbi, A. (2020). Economic effects of low oil prices in Saudi Arabia. *International Journal of Information Technology,* 1-6. https://doi.org/10.1007/s41870-020-00432-w
6. Ali, A. (2020a). Financial performance and size determinants: growth trend and similarity analysis of Indian pharmaceutical industry. *Humanities & Social Sciences Reviews, 8*(4), 547-560. Retrieved from https://www.researchgate.net/publication/343821372_FINANCIAL_PERFORMANCE_AND_SIZE_DETERMINANTS_GROWTH_TREND_AND_SIMILARITY_ANALYSIS_OF_INDIAN_PHARMACEUTICAL_INDUSTRY
7. Ali, A. (2020b). Working capital, profit and profitability: An absolute and relational study of selected leading Indian pharmaceutical firms. *Accounting, 6*(6), 951-960. https://doi.org/10.5267/j.ac.2020.8.001
8. Alkhteeb, T. T., Sultan, Z. A. & Mahmood, H. (2017). Oil revenue, public spending, gross domestic product and employment in Saudi Arabia. *International Journal of Energy Economics and Policy, 7*(6), 27-31. Retrieved from https://www.econjournals.com/index.php/ijeep/article/download/5633/3390
9. Al-Qudair, K. H. (2005). The relationship between government expenditure and revenues in the Kingdom of Saudi Arabia: Testing for cointegration and causality. *Economics and Administration, 19*(1), 31-43. Retrieved from https://www.kau.edu.sa/Files/320/Researches/51715_21850.PDF
10. Alsamara, M. K., Mrabet, Z., Elafif, M., & Gangopadhyay, P. (2017). The asymmetric effects of oil price on economic growth in Turkey and Saudi Arabia: new evidence from nonlinear ARDL approach. *International Journal of Development and Conflict, 7*(2), 97-118. Retrieved from https://ideas.repec.org/a/gok/ijdcv1/v7y2017i2p97-118.html
11. Al-Sasi, B. O., Taylan, O., & Demirbas, A. (2017). The impact of oil price volatility on economic growth. *Energy Sources, Part B: Economics, Planning, and Policy, 12*(10), 847-852. https://doi.org/10.1080/15567249.2017.1312641

12. Aregbeyen, O., & Kolawole, B. O. (2015). Oil revenue, public spending and economic growth relationships in Nigeria. *Journal of Sustainable Development, 8*(3), 113-123. https://doi.org/10.5539/jsd.v8n3p113

13. Balke, N. S., & Brown, S. P. (2018). Oil supply shocks and the US economy: An estimated DSGE model. *Energy Policy, 116,* 357-372. https://doi.org/10.1016/j.enpol.2018.02.027

14. Basher, S. A., Haug, A. A., & Sadorsky, P. (2018). The impact of oil-market shocks on stock returns in major oil-exporting countries. *Journal of International Money and Finance, 86,* 264-280. https://doi.org/10.1016/j.jimonfin.2018.05.003

15. Baumeister, C., & Kilian, L. (2016). Lower oil prices and the US economy: Is this time different? *Brookings Papers on Economic Activity, 2,* 287-357. Retrieved from https://www.brookings.edu/wp-content/uploads/2016/09/5_baumeisterkilian.pdf

16. Demirbas, A., Omar Al-Sasi, B., & Nizami, A. S. (2017). Recent volatility in the price of crude oil. *Energy Sources, Part B: Economics, Planning, and Policy, 12*(5), 408-414. https://doi.org/10.1080/15567249.2016.1153751

17. Dreger, C., & Rahmani, T. (2016). The impact of oil revenues on the Iranian economy and the Gulf states. *OPEC Energy Review, 40*(1), 36-49. https://doi.org/10.1111/opec.12060

18. Ebrahim, Z., Inderwildi, O. R., & King, D. A. (2014). Macroeconomic impacts of oil price volatility: mitigation and resilience. *Frontiers in Energy, 8*(1), 9-24. https://doi.org/10.1007/s11708-014-0303-0

19. Eid, A. G. (2015). *Budgetary institutions, fiscal policy, and economic growth: the case of Saudi Arabia* (Economic Research Forum Working Paper No. 965). Retrieved from https://www.dohainstitute.edu.qa/MEEA2016/Downloads/Ashraf%20Eid_Final.pdf

20. Gazder, U. (2017). Energy consumption trends in energy scarce and rich countries: comparative study for Pakistan and Saudi Arabia. In *E3S Web of Conferences* (Vol. 23, p. 07002). EDP Sciences.

21. Ghalayini, L. (2011). The interaction between oil price and economic growth. *Middle Eastern Finance and Economics, 13*(21), 127-141. Retrieved from https://www.researchgate.net/publication/235939209_The_Interaction_between_Oil_Price_and_Economic_Growth

22. Giri, A. K., & Joshi, P. (2017). The impact of macroeconomic indicators on Indian stock prices: An empirical analysis. *Studies in Business and Economics, 12*(1), 61-78. https://doi.org/10.1515/sbe-2017-0005

23. Haque, M. I., & Khan, M. R. (2019). Role of oil production and government expenditure in improving human development index: Evidence from Saudi Arabia. *International Journal of Energy Economics and Policy, 9*(2), 251. https://doi.org/10.32479/ijeep.7404

24. Hemrit, W., & Benlagha, N. (2018). The impact of government spending on non-oil-GDP in Saudi Arabia (multiplier analysis). *International Journal of Economics and Business Research, 15*(3), 350-372. https://doi.org/10.1504/IJEBR.2018.10011597

25. Ho, N. T., Wu, W. Y., Rivas, A. A., & Nguyen, P. T. (2019). The causal relationship between GDP, energy consumption, population, and oil price: evidence from Vietnam. *Humanities & Social Sciences Reviews, 7*(2), 100-105. Retrieved from https://www.researchgate.net/publication/334083842_THE_CAUSAL_RELATIONSHIP_BETWEEN_GDP_ENERGY_CONSUMPTION_POPULATION_AND_OIL_PRICE_EVIDENCE_FROM_VIETNAM

26. Jawad, M. (2013). Oil price volatility and its impact on economic growth in Pakistan. *Journal of Finance and Economics, 1*(4), 62-68. Retrieved from https://www.researchgate.net/publication/274527176_Oil_Price_Volatility_and_its_Impact_on_Economic_Growth_in_Pakistan

27. Jung, H., & Park, C. (2011). Stock market reaction to oil price shocks: a comparison between an oil-exporting economy and an oil-importing economy. *J. Econ. Theory Econ., 22*(3), 1-29.

28. Maghrebi, F., El Mezouar, Z. C., & Almanjahie, I. (2018). Test of causality between oil prices and GDP case study saudi arabia. *Economic Computation and Economic Cybernetics Studies and Research, 52*(3), 279-289. https://doi.org/10.24818/18423264/52.3.18.19

29. Mahalik, M. K., Babu, M. S., Loganathan, N., & Shahbaz, M. (2017). Does financial development intensify energy consumption in Saudi Arabia? *Renewable and Sustainable Energy Reviews, 75,* 1022-1034. https://doi.org/10.1016/j.rser.2016.11.081

30. Maji, I. K., Saari, M. Y., Habibullah, M. S., & Utit, C. (2017). Measuring the economic impacts of recent oil price shocks on oil-dependent economy: evidence from Malaysia. *Policy Studies, 38*(4), 375-391. https://doi.org/10.1080/01442872.2017.1320706

31. Majidli, F., & Guliyev, H. (2020). How Oil Price and Exchange Rate Affect Non-oil GDP of the Oil-rich Country–Azerbaijan? *International Journal of Energy Economics and Policy, 10*(5), 123-130. Retrieved from https://ideas.repec.org/a/eco/journ2/2020-05-16.html

32. Mohaddes, K., & Pesaran, M. H. (2017). Oil prices and the global economy: Is it different this time around? *Energy Economics, 65,* 315-325. https://doi.org/10.1016/j.eneco.2017.05.011

33. Nonejad, N. (2020). Crude oil price volatility and short-term predictability of the real US GDP growth rate. *Economics Letters, 186,* 108527. https://doi.org/10.1016/j.econlet.2019.108527

34. Nusair, S. A. (2016). The effects of oil price shocks on the economies

http://dx.doi.org/10.21511/imfi.17(4).2020.15

of the Gulf Co-operation Council countries: Nonlinear analysis. *Energy Policy, 91,* 256-267. https://doi.org/10.1016/j.enpol.2016.01.013

35. Nyangarika, A. M. (2018). Correlation of oil prices and gross domestic product in oil producing countries. *International Journal of Energy Economics and Policy, 8*(5), 42-48. Retrieved from https://www.econjournals.com/index.php/ijeep/article/view/6802

36. Nyangarika, A., Mikhaylov, A., & Richter, U. (2019). Influence oil price towards economic indicators in Russia. *International Journal of Energy Economics and Policy, 1*(6), 123-130. Retrieved from https://iopscience.iop.org/article/10.1088/1755-1315/192/1/012066

37. OPEC. (2020). *Saudi Arabia facts and figures.* Retrieved from https://www.opec.org/opec_web/en/about_us/169.htm

38. Sarrakh, R., Renukappa, S., Suresh, S., & Mushatat, S. (2020). Impact of subsidy reform on the kingdom of Saudi Arabia's economy and carbon emissions. *Energy Strategy Reviews, 28,* 100465. https://doi.org/10.1016/j.esr.2020.100465

39. Sarwar, S., Chen, W., & Waheed, R. (2017). Electricity consumption, oil price and economic growth: Global perspective. *Renewable and Sustainable Energy Reviews, 76,* 9-18. https://doi.org/10.1016/j.rser.2017.03.063

40. Sultan, Z. A., & Haque, M. I. (2018). Oil exports and economic growth: An empirical evidence from Saudi Arabia. *International Journal of Energy Economics and Policy, 8*(5), 281-287. Retrieved from https://www.researchgate.net/publication/327688922_Oil_Exports_and_Economic_Growth_An_Empirical_Evidence_from_Saudi_Arabia

41. Van Eyden, R., Difeto, M., Gupta, R., & Wohar, M. E. (2019). Oil price volatility and economic growth: Evidence from advanced economies using more than a century's data. *Applied Energy, 233,* 612-621. https://doi.org/10.1016/j.apenergy.2018.10.049

42. Vohra, R. (2017). The impact of oil prices on GCC economies. *International Journal of Business and Social Science, 8*(2), 7-14. Retrieved from https://ijbssnet.com/journals/Vol_8_No_2_February_2017/2.pdf

APPENDIX A

Table A1. FBI of oil prices, oil sector revenue, GDP, and public spending

Source: Own calculations based on absolute values given in Table 1.

Oil prices	Oil sector	GDP	Education	Health	Hous. and Commu. Ameni. Ser.	Soc. Secu. and Welf.	Oth. Commu. and Soc. Ser.
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
101.85	107.85	109.64	112.25	120.89	105.73	157.43	117.53
98.52	101.13	111.23	131.54	150.77	160.65	210.89	136.43
89.61	93.81	112.68	140.54	168.88	172.46	256.06	166.91
46.05	51.68	97.47	149.24	161.27	154.46	206.77	158.01
37.93	46.65	96.08	133.52	130.18	122.53	148.21	119.61
48.79	57.61	102.58	136.35	130.08	124.25	158.90	127.97
64.94	77.24	117.17	156.91	149.96	140.85	206.13	154.20

Table A2. CBI of oil prices, oil sector revenue, GDP, and public spending

Source: Own calculations based on absolute values given in Table 1.

Oil prices	Oil sector	GDP	Education	Health	Hous. and Commu. Ameni. Ser.	Soc. Secu. and Welf.	Oth. Commu. and Soc. Ser.
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
101.85	107.85	109.64	112.25	120.89	105.73	157.43	117.53
96.73	93.77	101.45	117.19	124.72	151.95	133.96	116.08
90.95	92.77	101.30	106.84	112.01	107.35	121.42	122.34
51.40	55.09	86.50	106.19	95.50	89.57	80.75	94.67
82.36	90.27	98.57	89.47	80.72	79.33	71.68	75.70
128.63	123.48	106.77	102.11	99.93	101.40	107.21	106.99
133.09	134.08	114.22	115.08	115.28	113.36	129.72	120.50

Table A3. Public spending avenues proportionate to GDP (%)

Source: Own calculations based on the absolute values given in Table 1.

Year	GDP	Education	Edu., % of GDP	Health	Health % of GDP	Hous. and Commu. Ameni. Ser.	Ho. and Com. Ame. Ser. % of GDP	Soc. Secu. and Welf.	Soc. Secu. and Welf., % of GDP	Oth. Commu. and Soc. Ser.	Oth. Commu. and Soc. Ser., % of GDP
2011	2517146	141859	5.64	62663	2.49	24662	0.98	2039	0.08	9317	0.37
2012	2759906	159235	5.77	75752	2.74	26075	0.94	3210	0.12	10950	0.40
2013	2799927	186605	6.66	94479	3.37	39620	1.42	4300	0.15	12711	0.45
2014	2836314	199370	7.03	105826	3.73	42531	1.50	5221	0.18	15551	0.55
2015	2453512	211716	8.63	101059	4.12	38093	1.55	4216	0.17	14722	0.60
2016	2418508	189416	7.83	81573	3.37	30219	1.25	3022	0.12	11144	0.46
2017	2582198	193419	7.49	81512	3.16	30643	1.19	3240	0.13	11923	0.46
2018	2949457	222585	7.55	93971	3.19	34737	1.18	4203	0.14	14367	0.49

Table A4. Public spending avenues proportionate to oil sector revenue (%)

Source: Own calculations based on the values given in Table 1.

Year	Oil sector revenue	Education	Edu., % of oil sector reve.	Health	Health, % of oil sector reve.	Hous. and Commu. Ameni. Ser.	Ho. and Com. Ame. Ser. % of oil sector reve.	Soc. Secu. and Welf.	Soc. Secu. and Welf,. % of oil sector reve.	Oth. Commu. and Soc. Ser.	Oth. Commu. and Soc. Ser., % of oil sector reve.
2011	1276416	141859	11.11	62663	4.91	24662	1.93	2039	0.16	9317	0.73
2012	1376576	159235	11.57	75752	5.50	26075	1.89	3210	0.23	10950	0.80
2013	1290789	186605	14.46	94479	7.32	39620	3.07	4300	0.33	12711	0.98
2014	1197414	199370	16.65	105826	8.84	42531	3.55	5221	0.44	15551	1.30
2015	659670	211716	32.09	101059	15.32	38093	5.77	4216	0.64	14722	2.23
2016	595494	189416	31.81	81573	13.70	30219	5.07	3022	0.51	11144	1.87
2017	735302	193419	26.30	81512	11.09	30643	4.17	3240	0.44	11923	1.62
2018	985900	222585	22.58	93971	9.53	34737	3.52	4203	0.43	14367	1.46

http://dx.doi.org/10.21511/imfi.17(4).2020.15