

Oil Price, Revenues and Expenditures in Saudi Arabia

Dr. Mwafaq M. Dandan
Associate Prof of economics
Albalqa Applied University

Dr. Mashhour Hathloul Maharmah
Assistant Prof of financial management
Albalqa Applied University

ABSTRACT

The increase in the price of crude oil is critically important for economic development. Crude oil is not only an important resource for production, but also accounts for a large proportion of the expenditure of private households as well as public sector. Saudi Arabia, which produces 9.5 million barrel per day, is considered the largest exporting country in the world, which represents 90% of its budget. Therefore, this fluctuation in the price of crude affects the government budget. This study aimed to examine the relation between the continuous price change and revenues and the whole impact in government expenditures during the period 2003-2014 in Saudi Arabia. Different statistical techniques were used to show the aforementioned relation. However, the study found that there is an adverse relationship between oil price and government expenditures in Saudi Arabia during the period of the study.

Key words: oil Price, Saudi Economy, Government Expenditures

INTRODUCTION

The increase in the price of crude oil is critically important for economic development. Crude oil is not only an important resource for production, but also accounts for a large proportion of the expenditure of private households as well as public sector. The second half of 2014 has witnessed a sharp decline in the oil price, bringing an end of a four-year period of price stability around \$105 per barrel. The decline, which is much larger than that of the non-oil commodity price indices compared to early-2011 peaks, may signal an end to a price "supercycle"⁵. The slump owes much to the perception that geopolitical threats are fading, but more fundamentally to supply additions in an environment of anemic demand. OPEC has backed away from any attempt to stanch this supply, calculating that any cuts would need to be deep to generate an adequate price response and would mean an unacceptable loss of market share. OPEC members are, therefore, set to keep output high for the time being⁶. This decline in oil price will definitely have its impact in the economic growth of many countries especially those which relies mostly in oil revenues like many gulf countries which Saudi Arabia one of them, as its economy still depends heavily on the oil sector. Oil revenue accounts for roughly 90.0 percent of total government revenues and oil exports account for about 88.0 percent of total export earnings⁷.

Although several empirical studies have examined the relationship between government expenditure and economic growth in Saudi Arabia, none of these studies has explored the relationship between different categories of government revenues and government expenditures. Therefore, the main objective of this paper is to empirically examine the relation between the change in the crude oil price and government revenues and the whole impacts on government expenditures. Hence, another objective of this study is to examine the impact of different components of government revenues (oil and non oil revenues) on different types of government expenditures (capital and current expenditures) in Saudi Arabia.

SAUDI ECONOMY (historical review)

Saudi Arabia, the biggest exporter of crude oil and other petroleum liquids in the world, is considered one of the fastest growing economies in the Middle East and North Africa. In 2014 the Saudi oil exports accounted for 89% of the country's total revenue. The value of these exports is being influenced by the recent decline in global oil prices, which resulted in a potential budget shortfall. In 2015, Saudi Arabia plans to spend about \$230 billion but expects to take in \$190.7 billion in revenue, resulting in an overall deficit of \$38.6 billion⁷.

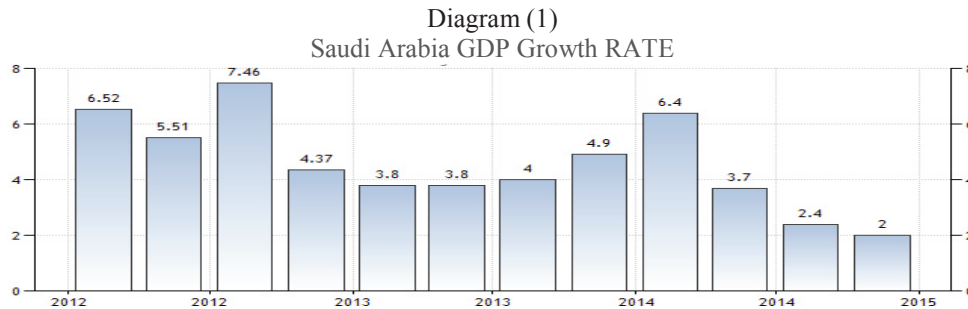
The Gross Domestic Product (GDP) in Saudi Arabia expanded 2.0 percent in the fourth quarter of 2014 over the same quarter of the previous year. GDP Growth Rate in Saudi Arabia averaged 5.28 Percent from 1969 until 2014, reaching an all time high of 27.49 Percent in the fourth quarter of 1974 –due to increase in oil price-, then

¹-Global economic prospective, Jan 2015

⁶ samba series report Feb. 2015

⁷ Wright, 2011

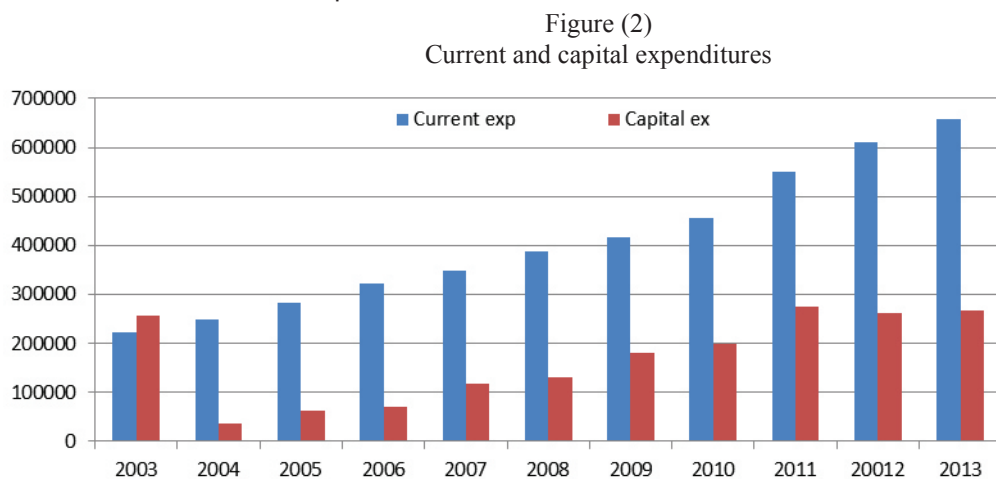
it has recorded low of -11.10 Percent in the fourth quarter of 1982. The following diagram shows the growth rate of Saudi economy during the recent years⁸



Source: <http://www.tradingeconomics.com/saudi-arabia/gdp-growth>

Public expenditures is viewed as a very important factor in financing investment and consumption activities, Saudi Arabia's fiscal policy plays a vital role in the economy. Saudi government activities may be divided into public investment, which is carried out by state-owned firms and government expenditures. The government expenditures consist of two types, current and capital.⁹

Figure 2 shows the historical path of government expenditures in Saudi Arabia during the period 2003-2014. As can be seen from the graph, in 2003 the Saudi government allocated a large portion of its budget to capital spending, but with the decline in oil prices in 2004-2006 capital expenditure shrank significantly, while the current expenditures has been increasing at higher rate during the recent years due to the increase in the oil price.



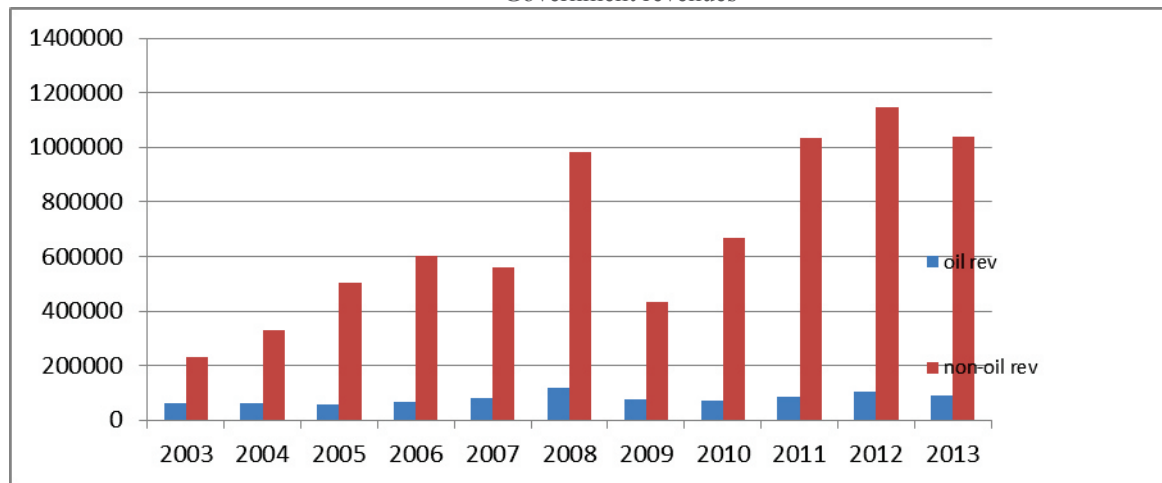
Source: Annual Statistics Yearbooks available at (<http://www.cdsi.gov.sa>)

Most of Saudi government revenues come from oil export as shown in figure number (3), which is natural due to the hike in the oil price and the huge quantity of oil exported, also, the same figure shows that non oil revenues has small proportion of the total government revenues. But it is expected that this trend is not going to last for long especially in this year and the coming years with the decline in the oil price to the range of 50\$ to 60\$ per barrel, as a result it is expected also that non oil revenues share of the total going to increase.

⁸ <http://www.tradingeconomics.com/saudi-arabia/gdp-growth>

⁹ Alshahrani, Alsadiq A.(2014)

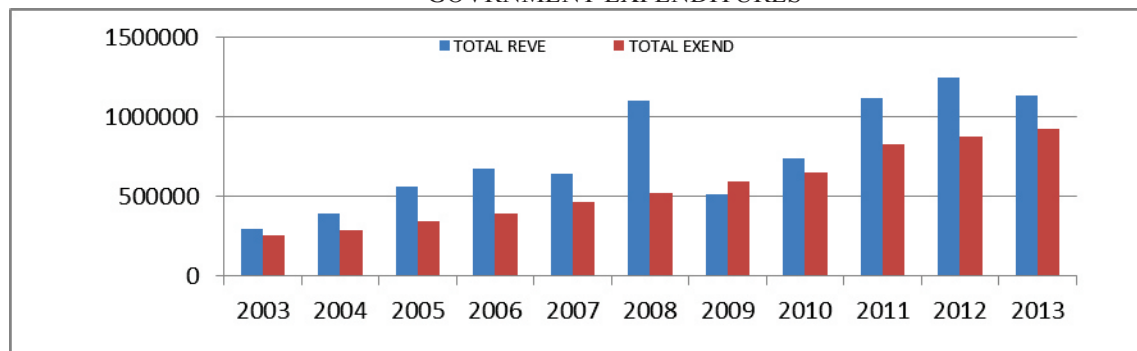
Figure (3)
 Government revenues



Source: Annual Statistics Yearbooks available at(<http://www.cdsi.gov.sa>)

However, if we compare the revenues with expenditures in Saudi Arabia we find that the balance of payment always in surplus due to the hike in oil revenues during the last ten years, i.e. 2008 recorded the highest surplus, and then this margin has declined in the following years due the dramatic increase in government expenditures. The following diagram depicts the relation between revenues and expenditures during the years 2003-2013.

Figure (4)
 GOVERNMENT EXPENDITURES



Source: Annual Statistics Yearbooks available at(<http://www.cdsi.gov.sa>)

OBJECTIVES AND SOURCE OF DATA

The purpose of this study is to investigate the relationship between Saudi government revenue (oil and non oil revenues) and government expenditures (capital and current). For this end, the study used secondary data from several sources, including existing databases and websites Data related to oil revenue amounts for the period of the study from the Saudi Ministry of Finance, while expenditures were collected from the publication of the Statistical Department

METHODOLOGY

To analyze the related data, the study used simple linear regression analyses between government revenue (as dependent variable) on one hand and Saudi budget expenditures (as independent variable) on the other hand, to point out to the trend in the relationship between them. Then oil revenues and non oil revenues were taken as independent variables and (capital and current) expenditures as dependent variables. For this purpose the following models were used:

$$\text{Total Ex} = \beta_0 + \beta_1 \text{OilR} + \beta_2 \text{OtherR} + \mu \dots \dots \dots 1$$

Where

Total Ex= Total expenditures

OilR = oil revenue

OtherR= other revenue or alternatively total non-oil revenue

Specification of model no2

$$\text{Current Ex} = \beta_0 + \beta_1 \text{OilR} + \beta_2 \text{OtherR} + \dots \dots \dots 2$$

Where

Current Ex = current expenditures

OilR = oil revenue

OtherR = other revenue or alternatively total non-oil revenue

Specification of model no3

$$\text{Capital Ex} = \beta_0 + \beta_1 \text{OilR} + \beta_2 \text{OtherR} + \mu \dots \dots \dots 3$$

Where

Capital Ex = Capital expenditures

OilR = oil revenue

OtherR = other revenue or alternatively total non-oil revenue.

HYPOTHESIS OF THE STUDY

Hypothesis for model 1

(1) H_0 = there is no relationship between oil revenue and Total Expenditures

H_1 = there is significant relationship between oil revenue and Total Expenditures

(2) H_0 = there is no relationship between other Revenue and Total Expenditures

H_1 = there is significant relationship between other Revenue and Total Expenditures

Hypothesis for model 2

(1) H_0 = there is no relationship between Oil Revenue and Current Expenditures

H_1 = there is significant relationship between Oil Revenue and Current Expenditures

(2) H_0 = there is no relationship between Other Revenue and Current Expenditures

H_1 = there is significant relationship between Other Revenue and Current Expenditures

Hypothesis for model 3

(1) H_0 = there is no relationship between Oil Revenue and Capital Expenditures

H_1 = there is significant relationship between Oil Revenue and Capital Expenditures

(2) H_0 = there is no relationship between other revenue and Capital Expenditures

H_1 = there is significant relationship between other revenue and Capital Expenditures

TESTING THE HYPOTHESIS

Dependent variable	Constant	Independent variables		R ²
		OilR	OtherR	
Total Ex	298520.7	0.8258685	-3.843739	0.76
		(3.69) [0.006]	(-0.99) [0.351]	
F(2, 8) = 12.94,		Prob > F = 0.0031		

$$\text{Total Ex} = 298520.7 + 0.826\text{OilR} - 3.844\text{OtherR} \dots \dots \dots (1)$$

(3.69) (-0.99)

The above mentioned model shows the estimates of the first model, where total expenditure is treated as a dependent variable and oil revenue and total nonoil revenue are treated as independent variables. The values below the partial coefficient are T-statistic and P-values respectively. The T statistic and probability values both lead us to the conclusions that we are not having sufficient evidence to accept the hypothesis of no relationship; alternatively it is concluded that there is significant relationship between oil revenue and total expenditure. The sign and magnitude of the partial coefficient of oil revenue shows that any one unit change in the oil revenue leads to 0.826 units change in total expenditures. The sign and magnitude of the nonoil revenue is negative, but there is no significant relationship between other revenue and total expenditures.

The coefficient of determination value shows that 76 percent of the total variation in total expenditures is explained by the oil revenue and non oil revenue. The F statistic leads us to the conclusion that the overall model is significant.

Results of model no2

Dependent variable	Constant	Independent variables		R ²
		OilR	OtherR	
Capital Ex	54928.35	0.3150604 (3.21) [0.012]	-1.530858 (-0.90) [0.60]	0.71
F(2, 8) = 9.59, Prob > F = 0.0075				

$$\text{Capital Ex} = 54928.35 + 0.315\text{OilR} - 1.531\text{OtherR} \dots\dots\dots (2)$$

(3.21) (-0.90)

The second model shows the effect of oil revenue and other revenue on the capital expenditures. The results indicate that the oil revenue is significantly related to capital expenditures, and any single unit change in the oil revenue will lead to 0.315 units changes in the capital expenditures in the same direction. Non oil revenue is appearing with the negative sign, but on the basis of T-statistic and P-value we cannot reject the null hypothesis of no relationship.

R² value shows that 71 percent of the total variation in the capital expenditures is explained by the independent variables of the model. The probability value of the F statistic leads us to the conclusion of the overall significance of the model.

Results of model no.3

Dependent variable	Constant	Independent variables		R ²
		OilR	OtherR	
Current Ex	243592.3	0.5108081 (3.88) [0.005]	-2.31288 (-1.02) [0.339]	0.78
F(2, 8) = 14.55, Prob > F = 0.0022				

$$\text{Current Ex} = 243592.3 + 0.510\text{OilR} - 2.313\text{OtherR} \dots\dots\dots (3)$$

(3.88) (-1.02)

The elasticity estimates of the model 3 shows that there is statistically significant and positive relationship between oil revenue and current expenditures, the magnitude of the partial slope coefficient of oil revenue is 0.511 which indicates that any single unit change in the oil revenue will bring about 0.511 units changes in the current expenditures in the same direction. Other revenue is not significantly related to current expenditures.

The goodness of fit measure of the model shows that 78 percent of the total variations in the current expenditures are explained by the variation in oil revenue and other revenue. The F statistic leads us to the conclusion that the overall model is significant.

Test for Multicollinearity

Multicollinearity refers to the situation of existing of linear relationship among independent variables. The variance inflating factor (VIF) test is utilized to examine the model for multicollinearity. As per rule if VIF value is greater than 10 then it is the case of severe multicollinearity.

Variable	VIF	1/VIF
OilR	3.01	0.332310
OtherR	3.01	0.332310
Mean VIF	3.01	

As shown in the abovementioned table, it is concluded that the model is free from the problem of multicollinearity.

Test for Autocorrelation

To test for autocorrelation the Breusch-Godfrey method is applied, the test uses chi-square distribution. All of the three models are tested for the detection of the problem of autocorrelation and the results are presented in the table below. BG test results for autocorrelation

Breusch-Godfrey LM test for autocorrelation				Remarks
H0: no serial correlation				
	Chi2	Df	p-value	
Model no. 1	0.080	1	0.778	H0 Accepted
Model no. 2	0.401	1	0.526	H0 Accepted
Model no. 3	0.002	1	0.960	H0 Accepted

Looking to the above tables we can confidently conclude that none of the model is being affected by the problem of autocorrelation. As the p-values of all of the three models which are 0.778, 0.526 and 0.960 respectively lead us to the conclusion to accept the null hypothesis of no serial correlation for all the three models.

Test for heteroscedasticity

The researcher has tested all of the three models for the constant variances property, Breusch-pagan test is being utilized for that purpose. The results of the test are given below.

Breusch-Pagan test for heteroscedasticity		Chi2	P-value	Remarks
Model no.1	Ho: Constant variance Variables: fitted values of totalex	0.36	0.5503	H0 Accepted
Model no.2	Ho: Constant variance Variables: fitted values of capitalex	0.84	0.3595	H0 Accepted
Model no.3	Ho: Constant variance Variables: fitted values of currentex	0.01	0.9199	H0 Accepted

Breusch-pagan procedure results in the above table suggest that all of the three models are free from the problem of heteroscedasticity. As looking to the probability values of 0.5503, 0.3595 and 0.9199 we says that we are not having sufficient evidence to reject our null hypothesis of constant variance, so we accept that and alternatively conclude that the all of the three models are free from the problem of heteroscedasticity.

CONCLUSION

According to the data provided and the data analysis, it is concluded that the change in oil prices has a direct impact on government expenditures in Saudi Arabia, since the oil revenues accounts for around 90 percent of total government revenues. The statistical test shows the following:

- 1) 76 percent of the total variation in total expenditures is explained by the oil revenue, which means that there is significant relationship between oil revenues and total government expenditures.
- 2) 71 percent of the total variation in the capital expenditures is explained by the oil revenues.
- 3-78 percent of the total variations in the current expenditures are explained by the variation in oil revenue .

Therefore, any decline in the oil price will have a negative effect in the government expenditures, and for the first time the Saudi government has witnessed defect in its 2015 budget.

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