Government Expenditure and Private Sector Growth in Saudi Arabia: A Markov Switching Model Analysis

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ABSTRACT

This paper investigates the relationship between government expenditure and non-oil private GDP in Saudi Arabia over the period 1970-2015, using a Markov Switching Autoregressive Model (MSAR)-which captures the dynamic pattern of time series and allows us to test the impact of government expenditure on GDP growth in finite unobserved states of the economy. The study results show that the growth effects of contemporaneous government consumption expenditure and government fixed capital formation expenditure are found to be negative only in the low (recessionary) state of the economy. This could be explained by the crowding out effect that exists only in recessionary periods. On the other hand, the disaggregated government expenditure model indicates that defence and security expenditure is estimated to have the expected negative and significant impact on non-oil private GDP growth, but only in the low state. In addition, out of the three highest government civil items of expenditure, human resources development is found to have a positive and significant growth effect in both states of the economy, while the growth effect of the other two types (health and economic development expenditure) is found to be insignificant in the low state. This insignificant growth effect of some types of government expenditure in the low state of non-oil private GDP could be explained by the procyclical nature of government expenditure because of the excessive dependency on oil revenues.

1. INTRODUCTION

GOVERNMENT SIZE, measured as the percentage of government expenditure to GDP and its impact on the macroeconomy, has received attention from many researchers in both developed and developing countries, with a focus on studying the growth effects of government expenditure. Empirical results vary significantly in terms of whether government expenditure boosts real GDP growth. For example, Landau (1983), Barro (1989, 1991), Ghura (1995), Ghali (1997), Fölster and Henrekson (1999, 2001), Brons *et a*l

(2000), Josaphat and Morrissey (2000), Minea and Villieu (2010), Miron (2010) and Barro and Redlick (2011), argue that there is either a negative relationship between government expenditure and real GDP per capita growth, or there is no evidence that government expenditure is positively related to economic growth. On the other hand, Aschauer (1989), Baum and Lin (1993), Griener and Semmler (2000) and Alexiou (2009), find a positive impact of government spending, or some components of it, on GDP growth.

In the context of Arab oil-exporting economies, the dependency on oil as the main source of government revenue, which leads to procyclical government expenditure, motivates researchers to study the impact of government expenditure on economic growth, especially in Saudi Arabia. Robert Looney's (1989) paper on Saudi Arabia's Development Strategy is one of the early studies on the relative efficacy of fiscal and monetary policy in Saudi Arabia. Looney's main findings suggest the superiority of simple rules over optimally designed discretionary policy in increasing the growth rate in non-oil GDP. In the same trend, Joharji and Starr (2010) examine the relationship between government expenditure and non-oil GDP in Saudi Arabia over the period 1969-2005. They find that current government investment has a larger long run effect on the rate of growth compared to capital government expenditure. Likewise, Ghali (1997) examines the impact of Saudi Arabia's government expenditure on per capita output growth, but his study shows no consistent evidence that government spending can increase Saudi Arabia's per capita output growth.

In contrast, Alshahrani and Alsadiq (2014) estimate the short- and long-run effects of different types of government expenditures in Saudi Arabia on growth over the period 1969-2010. Their main finding indicates that while public investments and health expenditure stimulate growth in the long run, spending in the housing sector boosts short run production. Focusing on just one type of government expenditure, Al-Jarrah (2005) studies the causal relationship between defence spending and economic growth in Saudi Arabia. Al-Jarrah finds bi-directional causality between defence spending and total real economic growth and also between defence spending and non-oil real economic growth. Al-Yousif (2000) explores the relationship between the size of the government and economic growth in Saudi Arabia and shows that the government size is positively related to economic growth only if it is measured as the percentage change in government expenditure.

The present study adds to the literature of fiscal policy and economic growth in Arab resource-rich countries, by investigating the relationship between different government expenditure programmes and non-oil private GDP, rather than non-oil GDP, in Saudi Arabia, over the period 1970-2015. As economic diversification and private sector share of GDP has been a key goal in the five-year economic development plans applied in Saudi Arabia since the 1970s, the study tests whether government expenditure contributes positively to the growth of non-oil private GDP. In addition, as the

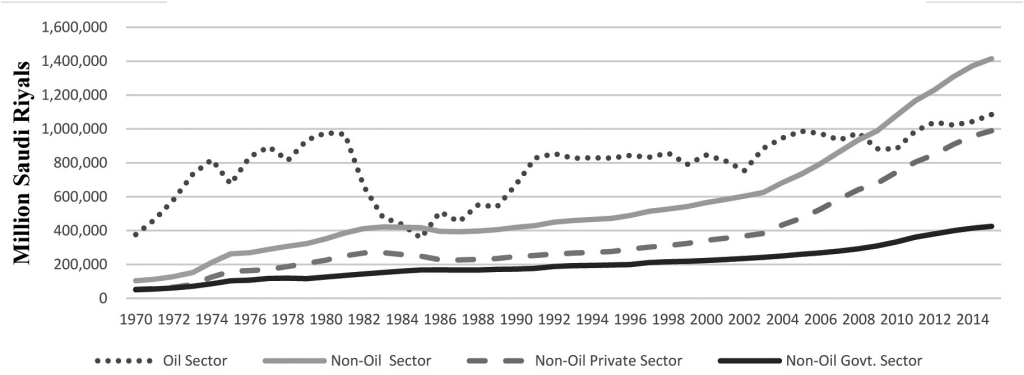
relationship between government expenditure and non-oil private GDP is subject to a regime change, the study applies the Markov switching model (Hamilton 1989), which accounts for multiple structures of the time series in different states and, thus, it captures the dynamic pattern of each time series.

The rest of the paper is organised as follows: the following section, Section 2, briefly explores the trends in government expenditure and GDP components in Saudi Arabia over the period 1970-2015. Section 3 shows the model data. Section 4 illustrates the methodology and empirical results. Section 5 discusses the results obtained from the econometric models and provides policy analysis. Finally, Section 6 delivers the study conclusions.

2. An overview of GDP components and government expenditure in Saudi Arabia[2]

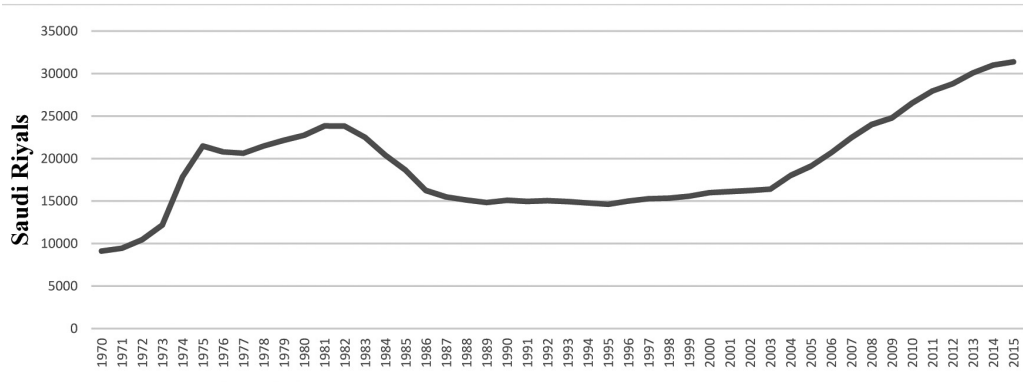
Saudi Arabia is a resource-rich country that has about one fifth of the world's proven oil reserves and is the largest producer and exporter of total petroleum liquids in the world.[3] It is also the largest economy in the Middle East, with about 25 per cent of total Arab GDP. In 2015, Saudi Arabia's GDP was valued at 2517.5 billion Saudi Riyals (SR) at 2010 constant prices ($1=SR3.75). Of this, the oil sector share was about 39.4 per cent,[4] the lowest oil sector share of GDP since 2009.

Figure 1a: A Saudi GDP Classification: Oil versus Non-Oil sector
(Constant 2010 Prices)



Source: Saudi Arabia General Authority of Statistics

Figure 1b: Real Non-Oil GDP Per Capita
(Constant 2010 Prices)



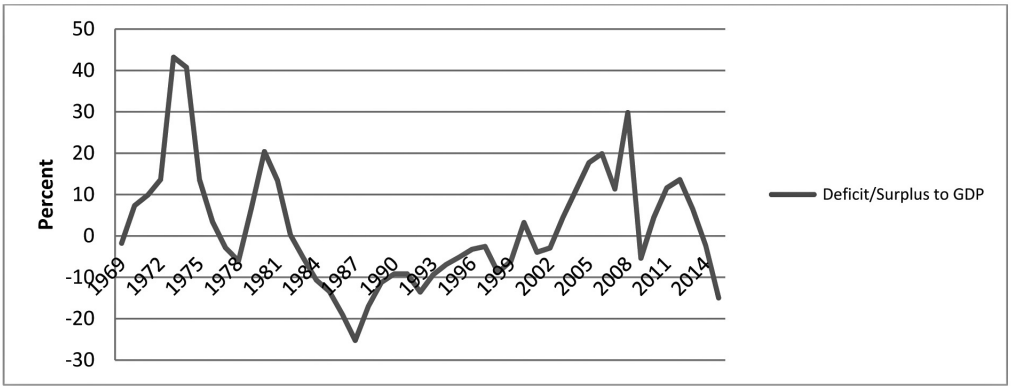
Source: Author's calculations based on Saudi Arabia General Authority of Statistics and the UN World Population Prospects data

As Figure 1a illustrates, 2009 represented a turning point when studying GDP components in Saudi Arabia, as it is the year in which the non-oil sector's contribution to GDP started to surpass the oil sector. Furthermore, the previous 15 years witnessed a noticeable increase in the contribution of non-oil private sector to GDP that led to a significant increase in non-oil private GDP per capita, as shown in Figure 1b. Like other oil-based economies, the Saudi government depends on oil as a major source of government revenue, which makes budget revenues vulnerable to fluctuations in international oil prices (the oil sector is responsible for about 90 per cent of total government revenue). For example, the sharp increase in oil prices in 1973 and 1974, the first oil shock, resulted in a budget surplus of 43.2 per cent and 40.7 per cent of GDP, respectively. In 1977, this huge surplus turned into a deficit of 2.8 per cent of GDP. The 1979 price surge after the Iranian Revolution led to a surplus of 20.4 per cent of GDP in 1980. Since 2003, the Saudi budget has realised a surplus, ranging from 4.5 per cent of GDP in 2003 to 29.8 per cent of GDP in 2008. The budget turned and showed a deficit of about 15 per cent of GDP in 2015, as a result of the recent sharp oil price drop.

Historically, budget data can be classified into four time periods: 1969-1982, 1983-2002, 2003-2013, and 2014-2015, based on the budget balance trend (Figure 2). In the first period (1969-1982), where Saudi Arabia had two positive oil shocks in 1973 and 1979, the budget balance was in surplus in most of these fourteen years. The embargo on oil shipments to the United States and the Netherlands in 1973 increased the oil price sharply (the 1974 oil price was triple that of 1973) while the Iranian revolution and Iran-Iraq war resulted in doubled oil prices in 1979. This period realised a significant increase in government capital expenditure, from 9.5 per cent of GDP in 1969

to 27.1 per cent of GDP in 1982, while the increase in current expenditure was relatively modest compared with the increase in capital expenditure.[5]

Figure 2: Budget Deficit/Surplus as a Percentage of GDP



Source: Saudi Arabia General Authority of Statistics

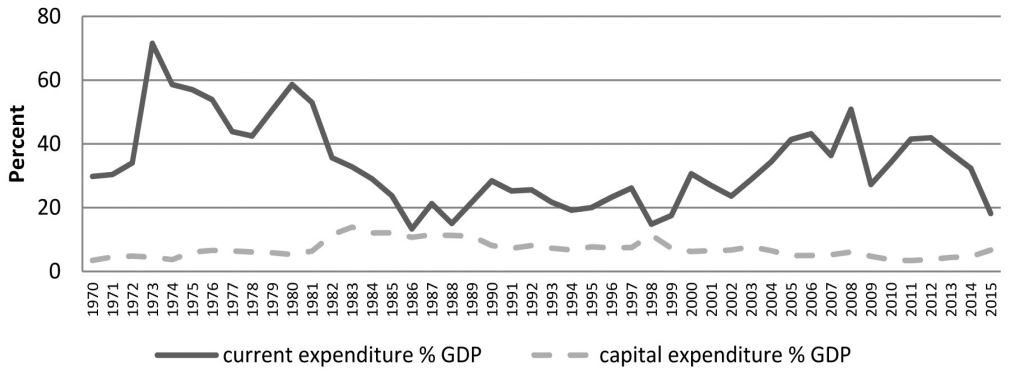
In the second period (1983-2002), the budget balance was in deficit in all years except for the year 2000. The beginning of this period witnessed a sharp decrease in oil prices, from $24 per barrel in 1985 to about $12.5 per barrel in 1986, mainly because of a coordination failure between OPEC countries on the level of oil production and the increase in exploration and production of oil outside OPEC. These factors kept oil prices below $20 in almost all years in this period. The prolonged budget deficit affected the composition of government expenditure, as the Saudi government gradually decreased its capital expenditure from 23.7 per cent of GDP in 1983 to 4.2 per cent of GDP in 2002, while keeping its current expenditure at a relatively high level.

The third period (2003-2013) saw a sharp increase in oil prices, from around $31 per barrel in 2003 to around $98 per barrel in 2013, that led to a prolonged budget surplus and helped the government accumulate more than $600 billion in its Sovereign Wealth Fund. The increase in oil price was pushed by the Iraq war in 2003, which led to the loss of Iraq's oil production, in addition to the growing demand for oil in the US and Asian countries, as a result of strong economic growth. Budget data show that capital expenditure gained a relatively larger share of total government expenditure compared with the second period, as the Saudi government gradually increased its capital expenditure from 4.1 per cent of GDP in 2003 to 11.1 per cent of GDP in 2013.

In addition, this period witnessed increased attention from the Saudi government on human development programmes, the introduction of a minimum wage (SR3000 per month) and an unemployment subsidy (SR 2000 per month). Recently, with low international oil prices since the fourth quarter of

2014 and with the high military expenses in Saudi Arabia given the war in Yemen, the budget turned into a deficit in 2014 and 2015. Thus, planned government expenditure growth increased by only 4.3 per cent and 0.006 per cent in 2014 and 2015, respectively, compared with an increase of about 20 per cent in 2013. Figure 3 shows the historical trends of current and capital expenditure as a percentage of GDP.

Figure 3: Government Current vs. Capital Expenditure as a Percenyage of GDP



Source: Author's calculations based on the Saudi Arabian Monetary Agency Forty Ninth Annual Report data

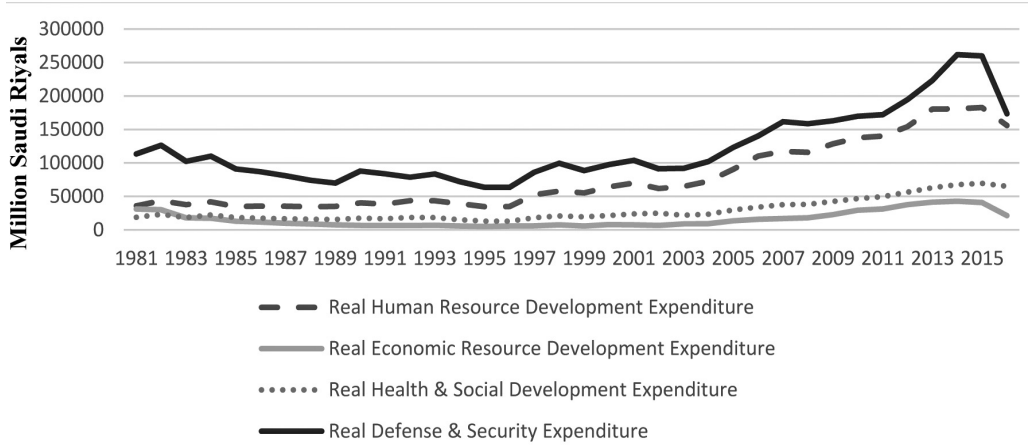
3. Data and model specification

Existing studies on the relationship between government expenditure and economic growth in Saudi Arabia use non-oil GDP, as a measure of economic growth, and current and capital expenditure, as a measure of government expenditure (Joharji and Starr (2011) and Ghali (1997). However, non-oil GDP includes both government and private sectors production. Thus, since a major goal of Saudi's economic policy is to increase the role of the private sector in the economy (as stated clearly in every five-years economic plan and also in the recently announced Saudi Vision 2030), this study examines the impact of government expenditure on non-oil private GDP per capita in two different model specifications: the aggregate government expenditure model and the disaggregated government expenditure model.

Dividing the non-oil GDP into private and government is essential since a significant part of non-oil GDP is contributed to by the government. For example, until 1999, the contribution of the Saudi government to non-oil GDP was around 40% annually. Only after that date, we started to see a gradual decrease in government contribution to non-oil GDP. Nevertheless, the Saudi government contribution to non-oil GDP is still as high as 30 per cent on average in the last 15 years (as shown in figure 1a). In addition, while both non-oil GDP and non-oil private GDP series exhibit a smooth positive trend, growth rates of both series are not always moving together. For example, during the

period 1990-1995, the non-oil GDP sector was growing at positive rates while the non-oil private GDP sector realised a negative growth in the same period (except of 1992). Therefore, we believe that excluding the government contribution component from the non-oil GDP is important as this gives us better figures of the size of the private sector contribution to GDP in Saudi Arabia.
Following the literature on government expenditure and economic growth (Feder (1982), Ram (1986), Grossman (1988), and Barro (1989)), the main variables of interest in the first model specification (the aggregate government expenditure model) are government consumption expenditure and government gross fixed capital formation expenditure. Government consumption expenditure is more relevant to GDP compared to government current expenditure that is used in the studies mentioned above because the later includes transfer payment, interest rate payment, and subsidies . Government gross capital formation includes spending on construction and purchases of capital and intermediate goods. In the second model specification (the disaggregated government expenditure model), government expenditure is divided into defence and security, human resource development (education and training), economic resource development, and health and social development. These four items of expenditure are the largest in terms of their size as a percentage of total government spending (figure 4 shows the time series trends of these four variables).

Figure 4: The Largest Four Expenditure Items in the Saudi Budget
(Constant 2010 Prices)



Source: Author's calculations based on Saudi Arabia General Authority of Statistics Data

Control variables in the literature include the current values of openness of trade, labour force, and private investment. We use the ratio of exports plus imports to GDP to reflect openness of trade, population as a proxy of labour force (since data on the labour force is not available for the specified

period of study), and gross private fixed capital formation as a proxy of private investment. All variables are expressed in growth rate terms. Data is obtained from the Saudi Arabian Monetary Agency annual reports and the General Authority for Statistics (detailed variables' description, treatment, and data sources are shown in the appendix). Table 1 shows the descriptive statistics of variables.

Following Alexiou (2009), government expenditure can be integrated into the neoclassical aggregate production function as follows:

$$Y = f(K,\ L,\ G_{con},\ G_{cap},\ T) \tag{1}$$

Where Y represents the level of output, K is the stock of domestic physical capital, L is the labour force, G_{con} is government consumption expenditure, G_{cap} is government capital expenditure, T is a measure of openness of trade. The marginal products of these variables are obtained by getting the total differential of the function and divide by gross domestic product (Y) as shown below:

$$dY/Y = (\partial Y/\partial K)dK/Y + (\partial Y/\partial L)dL/Y + (\partial Y/\partial G_{con})dG_{con}/Y + (\partial Y/\partial G_{cap})dG_{cap}/Y + (\partial Y/\partial L)dT/Y \tag{2}$$

All partial derivatives in the previous equation are expected to have a positive sign. Equation (2) represents the first model specification where government expenditure is divided into consumption and capital expenditure. The second model specification is represented in equation (3), where government expenditure is classified into the four spending categories mentioned above: defence and security (G_d), human resource development (G_h), economic resource development (G_e), and health and social development (G_s). All partial derivatives in equation (3) are expected to have a positive effect on GDP growth except of defence and security expenditure (G_d), which is expected to have a negative effect on GDP growth (as defence and security expenditure divert resources from the civil sector to the military sector, it is expected that defence and security to have a negative effect on GDP growth).

$$dY/Y = (\partial Y/\partial K)dK/Y + (\partial Y/\partial L)dL/Y + (\partial Y/\partial G_d)dG_d/Y + (\partial Y/\partial G_h)dG_h/Y + (\partial Y/\partial G_e)dG_e/Y + (\partial Y/\partial G_s)dG_s/Y + (\partial Y/\partial L)dT/Y \tag{3}$$

4. Methodology and empirical results

4.1 The Markov switching autoregressive model

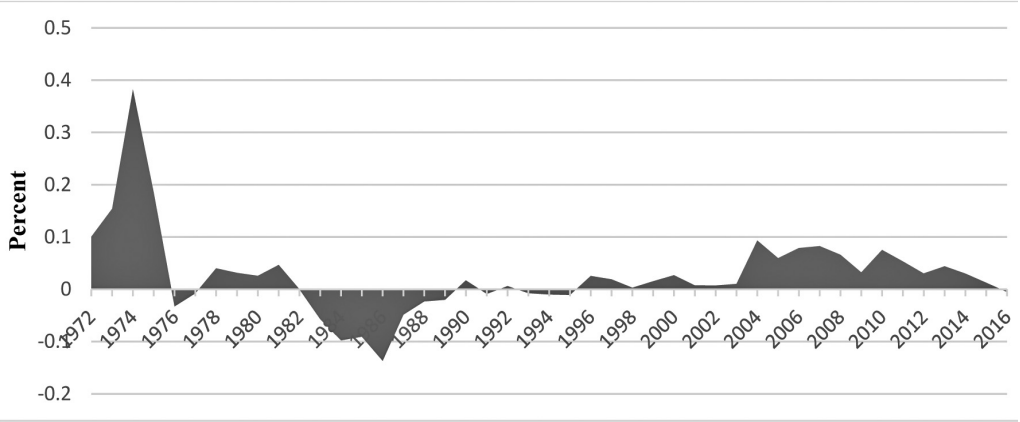
Since growth in GDP and government expenditure in oil-exporting countries is subject to regime switching due to oil price fluctuations, this paper aims at examining the relationship between government expenditure and non-oil

Table 1: Descriptive Statistics

	Mean	*Median*	*Maximum*	*Minimum*	*Std. dev.*	*Skewness*	*Kurtosis*	*Jarque-Bera*	*No. Obs.*
Population	17441.27	17399	31742	5300	8219.399	0.128801	1.802401	3.063729	49
Openness of Trade	0.77858	0.76	1.248459	0.564749	0.128165	0.89762	4.858159	13.62944	49
Real Private Fixed Capital Formation	1087.745	688.3082	3106.848	51.1697	965.6198	0.670725	1.887095	4.303897	45
Real Government Consumption Expenditure	2239.8	1832.342	6388.295	140.7049	1615.91	1.092853	3.009983	7.166121	49
Real Government Expenditure on Human Resources Development	778.5435	565.2519	1827.096	345.4699	495.6994	0.929057	2.421637	5.680635	36
Real Government Expenditure on Health and Social Development	292.4266	216.4694	694.1496	128.2154	170.1134	1.225556	3.153248	9.047145	36
Real Non-Oil Private GDP	19.64027	18.32593	31.68952	9.446988	5.684532	0.590421	2.564634	3.035864	46
Real Government Expenditure on Defence and Security	1208.431	1008.715	2617.517	634.4189	526.8266	1.249004	3.77081	10.25128	36
Real Government Fixed Capital Formation Expenditure	663.3544	441.7421	2285.663	53.57245	596.4501	1.373897	3.725563	11.44215	45
Real Government Expenditure on Economic Resources	161.0552	106.9732	428.133	49.48671	117.8938	1.032846	2.762533	6.485211	36

private GDP per capita growth using the Markov switching autoregressive model, as we expect that both the oil and non-oil GDP sectors are affected by changes in oil price levels. Historical data shown in Figure 5 illustrates the expected considerable fluctuations in real non-oil private GDP per capita growth in Saudi Arabia during the period of study 1970-2015. It is obvious that real non-oil private GDP per capita growth series does not exhibit any trending behavior as it went through periods of expansion (positive growth) during early 1970's, the period of the first oil shock, and the first decade and a half of the 21st century, which witnessed high oil price levels that led to significant budget surpluses, while growth in real non-oil private GDP per capita was negative during the 1980's and early 1990's (the period of low oil prices). The Markov switching autoregressive model, which is first introduced by Hamilton (1989), enables us to test the parameters of an autoregressive GDP growth model in different states, specifically the high and low state of the economy. In addition, the Markov switching model helps estimate the probability of a regime change.

Figure 5: Real Non-Oil Private GDP Per Capita Growth



Source: Author's calculations based on Saudi Arabia General Authority of Statistics Data

The following model specification is used to estimate the impact of government spending on non-oil private GDP per capita growth in a Markov switching autoregressive regression framework:

$$Y_t = \mu_{s_t} + X_t\alpha + K_t\beta_{s_t} + \sum_{i=1}^{p}\varphi_{i\,s_t}\left(Y_{t-i} - \mu_{s_{t-i}} - X_{t-i}\alpha - K_{t-i}\beta_{s_{t-i}}\right) + \varepsilon_{s_{t-i}} \quad (4)$$

Where Y_t is non-oil private GDP per capita growth at time t, μs_t is the state-dependent intercept, X_t is a vector of covariates with state-invariant coefficients α, K_t is a vector of covariates with state-dependent coefficients βs_t.

(Lags of Y_t may be state-variant or state-invariant), $\varphi_{i,}s_t$ is the ith AR term in state s_t, and εs_t is an independent and identically distributed normal error with mean zero and state-dependent variance $\sigma_s{}^2$. μs_{t-i} is the intercept corresponding to the state at the period *t-i*. also, βs_{t-i} is the coefficient vector on K_{t-i} corresponding to the state at period *t-i*. The choice of Markov switching autoregressive regression (MSAR) over Markov switching dynamic regression (MSDR) is based on data frequency. MSAR is used in models with low data frequency as it allows a gradual adjustment after the process changes state (regime), which is going to be suitable for our model as we use annual data.

The study first applies a simple two-state GDP growth model with state-variant variance to estimate the average non-oil private GDP per capita growth in the expansionary and recessionary states of the Saudi economy as follows:

$$Y_t = \mu_{st} + \varepsilon_{st} \tag{5}$$

Where $Y_t = \begin{cases} \mu_1 + \varepsilon_{1t} & \text{if } s_t = 1 \\ \mu_2 + \varepsilon_{2t} & \text{if } s_t = 2 \end{cases}$

4.2 Empirical results

Table 2 presents the estimation of non-oil private GDP per capita growth model in equation 4. The Markov switching model results show that the mean of non-oil private GDP per capita growth equals to 0.014% in state 1 (the high state that presents a relatively fast growth) with a variance of 0.036 (the exponential of log sigma (-3.31)), while it is equal to 0.004% in state 2 (the low state that presents slow growth) with a variance of 0.01 (the exponential of log sigma (-4.6)). Thus it is important to investigate the impact of different types of government expenditure on non-oil private GDP growth in each state.

Table 2. The Markov Switching Estimation of a Simple Two-State GDP Growth Model

Regressor	*Coefficient*	*Z-statistic[Prob.]*
	STATE 1	
constant	0.014**	2.04[0.04]
sigma^2	0.036 ***	-26.03[0.000]
	STATE 2	
Constant	0.004***	4.5[0.000]
sigma^2	-0.01***	-65.8[0.000]
Log likelihood	489.91	
Schwarz criterion	-5.4	

Notes: 1. The sample period runs from 1970 to 2015.
2. (***), (**), and (*) denote significant at 1%, 5%, and 10% level respectively

Table 3: The Markov Switching Estimation of a Two-State AR(4) GDP Growth Model (the Aggregate Government Expenditure Model Specification)

Variable	*Coefficient*	*Z-statistic[Prob.]*
STATE 1		
Constant	0.03**	2.12[0.027]
Δ log real government consumption expenditure	0.048***	6.1[0.000]
Δ log real government fixed capital expenditure	-0.007	-1.23[0.22]
$Sigma^2$	0.0034***	-73.8[0.000]
STATE 2		
Constant	0.002*	1.67[0.093]
Δ log real government consumption expenditure	-0.25***	-12.7[0.000]
Δ log real government fixed capital expenditure	-0.09***	-6.68[0.000]
$Sigma^2$	0.01***	-37.8[0.000]
STATE-INVARIANT REGRESSORS		
Δ log Openness	0.032	3.95[0.000]
Δ log real private fixed capital expenditure	0.017	2.2[0.02]
Δ log population	-0.018	-2.5[0.01]
AR(1)	0.93	9.94[0.000]
AR(2)	0.145	0.92[0.35]
AR(3)	-0.15	-1.32[0.18]
AR(4)	-0.11	-1.46[0.14]
Log likelihood	625.93	
Schwarz criterion	-7.0	

Notes: 1. The sample period runs from 1970 to 2015.
2. (***), (**), and (*) denote significant at 1%, 5%, and 10% level respectively.

The first MSAR model specification results (the aggregate government expenditure model), presented in Table 3, illustrate that growth in both government consumption and government fixed capital expenditure is negatively and significantly affecting non-oil private GDP per capita growth only during periods of relatively low growth rates (state 2) with point estimates of -0.25 and -0.09, respectively. However, government consumption expenditure turns to have a positive and significant effect in periods of relatively high growth rates (state 1), with a point estimate of 0.04, while government fixed capital expenditure is found to be insignificant. It is obvious that the negative effect of government consumption expenditure in state 2 (the displacement effect) is considerably stronger than the positive effect.

The second MSAR model specification results show the impact of disaggregated government expenditure. As shown in Table 4, only real human development expenditure has a positive and significant effect in both states, whereas real health and social development expenditure is found to have the strongest

positive effect among the three civil government expenditure items, but it is significant only in state 1. Defence expenditure has the expected negative and significant effect only in state 2. The state-invariant control variables and

Table 4: The Markov Switching Estimation of a Two-State AR(4) GDP Growth Model (the Disaggregated Government Expenditure Model Specification)

Variable	*Coefficient*	*Z-statistic[Prob.]*
STATE 1		
Constant	0.012	0.58[0.5]
Δ log real defence and security expenditure	-0.06	-1.5[0.13]
Δ log real economic development expenditure	0.035***	2.6[0.009]
Δ log real human development expenditure	0.069***	4.48[0.000]
Δ log real health and social development expenditure	0.18***	5.27[0.000]
$Sigma^2$	0.014***	-29.71[0.000]
STATE 2		
Constant	-0.016***	-4.37[0.000]
Δ log real defence and security expenditure	-0.03***	-3.94[0.000]
Δ log real economic development expenditure	-0.0007	-0.18[0.8]
Δ log real human development expenditure	0.042***	6.29[0.000]
Δ log real health and social development expenditure	0.13	1.1[0.28]
$Sigma^2$	0.002***	-60.57[0.000]
STATE-INVARIANT REGRESSORS		
Δ log Openness	0.026***	3.86[0.000]
Δ log real private fixed capital expenditure	0.008**	2.1[0.03]
Δ log population	-0.004	-1.2[0.2]
AR(1)	0.57***	7.3[0.000]
AR(2)	0.21***	3.1[0.002]
AR(3)	-0.06	-1.36[0.17]
AR(4)	-0.11**	-2.5[0.011]
Log likelihood	487.81	
Schwarz criterion	-7.1	

Notes: 1. The sample period runs from 1970 to 2015.
2. (***), (**), and (*) denote significant at 1%, 5%, and 10% level respectively.

openness of trade and real private fixed capital formation are found to have the expected positive and significant effect, while population growth is insignificantly affecting non-oil private GDP per capita growth. The openness of trade and private fixed capital formation results are consistent with Alexiou (2009) and Alshahrani and Alsadiq (2014). Although Alexiou (2007) points out that the insignificant impact of population on GDP growth is due to using population as a proxy of labour, this insignificant effect is not surprising in the Saudi context because of the labour market structure that shows a great reliance of Saudis on the government sector to create job opportunities (about

90 per cent of Saudis work in governmental jobs). Not only because the public sector provides secured jobs but also because of the low wage rate in the private sector compared to the public sector. Therefore, as the private sector depends mainly on expatriates, the substantial increase in population in Saudi Arabia (which ranges from 1.9 per cent to 4.6 per cent in the last decade) doesn't contribute much to private sector production and consequently, its impact on non-oil private GDP per capita turns out to be insignificant.

Finally, Table 5 illustrates the expected duration of each state and the transition probability in the disaggregated government expenditure model. The MSAR model post-estimation results show that the state of relatively high non-oil private GDP per capita growth (state 1) is expected to last for about 14.3 years while the recessionary state (state 2) is expected to last for about 6.2 years. The longer expected duration of expansion in the non-oil private sector compared to the expected duration of recession matches the historical data analysis. In particular, the Saudi non-oil sector (private and government) did not witness negative growth rates since 1989 while the last year of seeing negative growth rates in the non-oil private GDP was 1995. Recent data announced by the Saudi General Authority of Statistics shows that the first quarter of 2016 observed the first recession in the non-oil sector since 1989 as the non-oil sector contracted by 0.7 per cent. Besides, both states seem to be highly persistent as the estimated transition probability (P_{11}) is equal to 0.93, which means that the probability of the economy to stay in the expansionary state in the next period is 0.93, while the probability that the economy stays in the recessionary state in the next period (P_{22}) is 0.84.

Table 5. The Markov Constant Expected Durations

State	*Duration*	*Transition probability*
1	14.3	0.93 (P_{11})
2	6.2	0.84(P_{22})

5. Discussion and policy analysis

As mentioned above, the main advantage of using the MSAR model is that it allows us to test the growth effect of government expenditure on non-oil private GDP per capita in finite unobserved states: the expansionary and recessionary states of the economy. Results obtained from the MSAR model show that, while existing studies find either a positive or insignificant impact of current expenditure on non-oil GDP growth in Saudi Arabia (Yousif Al-Yousif (2000), Joharji and Starr (2011), and Alshahrani and Alsadiq (2014)), this study finds the contemporaneous growth effect of both government consumption expenditure and government fixed capital formation expenditure to be negative in the recessionary state of the economy. The reason behind the neg-

ative effect of government consumption expenditure in the recessionary state is that, as recessions and expansions in the Saudi economy depend mainly on the volume of oil revenues, the Saudi government finds itself forced to issue bonds and borrow money from local banks to cover its budget deficit during periods of recession, especially as the Saudi government doesn't levy income or sales taxes. For example, as the budget deficit reached about 15 per cent of GDP in 2015, the Saudi government had to borrow around $4 billion from local banks to fund its deficit. This local borrowing creates pressure on domestic liquidity, which affects private GDP growth negatively. In contrast, periods of high oil prices (expansionary periods) result in a budget surplus that helps the government to pay back its debts and increases liquidity in the domestic market, which leads to an increase in non-oil private GDP per capita growth. One explanation of the insignificant contemporaneous growth effect of government fixed capital formation expenditure in the expansionary state of the economy is the nature of this kind of expenditure (spending on roads, bridges, electricity, etc.) that makes it unproductive in the short run (Joharji and Starr (2011)). However, the lack of power of the Saudi Consultative Assembly (the Saudi Parliament) in the approval phase of the government budget raises questions about the criteria that the government applies when choosing its public projects and increases the probability of having 'white-elephant' public investment that doesn't contribute to the country's GDP (the Saudi Council of Ministers is responsible for preparing and approving the annual government budget).

The analysis of the disaggregated government expenditure model indicates a negative impact of defence expenditure on non-oil private GDP per capita growth, which matches the findings of the literature on defence expenditure and GDP growth. However, the MSAR model estimates this negative impact to be significant only in the recessionary state of the economy. This negative impact of defence expenditure is expected since Saudi Arabia is usually classified among the top ten military-spending countries worldwide (its ranking rose to the third place after the US and China in 2015 due to the war against Houthis in Yemen, according to Global Fire Power). Defence and security spending is always the largest item of expenditure in the Saudi budget accounts for more than 25 per cent of total expenditure and thus, a significant amount of resources is switched every year from the civil sector to the military sector, which explains the negative effect of defence and security spending on non-oil private GDP per capita growth.

On the other hand, although existing literature finds a positive impact of health expenditure on non-oil GDP growth in Saudi Arabia (Alshahrani and Alsadiq (2014)), this study finds healthcare expenditure to have a positive and significant growth effect only in the expansionary state, whereas its impact turned out to be insignificant in the recessionary state. However, the highest civil item of expenditure, human resources development, is found to have a positive and significant effect in both the expansionary and recessionary

states of the economy. This positive impact of human resources development on non-oil private GDP per capita growth matches the findings of studies that explore the role of education in increasing GDP growth such as Barro (2013) and (1991), Birdsall *et. al.* (1995), Roubini and Sala-I-Martin (1991), and Alshahrani and Alsadiq (2014). Budgetary data in Saudi Arabia shows that there is a significant increase in the percentage of government expenditure directed to human resources development from 8.8 per cent in 1981 to 25 per cent in 2015. This reflects an obvious political will to develop Saudi's capabilities and to equip them with the required skills for modernizing the Saudi economy. For example, the Saudi Human Resources Development Fund is in charge of funding many training programs for Saudi youth to make their skills match the market characteristics and increase their chances to find jobs in the market (the Saudisation program) such as: women empowerment, on the job training, training ending with employment, and e-training. In addition, the generous King Abdullah Scholarship program, which started in 2005, aims to send a significant number of Saudi students to continue their educational degrees abroad and gain the most up-to-date knowledge in different fields of science (more than 130,000 Saudi students study abroad, about half of them study in the United States). This could explain the positive and significant effect of human resources development on non-oil private GDP per capita growth in both the recessionary and expansionary states of the Saudi economy.

With the exception of human resources development expenditure, the insignificant effect of different types of government expenditure in the low state of non-oil private GDP growth could be explained by the procyclical nature of government expenditure in oil-based countries that makes government expenditure highly volatile, especially government capital expenditure. Recently, the sharp decline in oil prices in the last quarter of 2014 was a great opportunity for the Saudi government to take the along waited, ambitious steps toward reforming the fiscal sector that aim at decreasing the dependency on oil revenues. Prince Mohamed Bin Salman, the deputy crown prince, adopted a long-term plan (Saudi Vision 2030) with one of its main goals to generate sustainable income for the government by imposing a value-added tax and constructing a Public Investment Fund (mainly from the selling of a part of the assets of the state-owned oil company, Saudi Aramco) with a size that is expected to exceed $2 trillion, which would be considered the world's largest sovereign wealth fund. These revolutionary policy changes are planned to be implemented in 2018, so judging the efficacy of these changes would appear in future research. However, the non-existence (and the public resistance) of individual income taxes decreases the government’s ability to reduce the non-oil budget deficit and to implement a countercyclical, rather than procyclical, fiscal policy.

In addition, Vision 2030 aims at increasing the efficiency of capital expenditure by linking capital expenditure to economic development priorities and the National Project Management Agency regulations. Although this link-

age is expected to have long-run growth effects, the problem of capital expenditure volatility might make capital expenditure less significant in increasing economic growth. Furthermore, it is not clear if the Saudi government is going to move from applying discretionary fiscal policy decisions when dealing with the current budget deficit to adopting fiscal rules that would lessen the impact of low oil prices on government expenditure programs, and thus on economic growth, such as setting deficit and debt limits and determining multi-year deficit and debt targets.[8] Besides, it is really important to make the Consultative Assembly independent from the executive authority and increase its power in the budget approval and oversight processes, which would decrease the probability of having white-elephant public investment. Unfortunately, this major institutional change is still missing in the Saudi Vision 2030. Thus, although the fiscal policy reform plan seems strong and sound and contains important elements that would make it successful in decreasing government expenditure procyclicality, the absence of deficit and debt targets and the weak power of the Consultative Assembly might make it less effective in increasing the productivity of government expenditure and sustaining a reasonable level of non-oil budget deficit. More importantly, the real test to whether the Saudi government is keen to reform its fiscal policy is what would happen to this reform plan if the international oil prices increase in the near future to its early 2014 levels.

6. Conclusions

This study examines the impact of government expenditure on non-oil private GDP per capita growth in Saudi Arabia using the Markov Switching Autoregressive (MSAR) model during the period 1970-2015. The MSAR results show that the growth effects of contemporaneous government consumption expenditure and government fixed capital formation expenditure are found to be negative only in the low (recessionary) state of the economy. This could be explained by the crowding out effect that exists only in recessionary periods: since the Saudi government doesn't impose income or sales taxes and always borrows from local banks to cover its budget deficit during periods of low oil prices (recession), domestic liquidity and non-oil private GDP growth are negatively affected. On the other hand, the disaggregated government expenditure model indicates that defence and security expenditure is estimated to have the expected negative and significant impact on non-oil private GDP growth but only in the low state. In addition, out of the three highest government civil items of expenditure, human resources development is found to have a positive and significant growth effect in both states of the economy, while the growth effect of the other two types (health and economic development expenditure) is found to be insignificant in the low state. This insignificant growth effect of some types of government expenditure in the low state of non-oil private GDP could be explained by the procyclical nature of government expenditure as a result of the excessive dependency on oil revenues; a problem that

the Saudi government is trying to solve now by initiating a major fiscal reform that aims at generating a sustainable non-oil government revenue and decreasing government expenditure volatility. Whereas the fiscal reform plan looks promising, the absence of deficit and debt targets and the weak power of the Saudi Consultative Assembly in approving and overseeing the state budget raises doubts about the effectiveness of this plan in increasing government expenditure productivity and sustaining a reasonable level of non-oil budget deficit.

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APPENDIX
VARIABLES' DESCRIPTION, TREATMENT, AND DATA SOURCES

Variable	*Description and treatment*	*Data source*
Real Non-Oil Private GDP Per capita	Real annual government current expenditure (in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia
Real Government Consumption Expenditure	Real annual government current expenditure (in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia
Real Government Fixed Capital Formation Expenditure	Real government fixed capital expenditure in the non-oil sector in millions of constant Saudi riyals (using the consumer price index, (2010=100))	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia
Real Government Expenditure on Human Resources Development	Real government expenditure on education and training programs in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia

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Real Government Expenditure on Health and Social Development	Real government expenditure in the health care sector and on social development in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia
Real Government Expenditure on Defence and Security	Real government expenditure on external and internal defence and security in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia.
Real Government Expenditure on Economic Resources Development	Real government expenditure on economic cities and centers for natural resources conservation and renewable energy in millions of constant Saudi riyals (using the consumer price index, 2010=100)	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia
Openness of Trade	Ratio of exports plus imports to GDP	Saudi Arabian Monetary Agency and authors' calculations
Population	Million population	General Authority of Statistics, Kingdom of Saudi Arabia.
Real Private Fixed Capital Formation	Real private fixed capital expenditure in the non-oil sector (in millions of constant Saudi riyals using the consumer price index, (2010=100))	Saudi Arabian Monetary Agency Annual Reports; and General Authority of Statistics, Kingdom of Saudi Arabia.

ENDNOTES

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2. Saudi Arabian budgetary data and fiscal reports are collected from the following domestic and international sources: Saudi Arabia Ministry of Finance, Saudi Arabia Monetary Agency, Saudi. Arabia Ministry of Economy and planning, and the International Monetary Fund.

3. Saudi Arabian General Investment Authority (SAGIA).

4. The Saudi Arabia Central Department for Statistics and Information.

5. Current government expenditure consists of government consumption expenditure plus transfer payments, interest payments, and subsidies. Government consumption and fixed capital formation expenditure usually appear in the GDP calculation among other spending sectors.

6. The Saudi Ministry of Finance budgetary data shows that current government expenditure include spending on current expenses such as salaries, allowances, workers' wages, administrative and operational expenses, subsidies and transfers, and operation and maintenance expenses.

7. An example of discretionary fiscal decisions that are taken recently is that the 20 per cent state-employees wage cut in September 2016 (with a plan to reach 40 per cent wage cut by 2020) was reversed in April 2017 due to the relative stability and slight improvement in oil prices in the first half of 2017.

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