

## THE THEORY OF RICARDIAN EQUIVALENCE APPLIED TO OIL-ARAB EXPORTING ECONOMIES (2003-2012)

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**Abstract** - The validity of the Ricardian equivalence proposal remains controversial despite numerous empirical studies. This study used the DOLS approach to examine evidence from the Ricardian Equivalence Hypothesis in seven oil-rich Arab countries, namely Algeria, Bahrain, Oman, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates during the period 2003-2012. The results show that GDP per capita and government expenditure have a positive effect on private consumption, while government debt has a negative impact on private consumption. From the point of view of this study, the proposition of Ricardian equivalence, which affirms that private consumption remains unchanged, independently of government expenditures, does not apply to the countries in question. On the contrary, the Ricardian Equivalence Hypothesis was accepted since the government debt coefficient had negative and statistically significant impact on private consumption. therefore, the results revealed that individuals in these countries obtain Ricardian characteristics.

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**Keywords** - Panel-Cointegration, Ricardian Equivalence, Government Debt, Government Spending.

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### I. INTRODUCTION

One of the economic issues that arouses the curiosity of both academics and policy makers is the impact of government interventions on the economy. Issues such as the possibility that public policies affect the well-being of the population are often formulated. However, the answers found seem to have a wide range of variation, besides being sensitive to the hypotheses inherent to the formulation of the different models and the respective areas of public policies.

Fiscal policy affects aggregate demand, the distribution of wealth, and the economy's capacity to produce goods and services. In the short run, changes in spending or taxing can alter both the pattern and the magnitude of demand for goods and services. over time, this aggregate demand influences the allocation of resources and the productive capacity of an economy throughout its influence on the returns to factors of production, the allocation of capital spending, the development of human capital, and investment in technological innovations. Tax rates, through their effects on the net returns to labour, saving, and investment, also influence both the allocation and magnitude of productive capacity.

Macroeconomics has long presented two general views of the economy and the ability of fiscal policy to stabilize the economic activity. The equilibrium view sees the economy quickly returning to full capacity whenever disturbances displace it from full employment. Accordingly, changes in fiscal policy, or even in monetary policy have little potential to stabilize the economy. Instead, inevitable delays in recognizing economic turmoil, in exciting a fiscal response, and in the reaction of the economy to policy change may aggravate, rather than diminish business-cycle fluctuations. An alternative view

considers that the critical failures of the market cause the economy to adjust with greater difficulty to these disturbances. If, for example, consumers reduced their current spending to consume more in the future, producers, who would not know the consumers' future of consumer in the absence of appropriate futures markets for goods and services, would only see an indefinite fall in demand, and this could encourage them, in turn, to reduce their hiring and capital expenditure. In this world, changes in fiscal and monetary policy have greater potential to stabilize aggregate demand and economic activity

### II. OVERVIEW OF FISCAL PERFORMANCE IN SELECTED OIL-ARAB EXPORTING COUNTRIES

In the wake of rising oil prices since the beginning of this decade so far, macroeconomic policy problems in oil-exporting countries have attracted increasing attention. In particular, since oil revenues are large and, in most countries, accrue to governments, fiscal policy choices have a considerable impact on economic performance, for example with respect to economic growth, inflation and current account balances, and also influence advanced economies with respect to the recycling of oil revenues through the trade or the financial channel and in the context of global imbalances.

Fiscal policy in oil-exporting countries faces several specific challenges, which are mainly since oil revenues, which account for the bulk of government revenues in oil-focused economies, are exhausting, uncertain, volatile and large originated from external demand.

Governments faced a variety of pressures to boost spending, given the huge growth of revenues and

high capital surpluses, highlighting the short-term challenges. Governments have faced the option of saving unexpected revenues that result from high oil prices or increased spending, for example, in physical and social infrastructure (Sturm and Gonzalez, 2009).

In many oil-exporting countries, tax system is underdeveloped or do not exist until now. Therefore, automatic stabilizers do not currently play an important role these countries (Sturm et al, 2008).

The average gross public debt to GDP ratio of the main oil exporting countries reach approximately 80% in the late 2000s. This increase reflected, among other things, the difficulties in curbing relatively high spending when oil prices fell after an earlier boom in oil prices, particularly before financial crisis. However, since the beginning of this decade, public debt has collapsed as a result of the increase in oil prices. Oil exporters used extraordinary income to significantly and quickly reduce their public debt, and in some cases very high, and capital vulnerabilities have decreased (McKee, 2017).

Government spending as a percentage of GDP stood at 41 % of GDP in 2016. It was high in all Arab oil countries, especially in Kuwait, Libya and Oman (above 50 % of GDP). Government spending was also exceptionally high in per capita terms, and as a percentage of non-oil GDP, the proportion of spending relative to non-oil GDP averaged 58 % in 2016, varying from 37 % in the UAE to 94 % in Kuwait (IMF, 2017e).

If oil prices remained at relatively low levels compared to last years for a prolonged time, oil exporters would unavoidably have to adjust their fiscal policy or run the risk of accumulating a large public debt again. The adjustments may occur on the expense and the income side. On the expenditure side, current disbursements and expenditures on marginal investment projects could be reduced without hampering long-term growth prospects or diversification efforts. On the income side, introducing or expanding taxes could be considered to ensure fiscal sustainability.

The expansion of the income base through the development of an efficient tax system would be beneficial in the medium term, reducing the heavy reliance on oil revenues and increasing the authorities' control over public revenues. They are largely out of your control. The almost total absence of taxes is particularly surprising in Saudi Arabia, United Arab Emirates and Libya. Simultaneously, distortions and disincentives to work, save and invest must be minimized by introducing new taxes or increasing existing taxes, to prevent taxes from becoming an impediment to improve economic diversification (Sturm et al. 2009)

### III. RESEARCH PROBLEM

If the validity of the Ricardian Equivalency Theorem is verified, considering that public and private economic agents are rational, an expansionary fiscal policy would have no impact on the process of economic growth, so government spending would be inefficient to achieve impacts on the economy. variables of consumption, demand, income and employment, through the influence on the added consumption.

Given the context of the previous analysis, we will now proceed to formulate the following questions:

- What are the main reasons for accepting or rejecting the validity of the
- Theorem of Ricardian Equivalence applied to the oil-Arab economies?
- Will it be possible for the Ricardian Equivalence Theorem to be incompatible with the Mixed Economy currently in force in the oil-Arab economies?

### IV. RICARDIAN EQUIVALENCY THEOREM

The Ricardian Equivalency Theorem postulates that budget deficits financed by issuing public debt do not affect aggregate demand or interest rates because this increase in debt is neutralized by increasing private savings. Ricardian Equivalence occurs because the updated value of these future savings compensates exactly the created deficit, in such a way that the substitution of debt for taxes does not affect the wealth of the private sector (Hayo and Neumeier, 2017).

Under this perspective, fiscal policy would have no impact on consumption and aggregate demand, so that the fiscal deficit would not affect the real variables of the economy. Likewise, the above theorem assumes that economic agents make their decisions in an intertemporal perspective or overlapping generations, where the utility function is a function of the maximization of one's well-being and in the transfer of resources to his descendants, which will be destined to finance tax increases in the future (Carton et al, 2017).

According to Quintana, the problem dealt with by the Ricardian Equivalence Theorem is not the economic effects of government spending or taxes, but the comparison of the macroeconomic effects of two spending financing options: taxes or debt.

Whatever the financing mechanism of the budget deficit (taxes or internal debt), according to the Ricardian Equivalency Theorem, both sources assume the existence of a future tax, in this understanding, the aforementioned forms of financing are equivalent (Ricciuti, 2003).

## V. LITERATURE REVIEW

After the initial announcement of the Ricardian Equivalence proposal by David Ricardo in 1920 and the fundamental document of Barro in 1974, several studies were carried out to prove the validity of the Ricardian equivalence theorem by applying several estimation methods and using different groups of countries. Due to this heterogeneity of the estimation approaches, these surveys gave different and, in many cases, contradictory results.

Bhattacharya (1999) found that, for countries with high levels of debt, there is a negative relationship between public debt and private consumption, a trend consistent with Ricardian equivalence. In line with that, Issler and Lima (2000) tested the validity of Ricardian equivalence when evaluating the impacts of public debt on consumption in Brazil. The study found that the Ricardian equivalence hypothesis in the rational consumers in Brazil is consistent with Ricardian equivalence.

Alfonso (2001) investigated the Ricardian Equivalence Proposal for European economies. Specifically, Alfonso estimated the Euler equations of private consumption that were derived from the intertemporal consumer maximization problem first introduced by Hall (1978), using a panel data approach for the period 1970-2000. Applied the specification of fixed effects due to the common characteristics of the countries in the sample. According to its main conclusions, the proposal of Ricardian equivalence was rejected, since it revealed a positive relationship between private consumption and public debt. In contrast, (Vamvoukas (2001) examined the Ricardian equivalence and the Keynesian proposal for Greece and rejected the Ricardian equivalence hypothesis in favour of the Keynesian hypothesis.

Reitschuler and Lent (2004), tested the Ricardian equivalence hypothesis for 26 OECD countries for the period 1960-2002. His estimation approach was based on the theoretical model of dynamic optimization agents. This specific model allowed the existence of two types of consumers based on their access to credit. The empirical analysis that followed Reitschuler and Cuaresma (2004) allowed them to directly prove the validity of the main assumptions that imply the Ricardian equivalence proposition, which is if the economic agents have infinite planning horizons and the absence of liquidity restrictions. According to his estimates, the Ricardian equivalence hypothesis could not be rejected in 10 of the 26 OECD countries.

Reitschuler and Lent (2006) tested the Ricardian equivalence proposal for European countries for the period 1960-2002. According to its main results, the Ricardian equivalence hypothesis was accepted for eight of the 15 European countries.

Nickel & Vansteenkiste (2008), addressed the validity of the Ricardian equivalence issue by investigating the relationship between the current account and the fiscal balance for different levels of public debt by applying a dynamic panel model for 22 industrialized economies for the period 1981-2005. The model estimates showed that in countries with low debt, the relationship between the current account and the fiscal balance was positive, but less solid in countries with medium debt, while negative in countries with high debt. This negative relationship shows that in countries with high debt, consumers became Ricardians. This means that an increase in the fiscal deficit caused by an increase in government expenditure or a fall in taxes is not necessarily accompanied by an increase in the current deficit as consumers increase their savings and reduce their consumption.

Gogas et al. (2014) tested the Ricardian equivalence hypothesis by directly investigating the long-term relationship between public debt and private consumption, applying panel cointegration techniques for fifteen OECD countries during the period 1980-2010. According to the results of the panel cointegration test, the Ricardian Equivalence Hypothesis was rejected because no cointegration relationship was detected. According to the authors, the rejection of the Ricardian Equivalence Hypothesis was attributed to questions related to intertemporal linkage and myopic consumption behavior.

From the studies discussed above, it can be concluded initially that the results regarding the validity of the Ricardian equivalence proposition are subject to the estimation approaches, the group of countries and the periods of time used each time. Despite the differences in the results of these studies, there is a common point in most of them that implies that when government debt is at unsustainably high levels, consumers begin to behave in a Ricardian manner.

The Ricardian Equivalency Theorem was analyzed from different perspectives according to the main schools of economic thought. Below are the most important developments according to classical and neoclassical, Keynesian and the new classical macroeconomics.

The paper will test the Ricardian equivalence theorem for the oil-Arab economies by exploring the dynamic link between national government loans and private sector savings. In addition, an attempt will be made to quantify the long-term impact in the search to produce a complete characterization of the underlying mechanism. The research questions will be addressed in a dynamic context using panel data techniques.

Therefore, the article contributes to the existing empirical literature in the following ways. First, it offers a case study on the relevance of Ricardian equivalence for an oil-Arab economy. Secondly, by

using panel data techniques it considers the dynamic properties of the variables and explores the question in an intertemporal framework.

## VI. DEVELOPMENT OF THE THEOREM OF RICARDIAN EQUIVALENCE

Following Romer (2012), the budget constraint of the public sector must initially be defined, assuming that the present value of government spending over time must necessarily be less than or equal to the stock of initial debt (which is assumed to be negative), more the present value of income from taxes, discounted both variables at a real interest rate, the same that can experience changes over time. Therefore, the real interest rate at a given time will be given by:

$$R(t) = \int_{t=0}^{\infty} r(t) dt \quad (1)$$

In this way, the Budget Restriction of the Public Sector would be:

$$\int_{t=0}^{\infty} e^{R(t)} G_t dt \leq -D(0) + \int_{t=0}^{\infty} e^{R(t)} T_t dt \quad (2)$$

In other words, government spending on present values, taking an infinite time horizon, must be equal to or less than the stock of initial debt ( $-D(0)$ ) plus the present value of taxes that the government can get to collect in the same period. It should be noted that  $R_t$  represents the discount factor in each instant of time, both of public expenditure ( $G_t$ ) and of taxes ( $T_t$ ).

Using the intertemporal consumption model of Ramsey-Cass-Koopmans, whose development considers fixed quota taxes and assumes that the real interest rate faced by domestic economies and the public sector is the same, given the existence of competitive capital markets and free from uncertainty, Romer raises the following budget constraint for private consumption

$$\int_{t=0}^{\infty} e^{-R(t)} C_t dt \leq K(0) + D(0) + \int_{t=0}^{\infty} e^{-R(t)} W_t dt - \int_{t=0}^{\infty} e^{-R(t)} T_t dt \quad (3)$$

Where  $W_t$  is the labor income and  $K(0)$  is the initial wealth and the available labor income is defined by the difference between labor income and taxes. Note that it is assumed that the total debt contracted by the public sector is in the hands of the domestic economies, so it is part of the budget constraint of families. Assuming that in the long term, effectively the public expenditure must be equal to the stock of debt plus taxes and replacing this last variable in equation three, we obtain:

$$\int_{t=0}^{\infty} e^{-Rt} C_t dt \leq K(0) + \int_{t=0}^{\infty} e^{-Rt} W_t dt - \int_{t=0}^{\infty} e^{-Rt} G_t dt \quad (4)$$

As can be seen in equation (4), the private consumption of families is a function of the present

value of government spending, independently of the sources of financing of the same (debt or taxes). Similarly, taxes are not part of the budget constraint of domestic economies, an aspect that is also reflected in the characteristics of the utility function, which does not depend on the tax obligations of the public. In this way, we would have a utility function to maximize the following characteristics:

Given the consumption function according to equation (4), clearly this variable would not suffer any alteration due to changes in taxes or the level of public debt. In addition, government spending would be the only determinant of capital accumulation, with the understanding that investment is equal to the product less consumption and government spending. At this point of analysis, Romer argues that the only thing that affects the economy is the amount of government spending and not the way it has been financed.

$$\max U = \int_{t=0}^{\infty} u(C_t) e^{-\delta t} dt \quad (5)$$

If, for example, at a certain point in time,  $t_1$ , the government borrows from the public through the sale of bonds (in an amount equal to  $D$ ), these will be redeemed at  $t_2$ , by means of a tax equal to  $D$ .

Given this situation, families have an asset in the first place, whose present value is  $D$  (bonus value). However, if the government's future tax policy is considered, the family will have a liability, with a present value equal to  $D$ , therefore, the government's debt through a bond transfer does not imply net wealth for families and in consequence does not affect your consumption decisions.

According to the Ricardian Equivalency Theorem, households will keep the interest generated by the bond, in addition to its nominal value until they have to face higher taxes established by the public sector to comply with the obligations contracted before.

## VII. ECONOMETRIC METHODOLOGY

### 7.1 Specification of the model

The study was based on empirical studies such as Blinder and Deaton (1985) and Haug (1990), to test the validity of the Ricardian equivalence proposition. The study incorporated the private consumption ( $C$ ), Interest rate (INTR) and government debt (GOVDEBT), GDP per capita (GDPPR), government expenditure (GOVEX) and tax revenue (TAXR) in the empirical model. For this purpose, Equation (6) can be expressed as:

$$C_{i,t} = \alpha_i + \beta_1 GDPPR_{t,i} + \beta_2 INTR_{t,i} + \beta_3 GOVDEBT_{t,i} + \beta_4 TAXR_{t,i} + \beta_5 GOVEX_{t,i} + \epsilon_{t,i} \quad (6)$$

,  $i = 1, 2, \dots, N$ ,  $t = 1, 2, \dots, T$

Transforming the Equation (6) into natural log model, we get Equation (7), written as follows:

$$\begin{aligned} \ln c_{i,t} = & \alpha_i + \beta_1 \ln \text{GDPPR}_{t,i} + \beta_2 \ln \text{INTR}_{t,i} \\ & + \beta_3 \ln \text{GOVDEBT}_{t,i} + \beta_4 \ln \text{TAXR}_{t,i} \\ & + \beta_5 \ln \text{GOVEX}_{t,i} + \varepsilon_{t,i} \end{aligned}$$

$$, i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T \quad (7)$$

The Ricardian Equivalence Hypothesis postulate that, the consumption pattern of individuals is not affected by the government's choice to finance their expenses. This implies that the government debt has no impacts on private consumption ( $\beta_3=0$ ). In addition, government expenditures have a negative effect on private consumption, since they lead to higher taxes in the future ( $\beta_5 < 0$ ). Also, the the individuals will subtitle their current consumption with future consumption due to high interest rates, ( $\beta_2 < 0$ ) Therefore, the Ricardian equivalence hypothesis imposes that  $\beta_3 = 0$ , while  $\beta_5 < 0$  and  $\beta_2 < 0$ .

## 7.2 Data

Annual time series data is used in this study, for five Arab oil exporting countries, namely (Algeria, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates). All data cover the period 2003 – 2012. The data on private consumption, government spending, government debt, GDP per capita, real interest rates, and tax revenue were obtained from the World Bank's World Development Indicators database.

## 7.3 Analytical Techniques

### 7.3.1 Panel Unit Root Test

For the study of stationarity of the fiscal and real variables that involve the Ricardian Equivalence Theorem. the Im, Pesaran and Shin (IPS), Augmented Dickey-Fuller procedure were chosen to test for stationary.

Im, Pesaran and Shin (IPS) proposed a test of the presence of unit root in panels that combines information from the dimension of the time series with the dimension of the cross section, therefore less time is required for the test to have power. The test begins by specifying a separate ADF regression for each cross section:

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{i,t-j} + \varepsilon_{it}$$

where  $i = 1, \dots, N$  and  $t = 1, \dots, T$

The null hypothesis states that unit root is exist:

$$H_0: \rho_i = 0$$

The alternative hypothesis states that unit root is not exist:

$$H_1: \rho_i < 0$$

Where  $p_i$  is the order of the Augmented Dickey-Fuller regression, and  $\varepsilon_{it}$  indicated the errors which are independently distributed.

IPS presumes to have a balanced panel so the time, T presumes to fixed for all cross-sections to compute the individual test statistic.

The test is based on average individual unit root tests;

$$\bar{t} = \frac{1}{N} \sum_{j=1}^N t\rho_i$$

The standardized  $\bar{t}$  statistic converges to the standard normal distribution as  $N$  and  $T \rightarrow \infty$ .

IPS (2003) showed that  $\bar{t}$  test has better performance when T and N are small. They suggested a cross-sectionally demeaned version of both tests to be utilized in the case where the errors in different regressions include a common time-specific component.

The study used the Im-Pesaran-Shin and ADF-Fisher Chi-square tests to test the presence of a unit root. The results of the unit root tests are presented in the Table1 :

Variable	Level		Order of Integration
	Im Pesaran Shin	ADF – Fisher Chi-Square	
<i>Ln(private consumption)/ PRIV_CON</i>	1.12815	4.13096	I(0)
<i>Ln(GDP per capita)</i>	-3.3950	13.1214	I(0)
<i>Ln(government expenditure)/GOVEX</i>	5.53424	0.31881	I(0)
<i>Ln(government debt)</i>	-3.60236	10.1647	I(0)
<i>Ln(interest rate)/INTR</i>	0.32911	5.71926	I(0)
<i>Ln(inflation)</i>	1.74676	5.05608	I(0)
<i>Ln (Tax Revenue)/TAXREV</i>	-2.98345	10.7339	I(0)

Variable	First Difference		Order of Integration
	Im-Pesaran Shin	ADF – Fisher Chi-Square	
	$\Delta \text{Ln}(\text{private consumption})/\text{PRIV CON}$	-6.76728**	
$\Delta \text{Ln}(\text{GDP per capita})$	-6.0870 **	32.0182 **	I(1)
$\Delta \text{Ln}(\text{government debt})$	-4.54004 **	38.5699**	I(1)
$\Delta \text{Ln}(\text{government expenditure})/\text{GOVEX}$	-1.41534**	19.5496**	I(1)
$\Delta \text{Ln}(\text{interest rate})/\text{INTR}$	-6.30002 **	18.8026 **	I(1)
$\text{Ln}(\text{inflation})/\text{CPI}$	-3.99516**	19.08836**	I(1)
$\text{Ln}(\text{Tax Revenue})/\text{TAXREV}$	-4.98792**	24.7109**	I(1)

**Table 1. Results of panel unit root test**  
(Note) The sign \*\*, indicates 5 % significance

**7.3.2 Cointegration test**

Before estimating the long-term model, a cointegration relationship between the variables must be confirmed. We proceeded with Pedroni’s within-dimension and between-dimension ADF test statistics. The Pedroni test concludes that in samples with small time dimension, as our sample, has the best properties. The test estimation method is an extension of the Engle and Granger methodology,

where each cross section, the dependent variable is regressed in the explanatory variables,

$$y_{it} = \alpha_{it} + \gamma_{it} + \beta X_{it} + \varepsilon_{it}$$

The difference between the dimensions is that the between-dimension has a heterogeneous alternative hypothesis,  $\rho_i < 1$  whereas the within-dimension has a homogenous alternative,  $\rho_i = \rho < 1$  for all  $i$ . The results of the panel cointegration tests are given in Table 2.

Pedroni Panel Cointegration Tests				
Variables	Within- dimension		Between-dimension	
	ADF statistics	PP statistics	ADF statistics	PP statistics
Ln GOVEX	-2.872454**	-8.577**	-5.929852**	-19.20**
LnCPI				
LnGDPPR				
Ln GOVEDEBT				
LnINTR				
Ln EXDEBT				

**Table 2: Panel Cointegration Test**  
(\*\*) Indicates rejection of the null hypothesis at (5%).

The result of the Pedroni tests (ADF statistics and PP statistics) in table3 conclude that, there is a long run relationship among the logs of the variables.

**7.3.3 The Long run relationship**

A unit roots and cointegration (as pre-tests) suggest that the variables are non-stationary at level and cointegrated, we proceed to the estimation of the long-term relation using the dynamic ordinary least squares (DOLS) within-dimension (pooled) estimator suggested by Kao and Chiang (1999). This estimator

was chosen because it generates unbiased and asymptotically efficient estimates of the long-term relationship, even if there are endogenous regressors, which allows us to control the possible endogeneity of private consumption and other variables. In addition, it was recognized that in panel data samples with a small-time dimension, the DOLS estimator is performing better than other estimators, such as the fully modified non-parametric least squares estimator (FMOLS) (Pedroni, 2000).

Variables	Dependent Variable: $\Delta \text{Ln}(\text{private consumption})$	
	Coefficient	p-value
$\Delta \text{Ln}(\text{GDP per capita})$	0.130**	0.046
$\Delta \text{Ln}(\text{government debt})$	-0.244**	0.005
$\Delta \text{Ln}(\text{government expenditure})$	1.005**	0.001
$\Delta \text{Ln}(\text{interest rate})$	0.018	0.933
$\Delta \text{Ln}(\text{Tax rate})$	-0.092	0.600

**Table 3: DOLS estimation of the long run relationship**  
(Note) The sign \*\* indicates significance 5 % level.

The results of the long-term parameters indicate that the GDP per capita has a significantly positive effect on private consumption in countries in question which implies that an increase in the GDP per capita leads to an increase in the average level of private consumption.

Government debt has a negative and significant effect on private consumption. This implies that an increase in government debt decreases private consumption in oil-rich Arab countries. This result is opposed to the Ricardian Equivalence Hypothesis.

There is a positive relationship between government expenditure and private consumption in the long-run. With the coefficient of 1.05, private consumption will increase by 1.05 % as a result of a 1 % increase in government expenditure in Oil-rich Arab countries. Hence, fiscal policies that endorse excessive government spending may have positive effects on private consumption. The government's expenditure coefficients were positive and statistically significant in favour of the Keynesian proposition and contradicting to The Ricardian equivalence which implies that government spending negatively affects private consumption as it leads to higher future taxes. While the Keynesian view asserted that government debt induces wealth effects on private consumption and implies a positive relationship between government spending and private consumption.

The long-term results also indicated that the interest rate, although not statistically significant, has a positive effect on private consumption. Moreover, results depict that taxes, although not statistically significant, is negatively related with private consumption. This result is contradictory with the theory of Ricardian Equivalence.

From the analysis above regarding the long run effects of government debt on private consumption we can derive a very crucial conclusion. Specifically, findings the Ricardian Equivalence proposition was not rejected for all the countries in the sample as a negative relation between government debt and the private consumption was shown. The reason behind this fact is that in the long run individuals may face liquidity constraints. Thus, individuals are unable to smooth their consumption and base their consumption decisions on their availability, not on their permanent income, as the Ricardian Equivalence Hypothesis implies. The rationale behind this is that when government debt is at an unsustainable level, individuals increase their savings and therefore decrease consumption in anticipation of the next crisis. In this case, a reduction in the deficit that could change the expectations of individuals in relation to crisis prevention could be expansionary.

### VIII. CONCLUSIONS

The objective of this paper was to investigate the impact of government debt, GDP per capita,

government expenditure, interest rate and tax revenue on private consumption and therefore to test the validity of Ricardian Equivalence Hypothesis of public debt and other variables. To this end we performed a quantitative approach. We used panel cointegration by employing annual data for 7 rich-oil Arab countries over the period 2003-2012. The results showed that per capita GDP and government spending have significant positive impacts on private consumption, while government debt has negative impacts on private consumption. From the point of view of this study, the Ricardian Equivalence Hypothesis, which states that private consumption remains unchanged, despite government expenditure, does not apply to oil-rich Arab countries.

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