Natural Resources, Quality of Institutions and Public Spending: The Algerian Case

Rima Souidi
PhD Student ENSSEA
Permanent researcher
(CREAD) Algiers
souidirima@gmail.com

Djamila Kasmi Belkacem
Professor
ENSSEA Algiers
belkacem_djamila@yahoo.fr

Lylia SAMI
ESGCI et CREAD Algiers
Sami_lylia@yahoo.fr

Abstract

We attempt in this paper to estimate the impact of the endowment of natural resources, particularly oil rent, as well as the impact of the quality of institutions, on the level of public spending in Algeria. Our purpose is to test, by the application of an econometric estimation (OLS and 2SLS), the significance of the variable oil rent and the variables indicating the institutional quality of public expenditure management. Moreover, it was interesting to add the interaction term between rent and the variables indicating the quality of the institutions to see the indirect and common effect on the dependent variable.

The results of the estimation show that the impact of natural rent is greater than the impact of oil rent on both components of public spending: equipment expenses and operational expenses. Thus, we see that there is no proportional relationship between rent and public spending. In regards of the institutional quality, the results show that the budgetary procedures lack transparency with the presence of rent, because the benefits related to the exercise of power are more important, which encourage politicians to manipulate the composition of public expenditure to maximize their likelihood to make decisions. This result is argued by the positive relation between spending and respectively the level of financial risk, and the level of economic risk. Positive relationship between public spending and the measure of political risk shows that the current government increases spending to avoid conflicts and manifestations of the population. However, the interaction effect between rent and institutional quality measures on spending is negative, indicating that the presence of rent in less democrat countries like Algeria increases expenditure. This indicates that the positive public spending effects diminish as institutional quality improves.

Keywords: Natural Resources, Oil rent, Public spending, Institutional Quality.

JEL codes : C01, E02, H5

Introduction

Many countries are counted among the most endowed in terms of natural resources, oil and gas are the most significant examples. Nevertheless, it is necessary to insure a good management of this wealth so that the wealth constitutes a vector of growth and economic development.

Algeria is among the dependent countries in natural resources where the oil tax system occupies an important place in all government revenues. However, following the oil crisis of 1998, when the price of a barrel reached eighteen (18) dollars, the government made the decision in 2000 to establish a Revenue Regulation Fund (FRR) (Barka, 2009) in the form of an account of special affectation, with the aim to protect public spending from the negative effects of volatility and unpredictability in oil prices in international markets.

What is the impact of the endowment in natural resources and the quality of institutions on the management of the public spending in Algeria?

To answer this question, we use an econometric study inspired by the works of Rabah Arezki and Thorvaldur Gylfason (2011), and Louis-Marie Philippot (2008). We show the degree of significance of the relationship between total rent, oil rent, quality of institutions, and the components of public spending. We start with a brief review of the literature on a subject of the study. Then we present an empirical analysis which includes a description of the variables used and the econometric model. After, we present the results and our comments. Finally, we feature the conclusion and future prospects of the study.

1- Literature

There are numerous studies which have examined the relationship between resource rent, quality of institutions, growth and public spending**.** Starting with the literature on natural resources and its impact on the economic growth, we look to Frederik Van der Ploeg (2010) and his paper " Natural Resources: Curse or Blessing?" He identifies a variety of hypotheses and elements of proofs on the dependence of natural resources. At first, he presented the hypotheses supporting the appreciation of the real exchange rate according to important volumes of natural resources, deindustrialization, and bad growth perspectives. He considered that these effects are most recurrent in countries characterized by bad institutional quality, the absence of law, corruption, presidential democracies, and undeveloped financial systems.

On the other hand, the author exposed the assumptions assuming the presence of resources enhances "rent seeking" and is accompanied by bad quality of institutions, thus leading to corruption in non-democratic countries. Dutch disease and

deindustrialization are among the explanations (Corden & Neary, 1982; Corden, 1984) of the resource curse. In fact, wealth due to the export of natural resources leads to an appreciation of the real exchange rate, resulting in the contraction of the commercial sector (Neary & Corden, 1982; Corden, 1984). This illustrates, along with the Salter-Swan (1959-1960) model of two-sector economy, a resource windfall: abstracting from capital accumulation, international investment, and financial assets. Moreover, Salter-Swan developed for small economies a dependent or Scandinavian economic model, (Salter, 1959; Swan 1960; Aukrust 1960). The supply of non-tradable goods is positively related to the real exchange rate. Indeed, a real depreciation of the domestic currency stimulates an increased supply of tradable goods (via improved price competitiveness) to the detriment of the supply of non-tradable goods.

In addition, Van der Ploeg cited some empirical studies on the Dutch disease effects. The most important is the pioneering study by Sachs and Warner (1995), which explains the average real GDP growth per capita over the period 1970-1990 because of natural resources. This study shows that there is a significant negative effect of resource dependence (measured by the share of primary exports of GNP in 1970) on growth.

In another study about the relationship between natural resource rents, democracy and growth, Paul Callier and Anke Hoeffler (2007), started with a simple model of democratic politics in which they distinguish two dimensions of democracy: electoral competition and control. The authors used in the regression analysis eight sub-periods: 1970-1973, 1974-1977... 1998-2001. They successfully build a panel of 969 observations. The results show that in developing countries, the combination of rent and the low level of democracy have negatively affected growth.

The work of Rabah Arezki and Thorvaldur Gylfason (2011) examined the effect of the interaction between resource rents and democracy on corruption and internal conflict, presenting an empirical study with an econometric approach based on the dynamic panel data on a sample of 29 countries in sub-Saharan Africa over the period 1985-2007. The results suggest that good political institutions by limiting the power of executives diminished the negative effect of resource rents on corruption. On the other hand, the weakness of the political institutions increases the impact of resource rents on corruption. In parallel, the increase in resource rent leads to more (less) government spending in countries that are less (more) democratic. The term of interaction between resource rents and Polity2 (democracy) score on corruption is significant and quantitatively important. In general, the results show that the mechanisms by which the rent resources influence the corruption cannot be separated from political systems.

Concerning institutional quality, the economic historians such as North and Thomas (1973) provided the first accounts of their critical role. But what do we mean by institutions? According to Douglas North (1990), institutions are the game rules in a society or more formally, the humanly designed constraints that share human interaction. They structure incentives in human exchange, whether political, social or economic. However, legal institutions as a subset of the overall institutional

framework can be defined as the rules that govern trade relations between the different agents of society, businesses, households and government (Beck 2010).

Many economic studies in recent years suggest that institutions are necessary for economic development and growth. Indeed, in societies with institutions that are qualified bad in terms of management, politicians adopt unsustainable policies to satisfy different groups and stay in power (Acemoglu et al. 2002). Discovering later what are the measures of institutional quality, we distinguish the indicators of the governance of corruption, bureaucracy, rights and orders (Matthias Busse and Steffen Groning (2011). Other measures outlined in a study by Daniel Kaufman, Art and Pablo Kaay-Zoid Lobation 1999 are i.) the overall index of governance which is an average calculated based on six variables; namely 1) citizen participation and accountability - possibility for citizens to choose their leaders, to enjoy civil and political rights and to have an independent press; 2) political stability and absence of violence - the probability that a state will not be overthrown by unconstitutional or violent means; (3) effectiveness of public authorities - quality of public service delivery and competence and political independence of the public service; 4) regulatory burdens - relative lack of state regulation of product markets, the banking system and foreign trade; (5) rule of law - protection of persons and property against violence and theft, independence and efficiency of the judiciary and respect for contracts; 6) absence of corruption - no abuse of power for the benefit of private interests, (ii) property rights, and (iii) control of the executive power.

These measures themselves are not objective; they are subjective assessments and assessments of national experts or population assessments in surveys carried out by international organizations and non-governmental organizations.

Natural resources would prevent the development of "good" institutions conducive to economic development. If institutions are a factor of economic development, it is important to understand the determinants of institutional quality. A number of studies have been carried out (La Porta et al., 1998; Chong & Zonforlin, 2000; Islam & Montenegro, 2002; Rigobon & Rodrik, 2004; Siba, 2008) A number of important variables such as income, latitude, ethnic fragmentation, religious affiliation, openness, inequality, schooling or legal origin are mentioned. These variables are used later as instruments for the explanation of the institutions.

About the public spending and resource rents, Louis-Marie Philippot in 2008, examined in a working paper the relationship between natural rent and composition of public spending, by maintaining the arguments of the politico-budgetary cycle model Drazen and Eslava (2005a). He estimated a fixed effects model in order to explain the part of a category of expenditure in total public spending by number of variables, rent, and other control variables. The results show that the presence of rent is associated with an increase in current expenditures including subsidies. However, the existence of natural rent has no significant impact on the share of capital expenditure.

2- Rent, Institutional Quality and Public Spending in Algeria: An Empirical Analysis

2.1. Description of the Variables:

In this study the dependent variables are both components of public spending: equipment spending and operational expenses. The data relative to these two variables arise from bases compiled by the head office (executive management) of the Algerian Treasury (Ministry of Finance). We use logarithms to simplify the data.

Since the work of Sachs and Warner (1995), natural endowment is generally measured by primary exports in total exports or as a percentage of GDP. This indicator tends to measure the effect of concentration of exports, more than the effect of natural resources (Brunnschweiler, 2008). Here we use the measure of the natural wealth of a country, "the natural rent" compiled by the World Bank (World Development Indicators), as well as the measure of oil exports(OPEC Annual Statistical Bulletin 2016).

We therefore use three different measures between natural rent, oil rent and oil exports from World Development Indicators (WDI) 17 February, 2016 and OPEC Annual Statistical Bulletin 2016:

Table 1: Independent Variables; Measures of Rent

Variable	Definition	Data Source
Rent (% GDP)	Total Naturel Rent is the sum of oil rents, natural gas rents, coal rents, minerals rents and forest rents. Rents = natural resource price – extraction costs	World Development Indicators (WDI) 17 February, 2016
Oil rent (%GDP)	Oil rent	World Development Indicators (WDI) 17 February, 2016
Log oil_export	Oil exportation	OPEC Annual Statistical Bulletin 2016

Source: Developed by the authors

In addition, we use to measure institutional quality, three variables compiled by using data from the ICRG (International Country Risk Guide), which in total contains 22 variables in three set of categories: political, economic, and financial risk, starting in 1984. These data have been extensively used in the literature on the effects of institutions and, in particular they are the data underling the composite measure of « Institutional Quality » used in Mehlum et al 2006 and Boschini et al 2007. Moreover, the methodology of ICRG is regularly used by researchers of the IMF (International Monetary Fund).

We are essentially interested in the three measures: economic risk rating, financial risk rating that refers to the role of law and legal institutions (Beck,2010) and political

risk rating with respect to the rules and the level of democracy (Busse & Groning 2011) as well as Kaufman, et. al. (1999). These variables are presented with a score from 0 to 100.

The choice of these variables is argued by the compatibility of the data with the use of other variables in other case studies of Algeria. These three measures are presented as follows:

Table 2: Institutional Quality Measures

Variables	Definition	Data Source
E risk	All the risks of origins associated with the economic activity of companies. The risks can include external risks to a company such as the political risk, or risk of inflation, but also risks specific to the company such as operational risk.	ICRG (International Country Risk Guide)
F risk	The risk of losing money due to financial transactions (financial assets) or economic transactions with financial implications such as currency risk, interest rate risk, liquidity risk … etc.	ICRG (International Country Risk Guide)
P risk	Entails the risk of emergence of conflicts, terrorism, respect for the rule of law and regulatory and commercial environments.	ICRG (International Country Risk Guide)

Source: Developed by the authors.

In our econometric study, we introduced a control vector of variables X. These control variables are presented as follows:

Table 3: Control Variables

Variable	Definition	Data Source
TI (% GDP)	Expressed as a ratio of total investment in current local currency over GDP. Investment or gross capital formation is measured by the total value of gross fixed capital formation, and changes in inventories and acquisitions less disposals of valuables for a unit or sector. [SNA 1993]	FMI (World Economic Outlook Database, 2016)
GNS (%GDP)	Expressed as a ratio of gross national savings in current local currency and GDP in current local currency. Gross national saving is gross disposable income less final consumption expenditure after taking account an adjustment for pension funds [SNA 1993]. For many countries, the estimates of national saving are built up from national accounts data on gross domestic investment and from balances of payments-based data on net foreign investment.	FMI (World Economic Outlook Database, 2016)
Import Bs et S (% of GDP)	The volume of imports of goods and services to GDP.	World Development Indicators (WDI, 2016)

Source: Developed by the authors.

Table 4: Descriptive Statistics

	Mean	**Median**	**Maximum**	**Minimum**	**Std. Dev.**	**Obs**
LDE	5.761409	5.774334	7.821619	3.644666	1.500577	31
LDF	6.506523	6.752492	8.472747	3.957188	1.412602	31
OIL_EXPO	8.251196	8.226088	8.660415	7.942504	0.212133	31
OIL_RENT	18.19504	16.93440	31.90631	6.740223	6.961649	31
PRISK	54.20696	56.08333	64.25000	41.42000	7.404375	31
PRIX_BARIL	53.55930	38.46318	117.2294	18.48974	30.65020	31
RESERVE	10.03402	10.05362	10.08884	9.932677	0.055861	31
GNS	36.85158	34.53300	57.49400	20.16800	11.47309	31
IMP_BS_ET_S	25.69919	24.90000	36.00000	18.40000	3.831824	31
E_RISK	34.76667	35.25000	45.08000	25.75000	6.819384	31
F_RISK	38.13723	36.67000	49.00000	23.58000	9.011400	31
TI	32.03684	29.83700	49.05100	22.44000	7.624670	31
TEMP	23.84845	24.15000	25.00104	21.75417	0.920435	31

Source: Elaborated by the authors.

2.2. Econometric Model and Methodology

The study focuses on the case of Algeria which is among the most endowed countries with natural resources, and is where oil taxation has an important place in all government revenues. With regard to the period of analysis we are constrained by the availability of data on institutional quality, so we work over the period 1985-2015.

We proceed to econometric estimation to test the significance of the variables used. The model takes the following forms:

$$dp_t = \propto + \beta_1\ rent_t + \beta_2\ QI_t + \beta_3\ X_t + \varepsilon_t \ ....\ (1)$$

$$dp_t = \alpha_0 + \beta_1\ rent_t + \beta_2 QI_t + \beta_3 X_t + \beta_4\ (rent * QI_t) + \varepsilon_t ...\ (2)$$

The variable dp_t is the share of the various components of public spending. Our variable of interest is the total natural rent, the oil rent and the oil export. QI_t is the quality of institutions measured by three variables: economic risk, financial risk and political risk. X is the vector of control variables, and (rent*QI) is the term of interaction.

2.3. OLS Results:

For each category of expenditure, we estimate three models by integrating in turn the different variables of interest: rent measures and institutional quality (see the tables of results).

Table 5: Equipment Spending, Institutional Quality and Rent

Variables	Model (1)	Model (2)	Model (3)	Variables	Model (1)	Model (2)	Model (3)
rente	0.04 (0.02)*	0.004 (0.015)	0.05 (0.02)*	Oil rent	0.067 (0.03)	-0.01 (0.02)	0.03 (0.04)
E risk	0.04 (0.021)*			E risk	0.06 (0.02)*		
F risk		0.13 (0.019)*		F risk		0.13 (0.017)*	
P risk			-0.018 (0.01)	P risk			-0.02 (0.01)*
TI	0.13 (0.021)*	0.05 (0.018)*	0.11 (0.02)*	TI	0.10 (0.02)*	0.05 (0.01)*	0.09 (0.027)*
GNS	0.004 (0.022)	0.001 (0.014)	0.02 (0.023)	GNS	-0.0003 (0.02)	0.010 (0.013)	0.06 (0.023)*
Impor Bs et S	-0.05 (0.02)	-0.043 (0.016)*	0.016 (0.037)	Impor Bs et S	-0.04 (0.02)	-0.04 (0.01)*	0.039 (0.04)
R² Ajusted	**0.90**	**0.95**	**0.89**	R² Ajusted	**0.90**	**0.95**	**0.87**

With (*) to indicate the significance of variables at the 5% level. In parentheses, we give the standard deviations. ***Source: Developed by the authors.***

Table 6: Operational Expenditure, Institutional Quality, and Rent

Variables	Model (1)	Model (2)	Model (3)	Variables	Model (1)	Model (2)	Model (3)
Rent	0.06 (0.05)	-0.06 (0.03)	0.09 (0.035)*	Oil rent	0.048 (0.03)	-0.0008 (0.02)	0.07 (0.03)*
E risk	0.11 (0.02)*			E risk	0.08 (0.02)*		
F risk		0.20 (0.02)*		F risk		0.19 (0.029)*	
P risk			-0.08 (0.01)*	P risk			-0.02 (0.016)
TI	0.08 (0.03)*	-0.005 (0.024)	0.13 (0.024)*	TI	0.10 (0.03)*	-0.012 (0.02)	0.08 (0.03)*
GNS	-0.03 (0.035)	-0.008 (0.02)	0.014 (0.02)	GNS	-0.03 (0.031)	-0.03 (0.021)	0.003 (0.03)
Impor Bs et S	0.001 (0.04)	0.007 (0.026)	-0.07 (0.04)	Impor Bs et S	-0.004 (0.039)	0.02 (0.025)	0.10 (0.05)*
R² Ajusted	**0.77**	**0.90**	**0.90**	R² Ajusted	**0.78**	**0.88**	**0.72**

With (*) to indicate the significance of variables at the 5% level. In parentheses we give the standard deviations. ***Source: Developed by the authors.***

The results in Tables 5 and 6 show that the effect of total rent on the equipment spending is significant in two models, while the impact of the oil rent is significant in a single model. On the other hand, the impact of total rent on operating expenses is significant in a single model while the impact of oil rent is not significant.

For the measurement of economic risk and financial risk, their effect is positive on spending; however, political risk seems to have a positive effect on spending in a single model.

The effect of investment on equipment spending is positive, gross national saving (GNS) is negatively correlated with equipment spending as well as operating expenses in most models, and Import of goods and services seems to have a significant but negative effect on equipment spending.

Comments of the Results:

The impact of the natural rent is more important than the impact of the oil rent on the two components of public spending: equipment spending and operational expenses. Countries rich in natural resources, such as Algeria, are characterized by a weak rule of law, by a low quality of the legal institutions by a lower participation of citizens in public decision-making, by political instability, by a high level of corruption and absence of transparency. Find similar results in the work of Acemoglu et al. 2003; Mehlum et al. 2006; Isham et al. 2003; Sachs and Warner 1995; Golden and Neary 1982; Collier and Hoeffler 2007; Arezki and Gylfason 2011; and Beck 2010.

But in the case of Algeria, we find that there is no proportional relationship between rent and expenditure. This may be due to the part of the oil revenues allocated to the oil stabilization fund (FRR) supplied by the difference between the tax price and the price of oil on the world market. This fund was established in 2000 and is intended to be used to control the budget deficit and smoothing the benefits of long-term expenses.

For variables indicating the institutional quality, the measure of the economic and financial risk exercises a positive effect on spending (expenses). It means that equipment spending and/or operational expenses increase when the economic and financial risk increases--in particular, the risk of liquidity, the foreign exchange risk, the operational risk of companies. This effect is low (weak) and could be explained by the weakness of the economic role of companies in the global economy of the country, and the almost non-existence of the financial market in Algeria. But, we can add the effect of the important volatility of the exchange rate dollar/euro, because the Algerian State denominates (draws up) its imports essentially in euro, which has a negative impact on public spending (expenses). On the other hand, political risk seems to have a positive effect on expenditures in a single model. So government expenditure increases when the risk of conflict, violence and terrorist activity is high (corruption and lower levels of democracy) (Rabah Arezki et Gylfason, 2011).

Regarding the control variables, the effect of the investment is positive, which implies that the increase in equipment spending is associated with an increase in

investments, while the effect of the investment on operational expenses is not significant. Gross national savings (GNS) is negatively correlated with equipment spending and with the operational expenses in most models. The model (3) shows a negative but small significance of the effect of gross national saving (GNS) on equipment spending.

Finally, and surprisingly, the importation of goods and services seems to have a significant but negative effect on equipment spending, unlike the effect on operational expenses which is positive in the mode l(3), for a non-productive country, which needs to import to satisfy domestic demand for goods and services.

2.4.   2SLS Results and Introduction of the Interaction Term:

In this step, we use the double least square to correct the problem of endogeneity that can occur in the model.

One possible way of finding the causal effect from institutions on public spending may in this case be the use of instrumental variable technics. This possibility depends crucially on the validity of the instruments(s), there are a number of well-known studies, (such as La Porta et al. (1997), Hall and Jone s(1999) and Acemoglu, Johnson, Robinson (2001), Siba (2008), Alonso et Garcimartin (2009) , Anne Boschini, Jan Petterson, Jesper Roine, 2012)   that have good instruments for institutions and successfully used them.

These instruments are clearly obvious candidates in our setting but, we cannot assume that they will work equally well. Having tried multiple available instruments, we in the end use **air temperature** as proxy for **the latitude** (The absolute distance from the equator), as do La Porta et. al. (1998), Brunnschweiler (2008), and Siba (2008). According to Hall and Jones (1999), latitude does not have a direct effect on economic performance, all the impact transits through an effect on institutional quality.

The latitude captured the difficulties encountered by the countries close to the equator, notably because of climatic and health conditions in economic development but also in the construction of good institutions (Landes, 1998). We also used the lagged variable of economic risk "e_risk (-1)" and of political risk "p_risk (-1)". As for the oil rent, we used the instrument price of barrel, also the instrument reserves for the export of oil.

Moreover, it was interesting to add the interaction term between rent and quality of the institutions to see the indirect and common effect on the dependent variable. The interaction effect is regularly used in studies such as; Necklace and Hoeffler, 2007; Arezki and Gylfason, 2011, Christa N. Brunnschweiler, 2007, Anne Boschini, Jan Petterson, Jesper Roine, 2013, Acemoglu, et al. (2014) and others.

The results are presented:

Table 7: Instrumenting for Institutions and Natural Rents; Equipment Expenditure

Variables	Model 1	Model 2	Model 3	Model 4
Oil_rent	0.27 (0.0005)*	1.08 (0.0052)*		
Oil_export			1.92 (0.0015)*	1.54 (0.01)*
E_risk	0.17 (0.000)*		2.63 (0.05)*	
F_risk				0.204 (0.01)*
P_risk		0.23 (0.02)*		
Oil_rent*e_risk	**-0.005 (0.0078)***			
Oil_rent*f_risk				
Oil_rent*p_risk		**-0.01 (0.007)***		
Oil_export*e_risk			**-0.33 (0.03)***	
Oil_export*f_risk				**-0.24 (0.01)***
TI	0.08 (0.0002)*		0.067 (0.0043)*	0.07 (0.0017)*
GNS	-0.003 (0.853)	-0.02 (0.51)	0.01 (0.77)	
Imp Bs et S	-0.014 (0.7103)	0.09 (0.0033)*	-0.04 (0.32)	-0.04 (0.17)
C	-3.94 (0.000)*	-13.90 (0.01)*	-15.04 (0.0007)*	-9.28 (0.01)*
Instruments		Prix_barill, temp	Oil reserve, e_risk(-1)	Oil reserve, temp
R²	82%	62%	91%	93%

With (*) to indicate the significance of variables at the 5% level. In parentheses we give the probabilities.

Source: Developed by the authors.

Table 8: Instrumenting for Institutions and Natural Rents; Operating Expenditures

Variables	Model 1	Model 2
Oil_rent	0.76 (0.0087)*	
Oil_export		0.65 (0.0042)*
E_risk	0.30 (0.0024)*	
F_risk		
P_risk		-0.05 (0.016)*
*Oil_rent*e_risk*	**-0.01 (0.0074)***	
*Oil_rent*f_risk*		
*Oil_rent*p_risk*		
*Oil_export*e_risk*		
*Oil_export*f_risk*		
TI	0.033 (0.28)	0.06 (0.09)**
GNS	-0.041 (0.23)	-0.030 (0.35)
Imp Bs et S	-0.11 (0.24)	0.003 (0.95)
C	-5.93 (0.04)*	-4.53 (0.010)*
instruments	Prix-barill, temp	Oil reserve, p_risk(-1)
R²	81%	84%

With (*) to indicate the significance of variables at the 5% level. In parentheses, we give the probabilities.
Source: Developed by the authors.

Interpretation of Results:

The results in Tables 7 and 8 show that the effect of oil rent (or oil export) on equipment spending or operational expenses is positively significant at 1%. This means that the response of public expenditure to changes in the rent follows a pro-cyclical dynamic in the case of Algeria, which is not recommended for oil exporting countries because of the effect of resources to the development of the productive economy (counterpart), known as the resource curse, find similar results in the work of Rabah Arezki and Gylfason (2011). Whereas, when revenues are higher than

expected, the rest goes towards savings rather than spending. While, when revenues are lower than expected, the government can draw on its financial assets.

Indeed, the pressure of the various social categories for rent sharing (Gylfason (2001), Iimi (2007), Deacon and Rode (2012) and the considerable propensity of the state to invest in capital during favorable economic times explains the exceptional level of public expenditure in Algeria. The same political distortions that are the source of the large volume of public spending also explain the state's current "preference for spending". This preference for immediate spending at its postponement prints the fiscal policy a procyclical dynamics (Bouklia-Hassan, 2014).

In addition to being highly volatile and procyclical, the fiscal policy response to shocks in oil revenues is asymmetrical. Indeed, current public expenditure is probably more elastic to the increase in hydrocarbon revenues than to its decrease due to the irreversibility, to a certain extent, of the increase in current expenditure. In contrast, equipment spending often finances projects that are likely unproductive "military designated by the term (white elephants)" or have effects that extend over the medium to long term and can be deferred (McMahon 1997).

Regarding the variables (Institutional Quality), equipment spending (or operational expenses) increase following an increase in economic risk and financial risk, indicates a decrease in compliance with the law, and in the role of legal institutions in general. This result shows that the government favors non-productive projects or projects with low yields (infrastructure, subsidies, wages, etc.), to conceal the errors committed by the authorities with the reason to avoid the conflicts and discontent of the population. On the other hand, political risk (preventing corruption) has a positive effect on equipment spending.

However, the interaction effect between rent and institutional quality measures is negative, indicating that the presence of rent in less democratic countries, like Algeria, increases expenditures (spending). This indicates that the positive public spending effects diminish as institutional quality improves. So resource rents lead to more (less) government spending in less (more) democratic countries (Rabah Arezki and Gylfason, 2011).

Regarding the control variables, the total investment has a positive impact on equipment spending, while the latter has no effect on operational expenses. Imports of goods and services have a positive effect in one model indicating that compared to non-oil exports, Algeria still is in the excess situation of imports, to satisfy the needs of the population.

We conclude that the effect of rent and the quality of institutions on operational expenses is more important than the effect on equipment spending. In a country that favors inappropriate current and non-productive expenditures, needs to instead invest to improve the health, education of the population and support productive projects that stimulate growth.

3- Conclusion and Extensions

In this study, we try to identify the impact of the natural rent as well as the impact of institutional quality on the composition of public spending and thus select which of the two components, operational expenses or equipment spending react better. For countries rich in oil, gas or minerals, the formulation of fiscal policy can be a delicate exercise.

We found that the response of public expenditure to changes in the rent follows a pro-cyclical dynamic in the case of Algeria. Regarding the measure of institutional quality, we have chosen the most compatible measures with the other variables in the case of Algeria. We can introduce other measures such as the index of corruption, the index of governance, quality of bureaucratic...etc but it is more interesting if we use an approach with panel data, grouping several countries. This will allow us to make a comparison in terms of public expenditure management.

Indeed, the bad institutional quality shows that the budget procedures lack transparency with the presence of rent, because the benefits related to the exercise of power are more important in prompting politicians to manipulate the composition of public expenditure to maximize their probability to make decisions.

This assumption is argued by the positive relationship between public spending and the level of financial risk on the one hand and the level of economic risk on the other. This leaves us to ponder that spending affects the country's financial situation especially when these expenditures fueling infrastructure or projects with extremely low rates of return, referred under the term a "white elephant" (McMahon 1997). On the other side, the positive relationship between public spending and the extent of political risk shows that the current government increases expenditure to avoid conflicts and dissatisfaction of the population.

To conclude, budget transparency and good governance based on solid fiscal institutions should be a priority for developing countries rich in natural resources. Therefore, the increase in public expenditure requires first determining the destination and the distribution of investment.

To obtain more reliable results, we are going to proceed to do a study with panel data concerning countries with a stabilization or investment fund based on hydrocarbon. We try to show the behavior of each country towards the national savings and the management of the public spending.

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