

Impact of the subsidy (endowment) in natural resources and quality of institutions on the public spending: case of Algeria

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Abstract

We tried in this work to estimate the impact of the subsidy in natural resources, particularly the oil rent, as well as the impact of the quality of institutions on the level of the components of the public spending in Algeria. Our purpose is to test, by the application of an econometric estimation, the significance of the variable oil rent and the significance of the variables indicating the institutional quality on the public expenditure management. The results show that the impact of the natural rent is greater than the impact of the oil rent on both components of the public spending; equipment expenses and operational expenses. Thus we are seeing that there is no proportional relationship between rent and public spending. As regards the institutional quality, the results show that the budgetary procedures are lacking transparency with the presence of rent, because the benefits related to the exercise of power are more important which encourages politicians to manipulate the composition of public expenditure to maximize their likelihood of staying in power. This result is argued by the positive relation between the spending and respectively the level of financial risk and the level of economic risk. What lets meditate that the increase of the s expenses disadvantage the financial situation of the country especially when the performance on these expenses is extremely low. On the other hand, the positive relationship between public spending and the measure of political risk shows that the current government increases spending to corrupt people to avoid so, conflicts and manifestations

1. Introduction

Many countries are counted among the most endowed in terms of resource natural, the oil and the gas are the most significant examples in terms of strategic character. Nevertheless, it is necessary to insure a good management of this wealth so that they constitute 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 the all government revenue. However, and following the oil crisis of 1998, when the price of the barrel had reached eleven (11) dollar, the government made the decision, in 2000, to establish to establish a Revenue Regulation Fund (FRR) in the form of an account of special affectation, and with the aim to protect public spending of the negative effect of volatility and unpredictability in oil prices on international markets.

In this context, our question is:

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

To realize this study, we resorted to an econometric study inspired by the works of Rabah Arezki and Thorvaldur Gylfason; 2011, and Louis-Marie Philippon, on 2008. It to show the degree of significance of the relation between total rent, oil rent, quality of institutions and the components of the public spending. We start by a brief review of the literature on the subject of the study, then we present an empirical analysis which includes respectively; a description of

the used variables and the econometric model, after, we present the results and their comments and finally we feature the conclusion and extension of the study.

2. Literature

There are a significant number of empirical studies which examined the relation between the resource rent, quality of institutions, growth and public spending.

Starting with the literature on natural resources and its impact on the economic growth, also known under the name "the curse of the resources", Frederik Van der Ploeg, on 2010, in his paper "natural resources: curce or blessing?" Identifies a variety of hypotheses and elements of proofs on the question of the dependence in natural resources. At first, he presented the hypotheses supporting the appreciation of the real exchange rate according to important volumes of natural resources, the deindustrialization and the 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 "rent seeking" especially accompanied with bad quality of institutions, thus leading to corruption especially in non-democratic countries. as regards the Dutch disease and de-industrialization, wealth due to the export of natural resources leads to an appreciation of the real exchange rate resulting contraction of the commercial sector (and neary Corden, 1982; Corden, 1984). This is illustrating with the Salter-Swan (1959-1960) model of tow-sector economy with a resource windfall, abstracting from capital accumulation, international investment and financial assets. Moreover, in a dependent or Scandinavian economic model Salter-Swan which was developed for small economies (Salter, 1959, Swan 1960 Aukrust 1960), domestic production structure is to produce two types of goods: goods products inside and consume only inside (non-tradable goods) and goods produced and consumed inside and outside or products exposed to international competition. The supply of non-tradable is positively related to the real exchange rate. Indeed a real depreciation of the domestic currency stimulates increased supply of tradable goods (via improved price competitiveness) to the detriment of the supply of non-tradable.

In addition, the author cited some empirical studies on the effects Dutch disease. 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) by natural resources. This study shows that a significant negative effect of resource dependence (measured by the share of primary exports of GNP in 1970) on growth.

In another study, and about the relationship between natural resource rents, democracy and growth, Paul Callier and Anke Hoeffler; 2007, realized a study starting 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 for 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 N; 2011) examined the effect of the interaction between resource rents and democracy on corruption and internal conflict, presenting an empirical study by an econometric approach based on the dynamic panel data on a sample of 29 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 executive declined 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 less (more) democratic, following the significant effect of resource rents on government spending, and the term of interaction between resource rents and Polity2 score on corruption is significant and quantitatively important. Generally, the results show that the mechanisms by which the rent resources influence the corruption cannot be separated from political systems.

Concerning now, institutional quality, 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, are 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 (Thorston Beck; August 2010). Many economic studies in recent years suggest that institutions are necessary for economic development and growth. Indeed, in companies with institutions that are qualified bad in terms of management, politicians adopt unsustainable policies to satisfy different groups and stay in power (Daron Acemoglu, Simon Johnson, James Robinson and Yunyong Thaicharoen, 2002). Discovering later what are the measures of institutional quality, we distinguish the indicators of the governance (corruption, bureaucracy, rights and orders ...) Matthias Busse and Steffen Groning 2011, and other measures outlined in a study by Daniel Kaufman, Art and Pablo Kaay-Zoid Lobation 1999; (I) The overall index of governance which is an average calculated based on six variables, (ii) property right and (iii) control of the executive power.

About the public spending and resource rents, Louis-Marie Philippot in 2008, reviewed in a working paper, the relation between natural rent and composition of public spending, by maintaining the arguments of the politico-budgetary cycle model Drazen and Eslava (2005a). He estimates 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 expenditure including subsidies. However, the existence of natural rent has no significant impact on the share of capital expenditure.

3. Rent, Institutional Quality and Public Spending in Algeria: An empirical analysis

3. Description of variables:

In this study the dependent variables are both components of the 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 treasure (Ministry of Finance). We use the logarithm to simplify the data. To identify the impact of the natural resource rent and the institutional quality on the various compositions of the public spending, we introduce a measure of natural rent in percentage of the GDP (GROSS DOMESTIC PRODUCT), compiled by the World Bank (World Development Indicators).

Furthermore, for the case of Algeria, we used both measures of budgetary recipes; the oil tax system and the ordinary tax system. We also use the logarithm of the variable recipe. We thus use four (4) different measures between rent and budgetary recipe:

Variable	Definition	Data Source
Rent (% PIB)	Total naturel Rent	World Development Indicators (WDI) 17 February, 2016
Oil rent (% PIB)	Oil rent	World Development Indicators (WDI) 17 February, 2016
LFP	Logarithm of oil taxation	the general direction of the Algerian treasury (2015)
LRO	Logarithm of the ordinary taxation	the general direction of the Algerian treasury (2015)

Table 1: Independent variables; measures of income

In addition, we use for measuring institutional quality, three variables compiled by using data from the ICRG (International Country Risk Guide), containing various measures of quality of institutions such as the level of corruption ... etc. The methodology of ICRG is regularly used by researchers of the IMF (INTERNATIONAL MONETARY FUND). We are essentially interested in three measures; economic risk rating, financial risk rating and political risk rating, because these variables are compatible with the study of the case of Algeria.

These three measures are presented as follows:

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

Table 2: Institutional quality measures

In our econometric study, we introduced a control vector of variables X.

These control variables are presented as follows:

Variable	Definition	Data Source
TI (% PIB)	Expressed as a ratio of total investment in current local currency and GDP in current local currency. Investment or gross capital formation is measured by the total value of the 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, october 2015)
GNS (% PIB)	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 of 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 balance of payments-based data on net foreign investment.	FMI(world economic outlook database, october 2015)
Impor Bs et S (% of GDP)	The volume of imports of goods and services to GDP.	World Development Indicators (WDI), 17 February, 2016

Table 3: Control variables

3.2 Econometric Model and Methodology:

The study examines the case of Algeria, among the heavily endowed with natural resources where oil taxation has an important place in all government revenue. 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 conduct econometric estimation to test the significance of the variables used. The model takes the following form:

$$dp_t = \alpha + \beta_1 rent_t + \beta_2 QI_t + \beta_3 X_t + \varepsilon_t$$

The variable dp_t is the share of various components of public spending. Our variable of interest is the total natural rent, oil revenues; oil taxation and ordinary taxation. 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.

3.3 Results

For each category of expenditure, we estimate three models incorporate alternately the variables of interest, rent and institutional quality measures (see results table).

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)
R ² Ajusted	0.90	0.95	0.89	R ² Ajusted	0.90	0.95	0.87

With (*) to indicate the significance of variables at the 5% level Parentheses, we give the standard deviations.

Table 4: Equipment Spending, Institutional Quality and Rent

Variables	Model (1)	Model (2)	Model (3)	Variables	Model (1)	Model (2)	Model (3)
LFP	0.47 (0.07)*	0.25 (0.09)*	0.55 (0.08)*	LRO	0.86 (0.090)*	0.58 (0.12)*	0.75 (0.068)*
E risk	0.017 (0.015)			E risk	-0.016 (0.012)		
F risk		0.08 (0.023)*		F risk		0.04 (0.02)	
P risk			0.006 (0.008)*	P risk			-0.010 (0.004)*
TI	0.10 (0.015)*	0.067 (0.015)*	0.104 (0.015)*	TI	0.04 (0.014)*	0.04 (0.012)*	0.043 (0.012)*
GNS	0.02 (0.009)*	0.01 (0.009)	0.028 (0.010)*	GNS	0.03 (0.007)*	0.019 (0.008)*	0.03 (0.005)*
Impor Bs et S	-0.07 (0.01)*	-0.05 (0.015)*	-0.08 (0.030)*	Impor Bs et S	-0.05 (0.014)*	-0.05 (0.01)*	-0.03 (0.017)
R ² Ajusted	0.95	0.96	0.95	R ² Ajusted	0.97	0.97	0.97

With (*) to indicate the significance of variables at the 5% level. Parentheses, we give the standard deviations.

Table 5 : Equipment Expenditures, Institutional Quality and budget revenues

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)*
R ² Ajusted	0.77	0.90	0.90	R ² Ajusted	0.78	0.88	0.72

With (*) to indicate the significance of variables at the 5% level. Parentheses, we give the standard deviations.

Table 6: Operational expenditure, Institutional Quality and Rent

Variables	Model (1)	Model (2)	Model (3)	Variables	Model (1)	Model (2)	Model (3)
LFP	0.68 (0.091)*	0.78 (0.06)*	0.98 (0.05)*	LRO	1.32 (0.05)*	1.28 (0.08)*	1.23 (0.03)*
E risk	0.03 (0.012)*			E risk	-0.01 (0.007)		
F risk		0.05 (0.02)*		F risk		-0.002 (0.015)	
P risk			0.02 (0.006)*	P risk			-0.01 (0.002)*
TI	0.03 (0.015)*	0.06 (0.012)*	0.06 (0.01)*	TI	-0.03 (0.008)*	-0.02 (0.008)*	-0.02 (0.002)*
GNS	-0.015 (0.008)	-0.014 (0.007)	-0.017 (0.007)*	GNS	0.002 (0.004)	-0.001 (0.055)	0.03 (0.002)
Impor Bs et S	-0.012 (0.015)	-0.03 (0.015)*	-0.085 (0.02)*	Impor Bs et S	0.002 (0.008)	-0.002 (0.008)	0.026 (0.008)*
R ² Ajusted	0.96	0.96	0.97	R ² Ajusted	0.98	0.98	0.98

With (*) to indicate the significance of variables at the 5% level. Parentheses, we give the standard deviations.

Table 7: Operational expenditure, Institutional Quality and Budget Revenues

3.4 Comments of the Results

The influence of the natural rent is more marked than the influence of the oil rent on the two components of public spending: equipment spending and operational expenses. Countries rich in natural resources, exceptionally Algeria, are characterized by a weaker rule of law, by a low quality of the legal institutions "having for role the management of the business relation between individuals of society", by a less participation of citizens in public decision-making, by political instability, by a high level of corruption and absence of transparency. 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; Thoston Beck 2010.

But in the case of Algeria, we see 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 is intended to be used to control the budget deficit and smoothing the benefit of long-term expenses.

For variables indicating (appointing) the institutional quality, the measure of the economic and financial risk exercises a positive effect on the 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 on one side, almost non-existence of the financial market in Algeria on the other hand. 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 impacts negatively on the public spending (expenses). Secondly, 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 of the population).

Regarding the control variables, the combination between total investment and ordinary taxation (RO), makes the effect of the investment, negative, leaving to understand that the increase of the public spending is associated with lower investment especially productive. Gross national savings (GNS) is negatively correlated with expenditure of equipment and with the operational expenses in most models. This effect becomes positive in the presence of ordinary taxation in the explanation of the phenomenon. The model (3) shows a negative meaning but meager level of gross national savings (GNS) on the public 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 expenditures which is positive in the model(3) showing the increase in the operational expenditures following an increase in the level of importation of goods and services.

4. Conclusion and extension

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 expenditure reacted better.

Regarding the measure of institutional quality, we have chosen the most compatible measures studying on the case of Algeria. We can introduce other measures such as the index of corruption, the index of governance, quality of bureaucratic...etc but this is achieved by applying the approach of panel data, grouping several countries.

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 prompting politicians to manipulate the composition of public expenditure to maximize their probability to stay in power.

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 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). Secondly, the positive relationship between public spending and the extent of political risk shows that the current government increases expenditure for corrupting the people and avoids conflicts.

To obtain more reliable results (profits), we are going to proceed to a study by the approach of the panel data concerning countries persons with a stabilization or investment fund of stabilization or investment based on hydrocarbon. It to show the behavior of each country towards the national savings and the management of the public spending.

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