STABILIZATION FUND AND FISCAL POLICY : EVIDENCE FROM ALGERIA

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ABSTRACT

The aim of this paper is to examine if the presence of stabilization funds helps Algeria –as an oil rich economy- to stabilize their expenditures and address the pro-cyclical behaviour of fiscal policy, using Autoregressive Distributed Lag (ARDL) model for the period 1984-2016. Alike other oil countries, government spending in Algeria is considered to be strongly pro-cyclical .The results show that the establishment of stabilization fund in Algeria has not contributed to reduce the government spending pro-cyclicality. This is due to the absence of a rule that limits the withdrawals from the fund to finance budget deficit.

KEYWORDS

Stabilization Fund, pro-cyclicality, government expenditure, Institutional Quality, ARDL bounds test approach, Algeria.

JEL CLASSIFICATION: E62, Q35

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LES FONDS DE STABILISATION ET LA POLITIQUE BUDGETAIRE: CAS DE L'ALGERIE

RÉSUMÉ

L'objectif de cet article est d'examiner si la présence de fonds de stabilisation aide l'Algérie - en tant qu'économie riche en pétrole - à stabiliser ses dépenses et à reduire le comportement procyclique de la politique budgétaire. Un modèle autorégressif à retards échelonnés ARDL est utilisé durant la période 1984-2016.Les résultats montrent que la création d'un fond de stabilisation en Algérie n'a pas contribué à réduire la procyclicalité des dépenses publiques. Cela s'explique en partie par l'absence de règle limitant les retraits du fonds pour financer Le budget de l'État.

MOTS CLÉS :

Fonds de stabilization, procyclicalité, modèle ARDL, L'environnement institutionnel, Algerie.

JEL CLASSIFICATION : E62, Q35

صناديق ضبط الإيرادات و السياسة المالية: دراسة حالة الجزائر

ملخص

يهدف هذا المقال إلى معرفة ما إذا كان وجدود صندوق ضبط الإيرادات ساعد الجزائر –كبلد غني بالموارد – على تثبيت نفقاتها العامة و ساهم في الحد من مشكلة دورية السياسة المالية.و لمعالجة هذه الإشكالية سوف نستخدم نموذج الانحدار الذاتي للفجوات الزمنية الموزعة ARDL خلال الفترة من 1984 حتى 2016. بينت نتائج الدراسة التطبيقية أن سياسة الإنفاق العام في الجزائر تتميز بدورية شديد. كذلك تبين أن إنشاء صندوق لضبط الإيرادات لم يساهم في التقليل من دورية السياسة المالية في الجزائر، و لعل من بين أهم أسباب فشل هذا الصندوق في ضبط الإنفاق العام هو غياب قواعد واضحة تحد من المبالغ التي تسحب منه لتمويل الميزانية العامة.

كلمات مفتاحية:

صناديق ضبط الإيرادات، دورية السياسة المالية، البيئة المؤسسية، نموذج الانحدار الذاتي للفجوات الزمنية الموزعة، الجزائر.

تصنيف جال: E62, Q35

INTRODUCTION

Most recent studies have shown that developing countries with more natural resources tend to have lower rates of growth and underperforms economically and socially compared to poor resource countries. This puzzling phenomenon became known as the Natural Resource Curse or the paradox of abundance. One increasingly popular option for dealing with the resource curse is the natural resource funds or stabilization funds.

Since 2000, approximately 30 funds have been created. Many oil rich countries have established Natural Resource Funds , in which a portion of government revenues from oil and gas exportations is deposited,"usually known as Stabilization Funds", and to save part of the oil revenues for future generations ,"usually known as Savings Funds or future generations funds", or both (Davis et al., 2001) .

In general the primary objective of stabilization funds , especially in oil rich economies is to insulate the budget and the economy against resource prices volatility and governments' dependence on revenues from resources. Also, these funds can be used to stabilize capital inflows to avoid Dutch Disease, to protect resource revenues from corruption and mismanagement, and to save some revenues for future generations.

As in many rich resource countries, Algeria decided to set up a stabilization fund (Revenue Regulation Fund) to aid the sustainable management of its oil and gas revenues, stabilize government expenditures, and insulates its economy from the effects of oil prices volatility.

The oil stabilization fund of Algeria was established in 2000, based on a fiscal rule where oil revenue in excess of budgeted price is allocated into the fund. Since 2006, the rules governing the fund allowed for direct financing of the budget deficit by the fund's resources, when oil prices fall.

Over the last decade, over-spending by the government and highly pro-cyclical fiscal policy were the major challenges facing Algeria's oil fund main objective, which is smoothing and stabilizing public

expenditures. The objective of this paper is to investigate quantitatively and qualitatively whether the establishment of a stabilization fund has contributed in smoothing Algeria's government expenditures throughout the 15 years of RRF's existence. More specifically, this paper aims to answer the following question: does the presence of a stabilization fund (Revenue Regulation Fund) help Algeria's governments to stabilize their expenditures and address the pro-cyclical behaviour of government expenditures?

To our knowledge there is a clear gap in the research literature in regard to the role of the oil fund in stabilizing government expenditures in Algeria. This study is an attempt to fill the gap concerning this issue. This study is divided into five sections in addition to an introduction. Section two deals with the literature review on the effect of oil revenue funds on the stabilization of government expenditure. Section three presents some stylised facts about the performance of Algeria's stabilization funds (Revenue Regulation Fund) since 2000. Section four describes the empirical methodology. Section five presents the estimation results. Finally, Section six provides some concluding comments.

1- LITERATURE REVIEW

The existing literature on the effect of oil revenue funds on the stabilization of government expenditure is rather mixed. In a descriptive analysis of commodity-based stabilization and savings funds currently in place in Norway, Chile, Alaska, Venezuela, Kuwait, and Oman, Fasano (2000) finds that savings funds in countries like Kuwait, Norway, and the state of Alaska have contributed to enhance the effectiveness of fiscal policy by making government expenditures less driven by revenue volatility, whereas, in other countries (Venezuela and Oman) the experience with stabilization funds have been less successful . Nevertheless, the author report that the success of an oil revenue stabilization fund could be attributed as much as to fiscal discipline as to the funds management.

Davis et al. (2001) test the existence of oil revenue funds on the stabilization of government expenditure in a sample of 12 countries

producing non-renewable resources, including only five that had funds (Chile , Kuwait, Norway, Oman , Papua New Guinea , Algeria, Bahrain, Mexico, Saudi Arabia, UAE, UK, and Venezuela) . The main question they ask is whether such funds can smooth government expenditure, cutting the link between expenditure and oil (resource) revenues?

They find that in countries without stabilization funds resource export earnings are positively correlated with government expenditure. But also they find that in some countries, the existence of an oil fund does not affect this positive relation between spending and resource export receipts. Additionally , their evidence show that , in other countries with a fund government expenditure did not follow resource revenues , but they report that this was the case both before and after the establishment of the fund . Davis et al. (2001) concluded "*The creation of a fund did not have any impact on the relationship between oil and other natural resource export earnings and government expenditure*". These authors suggest that countries with more prudent expenditure policies tend to establish stabilization fund, rather than the establishment of fund stabilizing the government expenditure. In fact, the authors established that oil or resource funds in most cases have adverse impact on stabilizing budgetary expenditure and revenue.

Crain and Devlin (2003) examine the effect of natural resource funds on the volatility of government expenditures, for 71 countries for the period 1970-2000. Among their conclusions, they find that stabilization funds increase volatility of government expenditures particularly in oil exporting countries. However, the results also show that in countries like Norway and Chile the establishment of funds reduced the expenditure volatility.

Shabsigh and Ilahi (2007) test whether oil revenue funds help to reduce macroeconomic volatility. Using data over the period 1980-2003 from 15 oil exporting countries with and without funds, the authors find that oil funds are associated with reduced volatility of broad money and prices and lower inflation. Shabsigh and Ilahi (2007) conclude that oil revenue funds stabilize money and prices. They note that their results contradict the view that oil funds may simply be

"Veils", and that in and themselves, they do not affect economic performance.

Ossowski et al. (2008) examine the role of special fiscal institutions (Special Fiscal Institutions include fiscal rules and fiscal responsibility legislation, oil funds, and the use of budgetary oil prices) in fiscal management, using a panel data of 32 oil rich countries with and without stabilization fund in place (or SFI). The authors find that special fiscal institutions have no significant impact on expenditure growth or in reducing the correlation between expenditures and oil revenue. Additionally, the study finds that countries with broader governance institutions (e.g.,lower indices of corruption , higher governance effectiveness) have lower correlations between government expenditures and oil revenue .Ossowski et al. (2008) note that higher institutional quality (governance stability , democratic accountability , rule of law, and corruption) are crucial for improving public financial management , while, special fiscal institutions (including oil funds) are "second best " mechanism to protect oil resources and use them effectively . These authors conclude that successful special fiscal institutions require strong political and institutional framework.

Bagattini (2011) assesses the effectiveness of the stabilization and savings funds in 12 resource dependent countries over the period of 1992 – 2007, by creating an indicator of sustainable fiscal performance that measures the success of stabilization funds , and which is defined by its impact along three different dimensions : fiscal revenues , fiscal expenditures and savings. The study finds that the presence of stabilization funds have a positive impact on the reduction of public debt and on a reduction of government expenditures. The estimations results also show that the political variables (policy2, political stability, rule of law and civil liberties) are important for the success of stabilization funds.

Wagner and Elder (2005) conduct an empirical analysis studying the relationship between state expenditure volatility and the existence of stabilization funds for the United States of America over the period from 1969 to 1999. The authors find that the ability for natural resource funds to stabilize state expenditures depend essentially on

the structure of the deposit and withdrawal rules governing the fund. The results of the study show that states with rule-bound stabilization funds experience significantly less expenditures volatility from utilizing a budget stabilization fund.

In the most recent study of the issue, Sugawara (2014) explores whether the presence of stabilization funds created by government in resource rich countries are effective in reducing their expenditures volatility. Using a data of 68 countries over the period of 1988-2012, Sagawara (2014) finds that the existence of stabilization funds contribute to smoothing government expenditures. The results of the econometric analysis shows that volatility of government spending in countries with stabilization funds is 13 percent lower than in countries without such funds . However, the results also suggest that strong institutional framework and fiscal rules are important factors in reducing the volatility of government expenditure.

In fact, almost all these studies conducted on this matter, indicate that the effectiveness of natural resource funds in smoothing government expenditures, was only in countries with good governance institutions and sound public financial management.

2- OIL STABILIZATION FUND OF ALGERIA

To address the problems arising from the oil curse , such as the appreciation of national currencies (or the so-called Dutch Disease), the volatility of revenues , the pro-cyclicality of fiscal policy , corruption and misuse of newfound wealth , many oil exporting countries have set up oil stabilization funds over the past decade . Algeria is set to joint other oil rich countries such as Botswana, Chile and Norway in establishing these stabilization funds to help ensure proper management of oil revenues and stabilize government expenditure. This section presents the experiences of Algeria with stabilization funds.

2.1- Algeria's revenue regulation fund: an overview

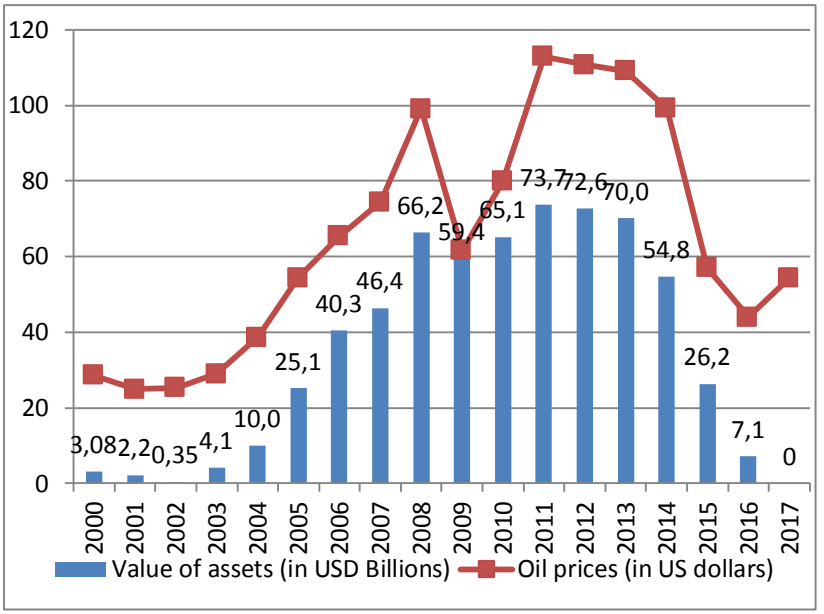
Algeria's Revenue Regulation fund: The revenue regulation fund (Fond de Régulation des Recettes) of Algeria was established in 2000, and administered by the finance ministry and the central bank .The fund accumulates part of the hydrocarbon revenue. The mission of the fund is to shield government expenditures from fluctuations in oil revenues, as well as to make advance payments on external debt principal. Henceforth, the oil fund of Algeria does not have intergenerational transfer purposes, it is stabilization rather than a saving fund. The rules of the fund provide that oil revenues above the budget benchmark oil price goes to the fund, while the fund's resources can be used to amortize debt and finance budget deficit when the price of oil drops below the reference value. Algeria's Revenue Regulation fund is a subaccount of the government at the Bank of Algeria (central bank). Consequently, it lacks governance arrangements and investment goals of sovereign wealth funds (IMF, 2009).

The revenue regulation fund first rules were passed on February 06, 2002. The stated objective of the fund was to reconstitute foreign exchange reserves depleted in 1998-99 during a period of low oil revenues .Although this goal has remained unchanged , the rules governing the fund have been changed twice , in 2004 , and again in November 2006. The 2004 budget law provides that the fund's resources are as follows: Oil revenue recorded in excess of budget law projections (which are based on prudent price per barrel forecasts) is allocated to the hydrocarbon stabilization fund. Also, according to the this budget law, the amounts accumulated in the fund can only be used to: i) Offset the shortfalls resulting from oil tax revenue below budget law projections; ii) Make advanced payments on external debt principal . In November 2006, the revenue regulation fund law was modified. As a result , the rules in which stabilization fund could only be used to repay public debt was amended by the budget complementary law of 2006 , which allowed for direct financing of the budget deficit by the fund's resources , unless the balance of the fund drops below 740 Billions of DA (10 USD billions).

2.1.1. Oil prices fluctuations and revenue regulation fund

Algeria's oil stabilization resources are highly correlated with world oil prices movements during the period from 2000 to 2015, as illustrated in Figure 1. As the rapid upsurge in oil prices during the period from 2000-2013, the revenue regulation fund accumulated more than 70 billion dollars by the end of 2013, equivalent to 31.6 percent of GDP. However, since the oil price fall has started in the first half of 2014, savings in the oil stabilization fund decreased slightly for the first time since the fund was created representing less than 21 percent of GDP in the end of 2015, and it is expected to decline to less than 15.2 percent of GDP in 2016 (IMF, 2014), reflecting the government's withdrawals to finance budget deficits.

Figure 1: **Algeria Revenue Regulation Fund (in USD billions)**

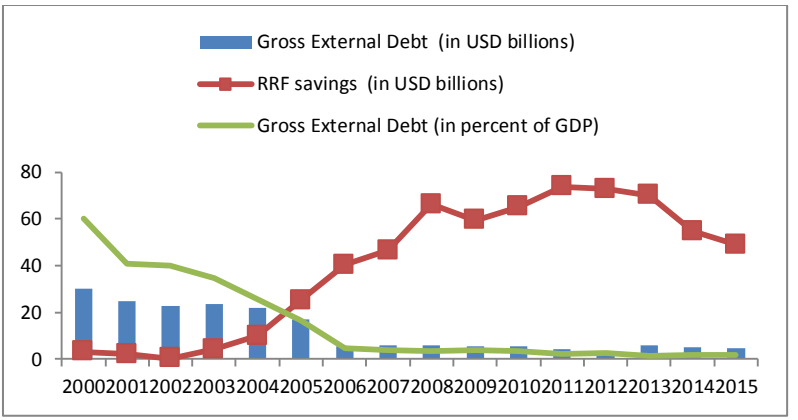


Source: *The data on Algeria Revenue Regulation Fund value Assets are available at Algeria's Ministry of Finance; Converted to USD, Own calculations. The data on oil price are available at US Energy Information Administration (EIA).*

2.1.2. The contribution of the fund in the repayment of the external debt

Since its creation in 2000, authorities have used part of the accumulated resources housed in the stabilization fund to make prepayments of the country's external debt .Thanks to high hydrocarbons export revenues, and the large savings accumulated in the oil stabilization fund, the Algerian authorities decided in 2004 to repay official external debt earlier than had been scheduled, and limit non-concessional borrowing. Between 2004 and the earlier of May 2006, Algeria refunded about $14 billion in external debt ahead of schedule. In 2005, Algeria repaid $3.3 billion to multilateral creditors, including the international monetary fund. In March 2005, Algeria obtained cancellation of $4.73 billion debt to Russia in exchange for Algeria agreeing to import an equivalent amount of Russian goods and services (IMF, 2008). By the end of **200**, Algeria prepaid a total of $8.5 billion in total debt to the Paris and London club, and $2 billion to multilateral creditors. As a result, Algeria external debt stock declined from $23.4 billion at the end of 2003 (about 34 percent of GDP) to less than $5,6 billion at the end of 2006 , or 4.8 percent of GDP (Figure 2) .

Figure 2: **External Debt, 2000-15**

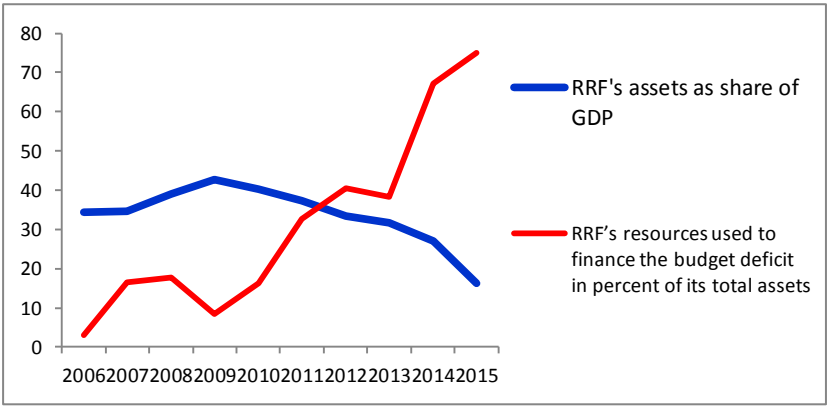


Source: The data on Algeria Revenue Regulation Fund savings are available at Algeria's Ministry of Finance; Converted to USD, Own calculations. The data on Gross external debt and GDP are available at World Bank, World Development Indicators (WDI).

2.1.3. The role of the RRF in financing the budget deficit

The budget complementary law of 2006 allowed the use of fiscal savings accumulated in the oil fund for financing needs created by fiscal deficits. Since that withdrawals from the stabilization fund to finance budget deficits have continued their upward movement, particularly during the last five years, as illustrated in Figure 3.

Figure 3: **RRF's resources used to finance the budget deficit**



Source: Algeria's Ministry of Finance.

As a result of higher spending and the sharp decline in oil prices particularly over the last two years, Algeria's fiscal deficit has grown significantly. From 1.2 percent of GDP in 2011 to 4.0 percent in 2012, and to 16 percent of GDP in 2015. Consequently, the withdrawals from the Revenue Regulation Fund (RRF) to finance the budget deficit have become more important, and started getting more and more frequent. With a tendency of higher public spending and lower fiscal revenue , the RRF balance will continue to decline in absolute terms and as a share of GDP (from 36.6 percent to 16.2 percent of GDP between 2012 and 2015). Taking these two trends together, the balance of the fund could be reduced to zero by the end of 2016.

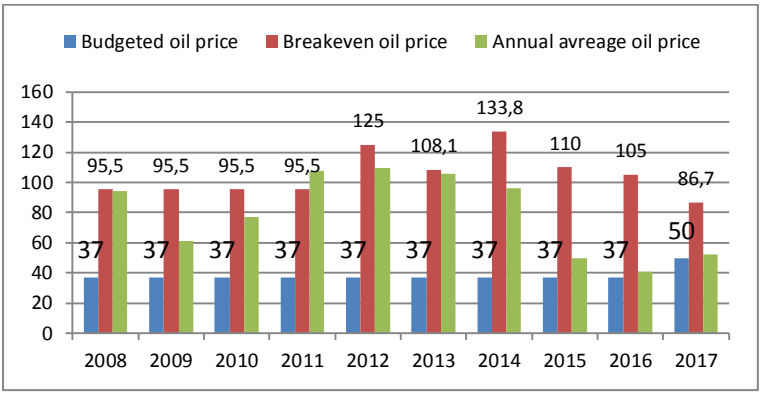
2.2- Limits of Algeria's revenue regulation fund

2.2.1. Shortcomings of the fund's resources

The future of Algeria's RRF depends essentially on the future evolution of its expenditures and resources, given uncertainties regarding Algeria's resources horizon and future oil prices. The uncertainty about the future path of oil prices: Since 2008, Algeria's budget laws have been based on an budgeted oil price of $37 per barrel .However , the fiscal breakeven oil price (the fiscal breakeven oil price is the minimum price per barrel that the country needs in order to balance its budget) has increased from $95.5 per barrel in 2008 to $125 per barrel in 2012 , to as higher as $130 per barrel in 2014,which is the highest breakeven oil prices in the region among oil exporters (Figure 4).

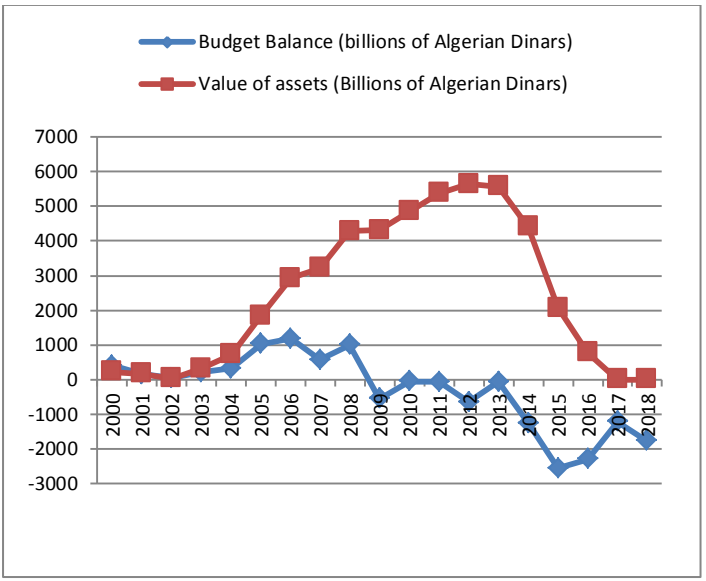
The real problem facing Algeria's stabilization fund resource, lies in the substantial gap between anticipated public expenditure by the budget laws on the basis of a reference oil price of $37 per barrel and the real spending, which implies a higher fiscal breakeven oil price. The budget benchmark oil price of $37 per barrel adopted by the government has not achieved fiscal balance , and deepens budget deficit over the years , since , the withdrawals from the fund to finance these deficits have increased substantially over years . On the other hand , since 2012 , the breakeven oil price has exceeded the average annual OPEC crude oil price , leading to significant decrease of the fund's resources, and to unsustainable budget deficits (Figure 5).Fiscal savings accumulated in the RRF declined in 2013 , 2014 , and 2015 , a further decline is anticipated in 2016.

Figure 4: **Algeria: Budgeted, Breakeven and annual average oil price (US$ per barrel)**



Source: IMF (2015) , Regional Economic Outlook: Middle East and Central Asia, May 2015, Washington , International Monetary Fund .

Figure 5: **Algeria: Budget Balance**

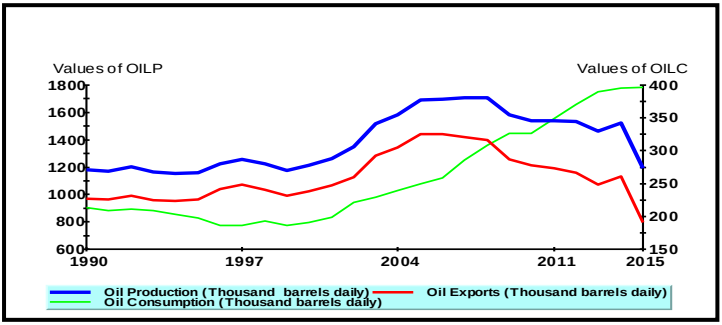


Source: Algeria's Ministry of Finance.

2.2.2. The uncertainties surrounding Algeria's oil production and exports

The other key challenges for Algeria's RRF stem from the heavy reliance of its wealth on an exhaustible source of revenues and a large exposure to fluctuations in international hydrocarbon prices. While oil production has declined since 2006, domestic hydrocarbon consumption has increased, consequently hydrocarbon exports contracted sharply (Figure 6).The trend of weak hydrocarbon exports together with declining prices will constrain hydrocarbon revenue, and weighs on fund's annual revenue.

Figure 6: **Algeria, Hydrocarbon production, consumption and exports**



Source : U.S. Energy Information Administration (EIA) , International Energy Statistics Database .

2.2.3. Limited role of the RRF in smoothing government expenditures

In Algeria, for instance, procedures for making withdrawals are unclear, and spending decisions are not rule-based (Revenue Watch Institute, 2013). The lack of a withdrawal rule has led to discretionary withdrawals that have enabled the Algerian government to increase spending when oil prices are high and to cuts when oil prices have declined. In Algeria , since the oil price fall starting in the first half of 2014 , savings in the oil stabilization fund has declined by around 5% since the fund was created , and it is expected to fall by a further 16% in 2015(IMF, 2014) reflecting the government's withdrawals to finance budget deficits . Also, the declining oil price will likely see Algeria use a substantial portion of its foreign reserves to prevent a budget deficit

from arising. Without doing so , the government will be unable to cover its public spending ,because , in Algeria government spending has been usually driven by revenue availability even after the stabilization fund was established.

2.2.4. Shortcomings of Algeria's RRF Transparency

Oil stabilization funds are set up by government to protect and stabilize the government's budget and overall economy from excess oil revenues volatility. In order to achieve this goal stabilization funds should be governed by strong institutions that ensure a high level of transparency in the use of funds resources. To assess the level of transparency of resource funds three indexes are often used: Linaburg-Maduell Index, Truman Sovereign Wealth fund's Scoreboard, and the Revenue Watch Institute's 2013 Resource Governance Index.

Linaburg-Maduell Index was developed in 2008 by the Sovereign Wealth Fund Institute, and scores SWF's on ten principles. The index ranges from one to ten, where one is the lowest level of transparency and ten is the highest . As for the end of 2014 Linaburg and Maduel rated 52 SWF's (Sovereign Wealth Fund Institute, 2014). The Truman scoreboard for SWFs was first created by Truman in 2007, and was further developed in Bagnall and Truman (2013). The scoreboard covers four area of evaluation, which are: structure of the funds, governance of the funds, transparency and accountability, and behaviour. The scoreboard ranges from 1 to 100. The higher the rating, the higher is the transparency level.

The 2013 Resource Governance Index (RGI) of the Revenue Watch Institute measures the degree of natural resource transparency in 58 countries. The index provides information on Natural Resource Funds as a special mechanisms used to govern oil, gas and minerals, and scores and ranks countries' natural resource funds. The governance Natural Resource funds index ranges between 0 which is the lowest level of transparency, and 100 which is the highest (Revenue Watch Institute, 2013).

Table 1: Truman scoreboard 2012, Linaburg-Maduell Transparency Index , the 2013 Resource Governance Index and other transparency indexes

Country	Fund	Resource Governance Index	2012 SWF Scoreboard
Venezuela	National Development Fund	58	27
Algeria	Revenue Regulation fund	6	29
Norway	Government Pension Fund	100	98

Table 1: (Continued)

Country	Linaburg-Maduell index	Corruption Perceptions Index*	Political Freedom Index**
Venezuela	1	19	5
Algeria	1	36	5.5
Norway	10	86	1

**Transparency International's 2014 Corruption Perceptions Index*

*** Freedom in the World Country Ratings 2014*

Table 1 presents the results of the Truman scoreboard 2012, the Linaburg-Maduell Transparency Index, and the 2013 Resource Governance Index for the five oil stabilization funds in Algeria, Venezuela ,and Norway along with the transparency international corruption perception index , and the political freedom index. According to the Linaburg-Maduell Transparency Index neither Algeria's nor Venezuela's funds fulfil the minimum score of 8 set by the SWFI in order to claim adequate level of transparency. Funds in Algeria and Venezuela do not fulfil even half of the transparency requirement. On 2012 SWF scoreboard , the average for our sample is 26.5 out of 100.According to the Resource Governance Index Algeria's fund exist in the bottom -20 group .

From this analysis it can be observed that the overall level of transparency of Algeria's fund is very low. In other words, the trends in our findings both for transparency of the fund and corruption and political freedom at the national level are similar. In fact the lack of transparency of these funds can be attributed to a low level of democracy and governance in these countries in general.

However, according to the three indexes of transparency, the fund of Norway ranks among the highest in governance, transparency and accountability .Indeed the Norway's Government Pension Fund is

suggested by many as a prime example to follow .In other words, in the case of Norway, there is a direct correlation between the level of democracy and transparency of the country and the level of transparency of its fund. As Norway's Minister of finance Kristin Halvorsen emphasized, 'Our transparency is very connected to the transparency of Norwegian society. It is a part of our tradition that other countries do not have (Gawdat Bahgat, 2010).

4- RESEARCH METHODOLOGY

4.1- Model and data

This section explores the effect of stabilization funds (more precisely oil stabilization funds) on the government spending in Algeria over the period from 1984 to 2016. Based on the theoretical and empirical literature, we estimate the following model:

$$REXPEND_t = \beta_0 + \beta_1(RGDP_t) + \beta_2(SF) + \beta_3(SF * RGDP) + \beta_4(TOT_t) + \beta_5(GDEBT_t) + \beta_6(CREDIT_t) + \beta_7(ICRGPOL)_t + u_t \quad \ldots\ldots(1)$$

Where:

REXPEND represents real total general government expenditure, used as dependent variable.

RGDP : is the real gross domestic product , the relationship between government expenditure and output (real GDP) is expected to be positive due to the phenomenon of pro-cyclicality of fiscal policies in most of oil exporting countries (Gavin and Perotti, 1997; Kaminsky, Reinhart, and Vegh, 2004;Talvi and Vegh, 2005; Alesina, Campante, and Tabellini, 2008; Ilzetski and Vegh, 2008).

TOT: index of the country's terms of trade. The terms of trade – the relative price of exports to imports -is an important variable for an oil exporting countries like Algeria, because in these countries, the main driver of the terms of trade is the oil price, thus, including TOT provides a control for oil prices shocks to the economy. Due the volatility and uncertainty of oil prices, many oil rich economies have found it difficult to smooth government expenditure, which has sometimes caused fiscal policy pro-cyclicality.

The cyclicality of fiscal policy is determined by looking at the sign and the size of β_1 coefficient, which measures the elasticity of government spending with respect to real output. If β_1 <0 , fiscal policy is countercyclical; if β_1 =0 , fiscal policy is acyclical; and if β_1 >0 , fiscal policy is pro-cyclical. An estimated $\beta_1 \rangle 1$ implies a more-than-proportionate response of the fiscal variable to output fluctuations.

SF*RGDP: stands for the interaction between stabilization funds assets and real GDP. It is expected that the establishment of stabilization funds in resource rich countries help stabilize expenditure levels, and insulate it from the volatility of oil revenue (IMF, 2008), therefor, the coefficient on the interaction term is expected to be negative.

Our basic model includes additional variables, especially financing constraints variables and political and institutional factors in order to investigate the interaction of these variables with fiscal cyclicality in Algeria.

Institutional quality variable is proxy by political risk index (ICRGPOL) taken from the dataset constructed by Political Risk Services (International Country Risk Guide governance indicators, 2013) .According to ICRG's definition" the aim of political risk index is to provide a means of assessing the political stability of the countries". The political risk rating comprises 12 variables covering both political and social attributes (Government stability, Socioeconomic conditions, Investment profile, Internal conflict, External conflict, Corruption, Military in politics, Religious tensions, Law and order, Ethnic tensions, Democratic accountability, Bureaucracy quality) .The ICRG political risk score ranges from 0.00% to 100% , with higher values indicating low risk, and lower score means higher risk .Countries with stronger political institutions are more likely to have less volatile fiscal policy , and as a result , more stable government expenditure (Sugawara , 2014).

For credit constraints , two variables are used : total (domestic and external) gross central government debt as a share of GDP (GDEBT) as

a measure for the domestic and external financing from Reinhart and Rogoff's (2010) data on external debts ; Following Gavin and Perotti (1997), we consider domestic credit to private sector expressed as percentage of GDP (CREDIT) as a measure of the degree of development of a financial system , it is expected that more developed financial systems enable countries to run anti-cyclical fiscal policy .

The macroeconomic and fiscal variables consist of annual data during the period 1984–2015, the main data sources are the International Financial Statistics (IFS), from the IMF, and World Development Indicators (WDI), from the World Bank.

4.2- The econometric model

The aim of the present paper is to investigate the long run and short run relationship among government expenditure, stabilization fund, and macroeconomic and institutional variables for Algerian economy over the period of 1984-2015, by using the ARDL bounds testing approach developed by Pesaran and al.(2001) . Indeed, the ARDL bounds test approach has various advantages over the Johansen's cointegration method. First, the ARDL bounds test is carried out even with mixture of I(0) and I(1) variables . Second, this technique is more appropriate for small and finite sample size as compared to the Engle-Granger (1987) and Johansen and Jeselius (1990) cointegration test (Pesaran and shin, 1999) . An additional benefit is that this technique overcomes the problems of serial correlation and endogeneity (Pesaran and shin ,1999) . For these reasons, this study employs the ARDL bounds test approach to estimate equation (1).

The implementation of the ARDL approach estimation requires three steps. The first step is to determine the existence of a long run relationship between the concerned variables using the wald-coefficient test or F-statistics, for testing the null hypothesis of no cointegration ($H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$) against the alternative hypothesis of long run relationship ($H_1 : \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0, \delta_5 \neq 0, \delta_6 \neq 0$) . Then ,

the calculated F-statistics is compared with the critical values proposed by Pesaran and al.(2001) . If the calculated F-statistic is higher than the upper bound critical value, then, the null hypothesis of no cointegration is rejected, indicating that long run relationship exists .If the calculated F-statistic falls below the lower bound critical value, then the null hypothesis of no cointegration cannot be rejected. However, if the F-statistic lies within the lower and upper bounds, then the results are inclusive. The second step in the ARDL bounds analysis is to estimate the long run coefficients of the selected ARDL model. Finally, in the third step we estimate the short run coefficients by estimating an error correction model (ECM).

4.3. Research results and discussions

4.3. 1.Test results for unit root:

According to Pesaran and al.(2001) the ARDL bounds test approach is valid for variables that are stationary either at level i.e. I(0) or at first difference i.e. I(1) , or even fractionally integrated . Therefore, it is necessary to investigate the order of integration of the individual time series in order to ensure that none of the variables is integrated of order two i.e. I(2) or higher . ADF test, and Phillips-Perron test statistics are employed. We run the test both in level and first differences. The results of unit root tests are reported in Table 1. In this study, these tests give the same results, namely that each of these series is I(1), that is they are integrated of order 1.

Table 2: **Unit root tests**

ADF unit roots test									
Variable	Level				First difference				Decision
	Intercept		Intercept and trend		Intercept		Intercept and trend		
	ADF	CV	ADF	CV	ADF	CV	ADF	CV	
EXPEND	0.068025	-2.9385	-1.7658	-3.5098	-4.8564	-3.0422	-6.8212	-3.5950	I(1)
RGDP	0.93357	-2.9385	-1.3493	-3.5098	-4.0452	-3.0422	-4.9186	-3.5950	I(1)
TOT	0.00202	-3.0422	-1.7942	-3.5950	-4.1299	-3.1472	-4.2744	-3.5692	I(1)
GDEBT	-0.67056	-3.0449	-1.9697	-3.7128	-3.2561	-3.0261	-3.8330	-3.7280	I(1)
CREDIT	-2.1809	-3.0422	-2.3956	-3.5950	-3.5523	-3.0888	-4.1716	-3.6519	I(1)
ICRGPOL	-1.9559	-2.9385	-2.3560	-3.5098	-3.4415	-3.0422	-4.1182	-3.5609	I(1)
SF*RGDP	1.598640	-2.99187	0.80396	- 3.61219	-4.4353	-2.9918	-4.3758	-3.6121	I(1)
Phillips- Perron unit roots test									
Variable	Level				First difference				Decision
	Intercept		Intercept and trend		Intercept		Intercept and trend		
	ADF	CV	ADF	CV	ADF	CV	ADF	CV	
EXPEND	0.5150	-2.944	-1.6979	-3.610	-3.6994	-2.845	-3.8579	-3.627	I(1)
RGDP	1.3414	-2.9447	-1.4957	-3.610	-5.3303	-2.845	-6.0527	-3.627	I(1)
TOT	-.53484	-2.845	-2.6634	-3.627	-5.7354	-2.944	-6.4554	-3.557	I(1)
GDEBT	-.39790	-2.909	-1.9533	-3.689	-3.4945	-2.9979	-3.8358	-3.583	I(1)
CREDIT	-1.6928	-2.845	-1.0699	-3.627	-3.8848	-2.9447	-4.1767	-3.5572	I(1)
ICRGPOL	-1.5763	-2.9447	-1.5390	-3.610	-4.7797	-2.8452	-4.7957	-3.627	I(1)
SF*RGDP	-1.3998	-2.9571	-1.6862	-3.5577	-3.6378	-2.9604	-4. 3264	-3.5628	I(1)

Notes : The sample period runs from 1984 to 2016.CV gives the 95 percent simulated critical values.

4.3. 2. Cointegration and long run analysis:

Since none of the variables is integrated of order two, cointegration can be investigated using the ARDL bounds test approach .The bounds test is conducted to determine the existence of a long run relationship between variables in equation (1). Since we use annual data, we choose two as the maximal lag length in the bounds test. The results of the test are shown in table 3 below.

Table 3: **Bounds test for cointegration analysis**

Critical Value	Lower Bound Value	Upper Bound Value
1%	3.15	4.43
5%	2.45	3.61
10%	2.12	3.23
Computed F-statistic : 8.433425		

Note : The computed F-statistic is 8.433425 (significant at 1% significance level) . Critical values are cited from Pesaran et al.(2001) , Table B1 , Case II (intercept and no trend) .

As the calculated F-statistics (8.433425) is greater than the upper bound at the one percent level (4.43) and five percent level (3.61), we conclude that there is a long run relationship between the variables of our model.

Once cointegrating relationship between the variables has been established, the estimate of the long run coefficients of the ARDL model can be obtained. The optimal lag order of each variable in the ARDL system is selected on the basis of Akaike Information Criterion (AIC). The coefficients of the long run relationship between government expenditure and its determinant are reported in the table 4.

Table 4: **Estimated Long-run Coefficients using the ARDL Approach**

Regressor	Coefficients	Standard Error	T – Ratio	[prob.]
RGDP	0.435947***	0.041420	10.525052	0.0000
SF*RGDP	0.000017***	0.000003	5.458435	0.0001
ICRGPOL	-0.424637***	0.049531	-8.573098	0.0000
TOT	0.034939**	0.012854	2.718209	0.0176
CREDIT	0.147915***	0.018752	7.887950	0.0000
GDEBT	0.030048***	0.007490	4.011565	0.0015
INPT	11.926035***	2.219809	5.372551	0.0001

Note: Dependent variable is REXPEND. We take government expenditure EXPEND and GDP in local currency and divide it by the CPI to get real data . The optimal lag is determined by AIC : AIC based ARDL(2, 1, 2, 1, 0, 0, 2). * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

The results above also show that there is a long run positive association between government expenditure and real GDP in Algeria, indicating that Algeria's fiscal policy exhibits strong pro-cyclicality, with an estimated coefficient $\beta_1 = +0.44$ at 1% significant level. As expected, the finding of pro-cyclicality of fiscal policy seems to be pronounced for Algeria, confirming the results of other related studies (Sturm and al., 2009; Abdih and al., 2010; Villafuerte and Lopez-Murphy, 2010; Erbil, 2011) which analyses the cyclical properties of fiscal policy in oil producing countries. Results in table 4 show that the coefficient of the interaction term (SF*RGDP) is positive and highly statistically significant, indicating that fiscal policy is pro-cyclical in Algeria, even with the establishment of the oil stabilization fund. Thus, this positive association means that the establishment of stabilization fund in Algeria has not contributed in smoothing public spending. And we have seen previously, both government expenditures and the fund's resources come from oil revenues, and a fall in the price of oil has a significant impact in reducing both public spending and the saving accumulated in the revenue regulation fund.

Besides, the long run coefficient of terms of trade is positive and statistically significant as expected. In particular Algeria is a neat exporter of crude oil and gas, so increases in oil prices and hence terms of trade (in Algeria the main driver of terms of trade is the oil prices) tend to increase government expenditure.

The results also show that there is evidence of a positive relationship between government expenditure and financial constrains variables, as the coefficients of both total government debt as a share of GDP (GDEBT) and private credit to GDP ratio (CREDIT) show a significantly positive effect on the pro-cyclical pattern, which is in line of what would be expected in theoretical terms.

The results also show that the estimated coefficient on the variable political risk (ICRGPOL) is negative and statistically significant, implying that fiscal behavior is more pro-cyclical when the political and institutional variables (proxied by the political risk index) are low .These results are consistent with the theories that explain pro-

cyclical behavior on fiscal policy due to the weak quality of institutions and corruption in government.

4.3.3. Short-Run Dynamics:

The short run coefficients obtained from the error correction representation (ECM) version of the ARDL model was also estimated and the results are reported in table 5. The results show that stabilization fund leads to a worsening of the pro-cyclicality of government expenditure in the short run. Besides, from the results, it is clear that the error correction term $ecm(t-1)$ is negative and statistically significant at 1% level.

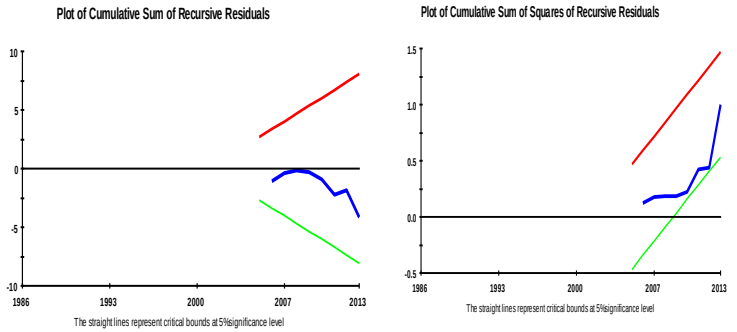
The stability of the estimate model is examined using the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. As shown in figure 6, the graphs of the CUSUM and CUSUMSQ test lie within the 5% critical bounds which confirm that the estimated model is stable.

Table 5**: Short-run Error Correction Model (ECM) for the selected ARDL**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REXPEND(-1))	0.632589***	0.102754	6.156332	0.0000
D(RGDP)	0.310056***	0.062940	4.926207	0.0003
D(TOT)	-0.107958***	0.011749	-9.188872	0.0000
D(TOT(-1))	-0.030954**	0.010630	-2.911937	0.0121
D(SF*RGDP)	0.000053***	0.000008	6.748677	0.0000
D(SF*RGDP(-1))	-0.000009	0.000008	-1.112853	0.2859
D(ICRGPOL)	-0.212755***	0.059661	-3.566099	0.0034
D(CREDIT)	0.205380***	0.028794	7.132697	0.0000
D(GDEBT)	0.041721***	0.010331	4.038453	0.0014
CointEq(-1)	-0.388500***	0.136687	-2.842260	0.0000

Note: Dependent variable is EXPEND . We take government expenditure EXPEND and GDP in local currency and divide it by the CPI to get real data .The optimal lag is determined by AIC : AIC based ARDL(2, 1, 2, 1, 0, 0, 2). * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Figure 7: **Plots of CUSUM and CUSUMQ statistics for coefficients Stability Tests**



These results indicate that fiscal policy of Algeria exhibit high pro-cyclicality, which is in line with most empirical literatures which analyse the cyclical properties of fiscal policy in developing and emerging countries as indicated by Kaminsky and al (2004), and other studies. Furthermore, the results show that even with the creation of an stabilization fund, government has failed to reduce the pro-cyclical bias of fiscal policy.

CONCLUSION

Oil exporting countries encounter major challenge due to the unpredictability and the volatility of oil prices and, as most of oil revenues belong to the government, price volatility can transmit to fiscal policy. To reduce fiscal spending instability and pro-cyclicality arising from the volatility of oil revenues as well as inducing the governments to save part of oil wealth for future generations , many oil rich countries have established the so called oil funds, Algeria is set to join other oil rich countries in establishing these stabilization funds to help stabilize government expenditure.

The central question that we ask here is whether or not oil stabilization funds can contribute to stabilize government spending

and mitigate the business cycles in Algeria. Our empirical analysis shows that government spending is highly pro-cyclical in Algeria.

In fact, despite the creation of an oil stabilization fund since 2000, government has failed to reduce dependence of the national budget on the oil revenue, and therefore, the pro-cyclical bias of government spending. Part of the reason behind this is the absence of a rule that limits the resources withdrawn annually from the revenue regulation fund to finance spending, the lack of limit on the fiscal balance, and weak performance of state institutions (IMF, 2013) .In Algeria institutions are not functioning well. Thus, it is required to modernise the institutional framework, because countercyclical and effective fiscal policies require strong institutions and more transparency and accountability.

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