

The oil prices variation and their influence in the Algerian economy

An empirical analysis

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Abstract:

This article analyzes the relationship between the variation of international oil prices and its effects on indicators of the Algerian economy from 2008 to 2017. To achieve this, we used secondary sources regarding the oil price average-considering just BRENT references- for each year, and other macroeconomic indicators. This information was analyzed through statistical models. First, we took Oil price as the main variable and we confronted each of the macroeconomic indicators collected to test whether they were independent from this main variable or not; second, we applied a Poisson regression to find if the citizen perception of the economy in these countries has a correlation with the booms and busts of oil prices. In the end, we found a divergence between the citizens' perception and the economy's positive or negative economic performance.

Keywords: Economic Growth, Economy, Oil Price, GDP.

JEL Classification Codes: Q32

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1-Introduction :

The volatility of the international price of oil is a very large risk factor for countries that export this raw material (commodity), especially if they are highly petro-dependent, that is, their economies have a high degree of dependence on oil income. . The case study in this paper, Algeria, is an example of how much damage a decrease in the international price of Brent crude can cause, especially for public finances. In this sense, and as can be seen with the data we have compiled, a fall in the price generates large variations in the income of the central national government, a lower income tax collection, less transfer in royalties and a fall in production or exploration.

In other words, the impact of the price of a barrel of oil is not only perceived in terms of fiscal income or participation in GDP, but is also reflected in the balance of payments, through the current account. Since fluctuations in oil prices in oil-exporting countries have a tangible impact on the economy, it is important to know how the population perceives these variations and their position in this regard. For this reason, the main interest of this article is to find out if there is any correlation between the years of bonanza and crisis in oil revenues and the perception that the population has about the economy of their nations.

In order to carry out this research, we have resorted to the collection of information of an economic, social and demographic, political and perception nature. In order to be able to know with secondary information: what population there was in each year (the annual estimates) in Algeria; what was the growth of GDP and GDP per capita; whether or not tax reforms were carried out each year and, finally, find out what idea people have about the economy of their country.

Finally, the body of this work is divided into several sessions, beginning with the background of the problem, where information is collected on the price of oil, the events since the 2008 crisis in Algeria, and what were the consequences of the increases or decreases in the international price of a barrel of oil. Among others, this is complemented by the literary review where studies are shown that have evaluated aspects related to what this article deals with, both economically and in studies on perception. Then the methodology and instruments used for the research and data analysis are detailed, to finish with the analysis and discussion of the results and deliver the conclusions.

Objectives

General: Analyze the relationship between the fluctuation of oil prices and various indicators of economic perception in Algeria between 2008-2017.

Specific:

- Know the perception that the population has about the economic situation of the country.
- Study and compare the effect that the variation in oil prices has on the economic well-being perceived by the population of both countries.

History of the problem

Commodities are volatile, they are listed on the different mercantile exchanges of the world and their prices are defined from there. Oil, as the main one among all raw materials, is not the exception to this market rule that, at least from the basic theory, poses a game of free supply and demand to establish a value to be paid for this good. But this is not always the case, since oil, due to its relevance and commercial importance, is subject to different manipulations that allow speculating with its price, depending on the side of the balance on which it is found; that is, if you

are a buyer, seller or investor. These interventions on the price of oil go from the economic to the political, geostrategic and military plane. Thus, different geopolitical and economic events had a strong impact on the oil market for more than 40 years (Sehgal and Pandey, 2015), before the Global Financial Crisis of 2008: Wars, tensions between states (mainly producers), sanctions or economic crises that affected the price of oil up or down.

In the months before the crisis, oil peaked at 145 USD per barrel and then fell, at the end of 2008, to 43 USD per barrel (Sehgal and Pandey, 2015). The crisis broke out, and the main oil consumers reduced their consumption, which led to an oversupply and eventually a drop in the price of a barrel of crude. Then came a new boom period motivated by non-economic factors, such as the conflicts in the Middle East, the Arab Spring, or the US economic sanctions on Iran. Nevertheless, as on other occasions, it did not last forever.

The United States began to exploit and flood the markets with unconventional oil, while the rest of the producers continued to produce and produce oil, until there was again an oversupply, China stopped demanding so much crude oil and the European Union was still largely in recession, and thus prices fell again in 2014.

Today the trend is upward again, but uncertainty persists; speculation and risk factors continue to push the price of a barrel up and down. Naturally, this affects Algeria, since the country derive most of their income from oil revenues; In in Algeria GDP it represented 54.36% (World Bank, 2018).

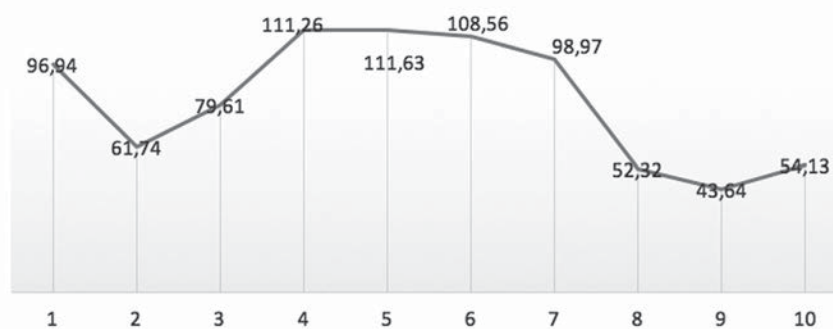


Figure 1. BRENT oil reference price for Algeria. Own elaboration based on World Bank (2018).

2. Literature review:

Oil is not only the most sold product in the world but also the most important energy resource in economic activity (Peng et.al 2020). In this regard, changes in its prices always became a research problem. The impact of oil prices on major macroeconomic changes—economic growth, inflation and unemployment is an important economic problem. In general, oil price shocks are detrimental for industrial production and the stability of the economy (Dudian et.al. 2017). Researchers have long been interested in studying oil price volatility and shocks (Deng et.al. 2018). In this context, we reviewed the recent studies analyzing the effect of oil prices on GDP as well as GDP per capita in the case of oil-exporting countries.

El Anshasy. (2009) analyzed the influence of oil prices on GDP by applying the Generalized-Method-of-Moment (GMM) model to the data period of 1970–2004 for 15 oil-exporting countries. The outcomes of estimation revealed a positive oil price effect on GDP. Farzanegan and Markwardt

(2009) also examined the relationship between oil prices and output growth using the Vector Autoregressive (VAR) method and concluded that oil price has positive impact on output growth in Iran. Mendoza and Vera (2010) reached a positive and significant effect from oil price shocks to economic growth employing the Generalized Autoregressive Conditional Heteroscedastic (GARCH) technique for Venezuela. In addition, Nwani and Orie (2016) in the case of Nigeria, Nusair [22] in the case of Gulf Cooperation Council (GCC) countries, Sadeghi (2017) in the case of 28 oil-exporting countries, Vohra (2017) in the case of Gulf Cooperation Council (GCC) countries, Foudeh (2017) in the case of Saudi Arabia, Alekhina and Yoshino (2018) in the case of non-OPEC oil exporting countries, Taghizadeh-Hesary et al. (2019) in the case of oil exporters, Sultan et al. (2019) in the case of Indonesia, Balashova, and Serletis (2020) in the case of Russia reached the positive effect of oil prices on GDP or GDP per capita.

From the crisis of 2008 to 2014, the price of a barrel of crude has gone through different moments that have marked this period as an era of great volatility. These events can be summarized as follows: the global financial crisis that mainly affected the US and other industrialized countries, which ended up reducing demand; the sovereign debt crisis (2009-2012) in several European countries (Spain, Greece, Portugal, Ireland, Italy); the Arab Spring (2011), which affected large producers such as Libya, and political problems in Venezuela (which still persist), both events pushed up the price of a barrel by reducing supply; the exploitation of unconventional oil in the US, and, finally, the slowdown in the Chinese economy, these two events once dented the price of crude oil and put pressure on this commodity, dragging the price down. Oil continues to be an economic variable of great importance that, frequently vitiated by geopolitical events and by global economic cycles, represents a chronic source of uncertainty for producers and consumers (Santillán and Venegas, 2015, p.1).

In general, the countries dependent on oil exports in the region emerged well from the events of this turbulent and volatile time, as they were able to continue the growth rate, albeit with less intensity. For example, in the case of Algeria, which although it is considered an oil nation, the income it receives is very relevant for the nation's public finances and even as a percentage of its GDP. In the period under study, the governments of Algeria had to weigh the ups and downs of oil to meet the financing needs that their government programs demanded. Thus, it was found that there were many tax reforms in the 2008-2017 period, to modify the tax system and thus be able to obtain higher income through taxes.

Oil, the economy and public perception

Oil is the engine of the global economy because it is the main source of energy in the world, and being the basis for the development of any nation it is imperative that all people have knowledge, are aware or at least aware of what that may occur with the international prices of this commodity regardless of whether one lives in a producing country or not, since even importing countries, like oil producing countries, are affected by its volatility, although inversely: an increase in prices is beneficial for the producer, but not for the consumer, and a decrease in price would have the opposite effect.

Price volatility can have different effects on an economy, which will be conditioned by the composition of the national GDP, political conditions and the level of development of each State. In the African case, for example, the disparity between production and reserve levels in each of the oil-exporting countries generates differences in the economic impact of price changes; additionally, the

differences in the policies of each country regarding the configuration of the hydrocarbon sector generate different impacts, effects when prices rise, or fall.

According to studies, the majority of the population seems to have a great interest in economic development, to cite an example, in the middle of an election. Voters are able to evaluate the development of a government with respect to all its performance at the helm of the country; they are not only interested in the economic results close to the elections (Clegg, 2016). This with respect to the British electorate. That is, there are cases in which the economy is the main incentive to vote or not for a candidate / party.

On the other hand, other studies indicate that the perception of the economy is something not entirely realistic and that it may respond to other factors. Such is the case of a study presented by the Pew Research Center (DeSilver, 2017), where it is appreciated that the way of perceiving the economic development of a country seems to be linked to the socio-political conditions of each nation. The study carried out a series of surveys in 38 countries of the world to know the perception of citizens regarding the economy of their countries. Thus, for example, comparing the results of Greece and South Africa, both with very similar unemployment rates (23.9% and 25.9%, respectively), 45% of South Africans said that their country's economy was doing well, against 2% of the Greeks.

3. Methodology:

This study is longitudinal exploratory in nature since it addresses the period from 2008 to 2017, with annual observations for Algeria. Specifically, eleven variables from different categories were chosen in order to verify whether the fluctuation of oil prices affects the perception of citizens regarding the economic situation of their respective country. Table 1 contains a summary of the variables included in the study.

Table 1: *Variables used in the study*

Category	Variables	Type of variable
1. Economy	- GDP per capita - Inflation - GDP (Anual) - GDP per capita growth percentage - Total External Debt - Oil income / IGNC - Oil income / GDP - Economic Complexity Index	Continuous
2. Policy	- Tax Reforms	Categorical
3. Demografic and social	- Pobulation - Inequality	Continuous

Source. Owen Elaboration

After establishing the validity of the variables and checking the independence between them, a Poisson regression was applied taking into account the categorical nature of each variable (see Results section). The central relationship that is analyzed in this study can be established as follows:

$$\pi_{ij} = \varphi_1 + \varphi_2 \dots + \theta_{ij} + error$$

π_{ij} , is the perception of citizens regarding the situation of the economy

φ_1 , denotes the fluctuation of oil prices

θ_{ij} , are the variables listed in table 1

In order to apply the Poisson regression model, dummy variables were created from the categories considered as independent variable. In this way, perfect multicollinearity was avoided. Subsequently, the results obtained were analyzed.

4. Results:

Initially, the tables are shown with the graphs of the information collected for the variables that were the object of study. Then the statistical results on the independence of these variables are approached with the control variable (OilPr), to finish with the results of the regression on the public perception of the state of the economy in Algeria with respect to the price of oil in the international market in the BRENT references.

First, a tracking of the economic, social and political information of both countries was carried out. a certain correlation can be observed between these variables and the price of oil. The results can be seen in graphs 2, 3, 4, 5, and 6.

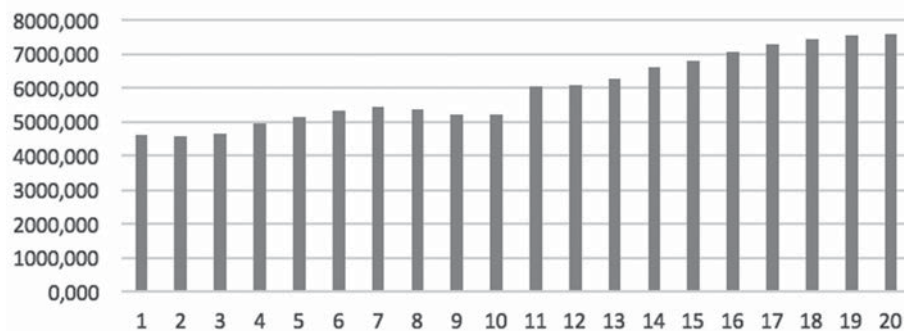


Figure 2. Variation of income per capita. Own elaboration based on World Bank (2018).

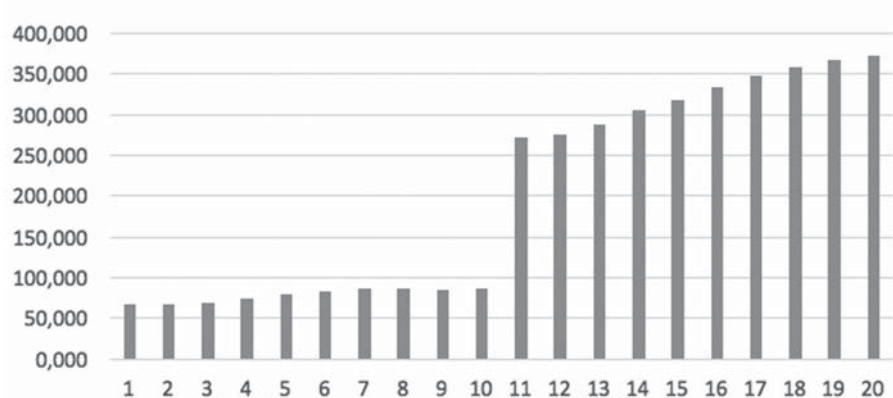


Figure 3. Annual GDP. Own elaboration based on World Bank (2018).

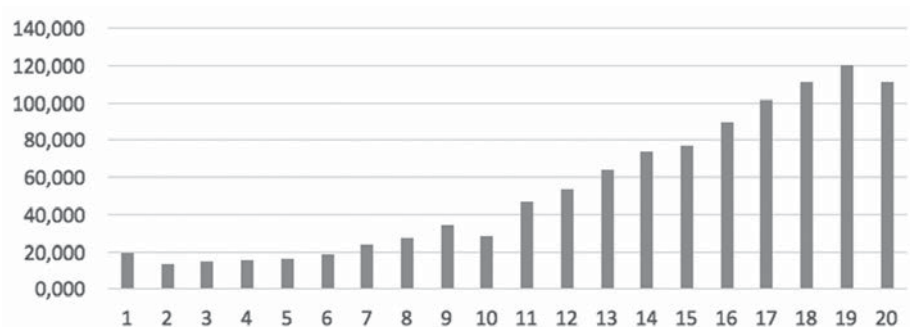


Figure 4. External debt value. Own elaboration based on World Bank (2018).

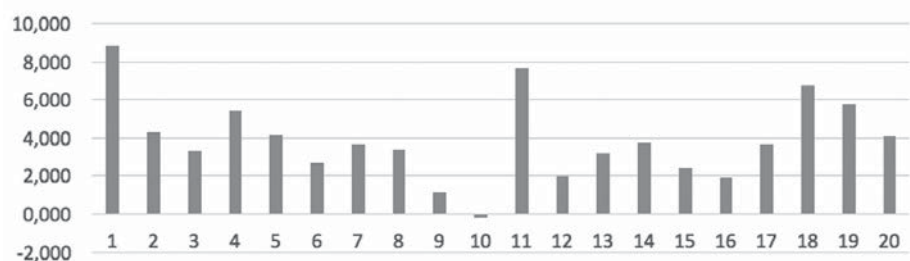


Figure 5. Annual Inflation. Own elaboration based on World Bank (2018).

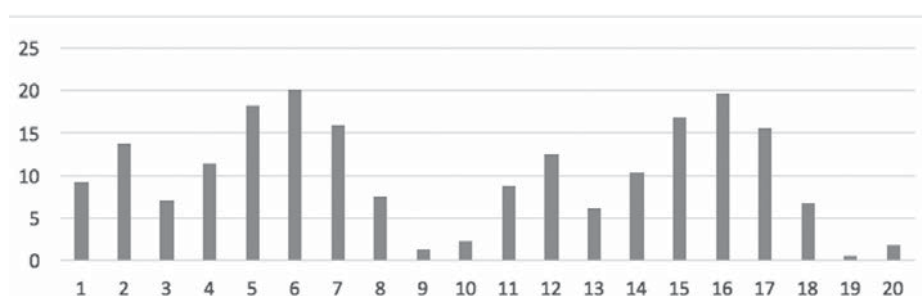


Figure 68. Oil income percentage of total CNG income. Own elaboration based on CCG (2018) and Minhacienda (2018).

The data collected was compared with the variation in the price of a barrel of oil, in order to find some type of dependence or relationship, either directly or inversely proportional to the variation in international oil prices. As can be seen, the only variable that was statistically significant to be considered dependent on the price of oil was the one that corresponds to oil income as a percentage of GDP; The rest of the variables showed independence from this factor, since their values were higher than 0.005, which allowed us to proceed with the regression to observe if the public perception of the economy is affected positively or negatively with respect to each one. of these independent variables (the price of oil was included in this regression).

It is worth mentioning how particular is the case of the oil income variable as a percentage of the income of the Central National Government, which although it could be assumed that it would be a variable dependent on the price of oil, statistically it is not possible to affirm such a question since its values were higher than the limit of 0.005. This could be because this income includes taxes, royalties and other income received by the State throughout the chain of exploitation

and commercialization of hydrocarbons.

Independence analysis

Among the data analyzed, and after making the P-value calculations to know whether or not there was independence between the control variable (Oilpr) and the others, it was found that with respect to the first, among the years under study all the variables, except oil income as a percentage of GDP (IngPetGDP), had an independent behavior from the control variable, that is, their behavior was autonomous from Oilpr's fluctuations; or at least statistically speaking, the behavior of the variables in relation to the control variable is not relevant and therefore a direct relationship can be disregarded.

Regression analysis

To apply the regression, the dependent variable (the population's perception of the economy) was approximated to a series of questions applied in the different waves of Africa barometer surveys. In this case, the methodological decision was made to use the question that was most directly related to the topic of interest:

In this case, the question used is relevant because it does not contain a cognitive bias that conditions the respondent's response to fluctuations in oil prices. In this way, the study ensures that the effect found in the regression manages to reflect an indirect effect of the change in people's economic well-being, as a result of the rise or fall of oil prices in international markets. After applying the Poisson regression for the variables established in the previous section, the results shown that the variables studied in the regression did not yield statistically significant results since their p-values are greater than 0.05. The interpretation of these data shows that the perception of citizens is not conditioned by the behavior in the economy. The reasons can be explained by the disconnection that citizens have with respect to specific economic phenomena. For example, a person will be affected by the crisis in oil prices if they experience an immediate effect (i. E. Changes in prices in the basic food basket).

4-Conclusion:

The general objective that gave birth to this work was to analyze the relationship that exists between the fluctuation of oil prices and various indicators of economic perception in Algeria (2008-2017), against which the following can be concluded:

Regarding whether oil prices are related to economic perception in Algeria, there is no evidence that can be used, at least statistically, to support this idea. For this reason our hypothesis, that the public may perceive a better or worse economic situation when there is a rise or fall in the price of a barrel of oil, can be ruled out.

One of the main findings, in addition to having found an independence between the economic perception and the price of a barrel of crude oil, is that, apparently, from the statistical model applied in our study, there is no proportional interaction in the behavior of the price of oil. and its impact on national production (Gross Domestic Product).

One of the main limitations of the study was the difficulty of obtaining articles that addressed the price of oil not so much from a purely economic perspective or how it affects the fiscal policy of a State, but from the public perception and the relationship that may exist between what citizens feel and what the economic reality of their countries would be like.

As for possible lines of research, the space is left open to analyze the behavior of the oil price and its relationship with the GDP of Algeria, but from another statistical, mathematical or econometric model.

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