

THE IMPACT OF OIL PRICE FLUCTUATIONS ON THE SIZE OF THE MAJOR ECONOMIC SECTORS, STANDARD STUDY FOR THE HORIZONS 2030

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ABSTRACT: Although it was previously the concern of economists and governments across the world, the oil prices fluctuation impact heavily the economies of exporting countries and remains a hot debating topic. The vulnerability of the Algerian economy to external shocks, especially those linked to oil prices direct researcher to the long standing debate of economic diversification which is becoming the main challenge in the country's overall economic policy. This work will be devoted to examining the correlation and relationship between some economic sectors outputs, GDP and oil prices volatility in the short and medium term basing on annual data extracted from the Algerian context during the period starting from 1980 using CPA and the VAR econometric model. Our research reveals the existence of a delayed and wrapped impact between the fluctuating oil prices and the contribution of economic sectors to the overall GDP. The findings help into identifying, for the perspectives of 2030, the precarious, most affected, and least sensitive economic sectors in term of impact received following oil prices fluctuation which should assist the government to better narrow and focus the current diversification models and program aiming optimized outcomes notably in sectors such as agriculture and industry.

Key Words: Oil prices, fluctuation, public economy, VAR Modelling, sectorial diversification

JEL Classification: E60, O11, H12

1. INTRODUCTION:

In recent years, and especially after the 2008's recession, the debate on economic diversification has become a major subject in energy exporting countries which attempted to review their macroeconomic policy on medium and long term basis. These debates aim to propose structural and strategic solutions to the development of other economic sectors, hence the need to understand and model the relationship between oil prices and economic

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diversification. Moreover, in the context of Algerian economy vulnerability to energy market shocks, notably those related to oil prices, which often occur due to the strong participation of the energy sector into the country's GDP and government revenue to the detriment of other economic sectors. This participation had over decades weakened the macro-economic balance of the country and thus impacted the overall stability. Therefore, this research focuses on the impact of oil price fluctuation on the share of economic sectors constituting Algeria GDP using a multivariate statistical analysis by component principal analysis PCA and also VAR model for analysing the response functions following a shock of energy market notably oil prices into the different sectors. The study is predicted to reveal the interaction between the component along with the relevant sectors for wealth creation and regeneration of reliable incomes to mitigate the impact of oil prices fluctuation.

2. LITERATURE REVIEW:

Nowadays, several theoretical or even empirical researches notably works of Rosenstein –Rodan (1943) and Leontief (1963) were devoted into identifying the relationship between energy export, economic diversification and growth. The output validated the direct relationship and identified a strong correlation between the productivity of the investigated countries including sectorial variety and the energy market. Furthermore, it is widely known among the economics community that it is difficult to make accurate forecasts on the evolution of the oil market. Some experts estimate an increase of the courses basing on research carried by Hotelling (1931) which justified the prices fluctuation by the fact of the exhaustion of the reserves of oil in counterpart of the increase of the demand or discovering new reserves. On the other hand, studies carried out by Prebisch (1950) had shown that the global economies and especially developed countries economies impact heavily the demand on energy including oil pushing therefore prices upwards and downwards depending on the situation .

In this regards, other economists emphasis on the fact that the growth of the energy sector at the expense of other sector such as industrial and agricultural sector is explained by Dutch disease theory (Corden & Neary, 1982)¹ also known as the malediction of natural resources wealth. In one hand, high oil prices have led to higher production costs and lower production volumes, as several studies have shown that high oil prices in turn led to a slowdown in energy contribution towards GDP (Husain, 2015). On the other hand, several notorious researchers pinpoint the political decision also called institutional factor to explain this situation while others turned their interest into the political situation (Ross,

¹ W. M. Corden , 1984; Booming Sector and Dutch Disease Economics: Survey and Consolidation; Oxford Economic Papers, New Series, Vol. 36, No. 3 pp. 359-380 Published by: Oxford University Press Stable URL: <http://www.jstor.org/stable/2662669> . Accessed: 01/02/2011 internationals ISSN 0014-2123 (print) 1703-7891 (digital)

2004)² and overall international conjuncture (Collier & Hoeffler, 2001), or even internal political system and climate (Ross, 1999)³ and (Gylfason, 2000)⁴.

Furthermore, a work carried out by Sami et al. (2014)⁵ focused on the interaction between natural resource dependence and regional political stability on economic growth using an econometric model which resulted into backing the natural resource malediction hypothesis in such context. Finally, other research works notably those carried out by Sachs and Warner (1995, 1997, and 2007)⁶ evoking the often negative impact and thus the relationship between natural resources abundance and economic growth⁷ and concluded that energy exporting countries tend to grow more slowly than others in unstable market context.

The results of an empirical study carried out by Frad and Zouari (2014)⁸ using VAR modelling showed that positive oil prices shocks had a direct and instant impact on the financial market in addition to the energy and manufacturing sector. Nonetheless, the researcher omitted to investigate the impact over other sector and thus the contribution towards the diversification. The first work on this issue was carried out by Laughlin(1933) at the time of post 1929 crisis. For the American economist Massel (1970), the main question of diversification concerns the good governance of the state to know how to manage the fluctuations and the impact of commodity prices. Finally, some studies (Imbs & Wacziarg , 2003) revealed that diversification can be counterproductive if funding and resources are to be reallocated to successful sectors for the benefit of new sectors.

3. STATISTICAL STUDY:

3.1. The relationship between Oil prices and other sectors contribution on GDP:

The analysis of the oil price volatility over the past decades reveals that oil market shock and prices fluctuation at medium-term are often a logic result of either from natural

² Ross M, 2004, "How do natural resource influence civil war ?" evidence from Thirteen cass", international organization 58(1) , pg 35-67.

³ Ross M, 1999, "The political economy of resources curse", world politics, 51, p297

⁴Gylfason, 2000, "Resources, agricultures and economic growth in economies in transition", working paper 157, the center for economic researchs and graduate education institute, prague.

⁵ SAMI Lylia, BELARBI Yacine, FERFERA Mohamed Yassine; 2014 ; "Regional Institutional Quality and Oil Dependence: What Effect on Economic Growth in Arab Countries? An econometric approach with spatial effect in PSTR models "; Economics & Strategic Management of Business Process (ESMB); Volume 2, pg 169-201.

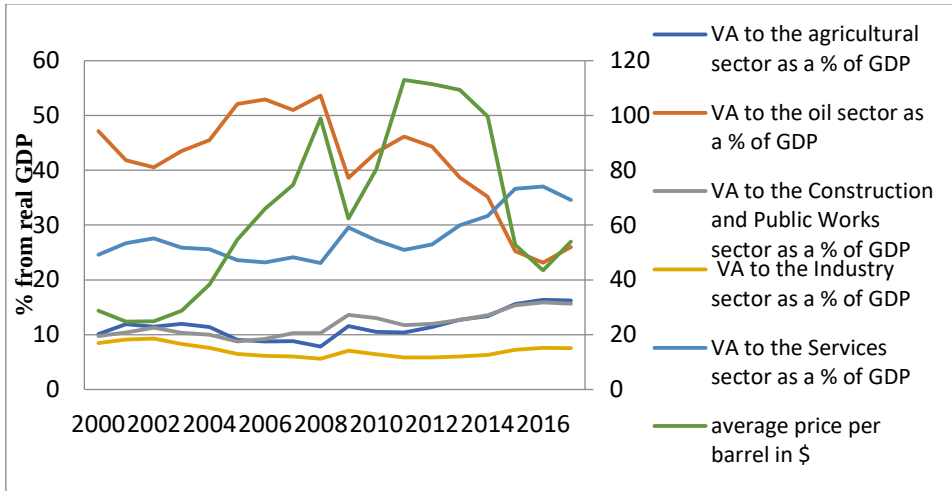
⁶ Sachs J.D , 2007, "How to handle macroeconomics of oil wealth", Colombia university press, NY.

⁷ Jeffrey D, Sachs and Andrew M. ; 1995, 1997; "Natural resource abundance and economic growth"; Warner Center for International Development and Harvard Institute for International Development Harvard University Cambridge

⁸ Haifa Frad, Ezzeddine Zouari; 2014 ; "The Impact of Oil Price Change on Islamic Stock Market Returns An Empirical Study on the DJIoil & Gas Index"; Economics & Strategic Management of Business Process (ESMB), pg 125-129.

or geopolitical factors (disaster, revolution, war, embargo). A perfect example of Libyan war started in 2011 and continues till nowadays. The hypothesis of falling prices is more likely consolidate when the country is in an unstable regional political environment in addition to other factors, such as 2008 global market crash or different mechanisms of adjustment in the production and consumption introduced at OPEC and non-OPEC level.

N° 1: Evolution of the different Economic sectors and Oil prices (2000-2017)



Source: Established by the authors using data from NOS (National Office of Statistics) and OPEC

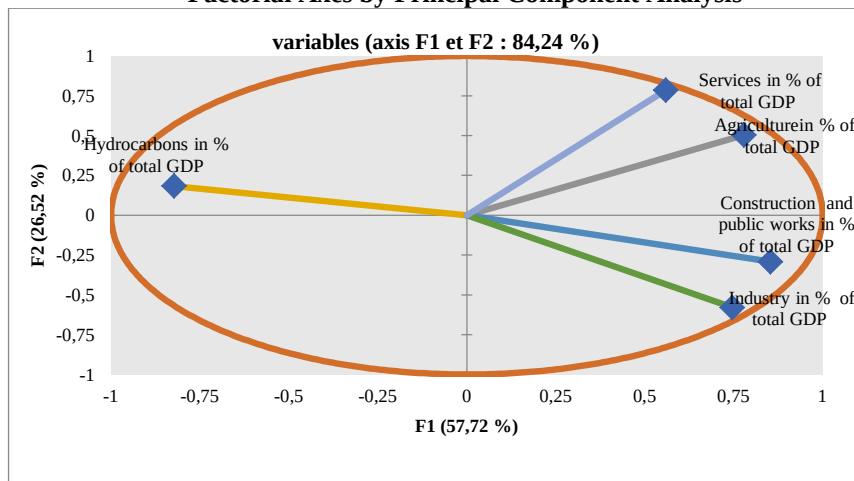
Form the above line graph; we remark that the energy market contribution towards GDP evolves following the same trend as the oil market does. This confirms the complete dependence of the Algerian economy on the energy export and transformation. Thus, we can conclude that the oil price variable is an exogenous variable. On the other hand, the remaining sectors are impacted negatively by oil prices increase as despite the good shape of the oil market between 2000 and 2008 the agriculture and industrial sectors followed a negative trend which gives a perfect illustration of the Dutch syndrome known as "malediction of natural wealth" by neglecting other sectors when it is supposed to allocate particular attention and benefit them. Nevertheless, since 2008 we notice a consistent contribution of these sectors along with oil prices evolution so that the rise in oil prices increases the contribution of these sectors through the volume of investments provided and in terms of setting up strategic plans to promote these productive sectors.

3.2. Multivariate data analysis by PCA: Study on relationship between the different economic sectors using principal Component analysis PCA.

Principal component data analysis (PCA) allows the exploration of links between given variables by the notion of distance, in our case the different economic sectors constituting the GDP are the variables and we aim to represent and identify the correlation relationship along across the years.

This part of the work is devoted to identify, in one hand the nature of relationship between Algeria's economy five (05) main economic sectors, and in the other hand, to analyse the proportion of each sectors in GDP over a period from 1980 to 2017. The variables used are percentage of contribution of the economic sectors (energy, agriculture, services, industry, construction and public work) towards the country's GDP. As 84.24% of the Assessment of our data is mainly represented by the first factorial plan, thus the CPA had a big part of explanation by 2 dimensions:

Figure N° 1: Contribution of Variables (part of economic sectors to GDP) to Factorial Axes by Principal Component Analysis



Sources: Established by the authors using XLSTAT

The first point that we remark is that the projection point gets closer to the circle of the sphere, Regarding the first factorial axis, the variable contributor is the part of energy sector to GDP, so we can give the name of energy contribution to this main principal component because it represents the most discriminating explanatory variable. For the 2nd factorial axis, the variables that contribute the most to its construction are the parts of agriculture, public work and industry to the GDP, so the name of the productive sector's contribution can be assigned to it.

The circle of the variables clearly exposes the strong negative correlation between the share of contribution brought by the energy sectors towards the country's GDP and the remaining sectors contributions. The explanation is twofold, first point is the higher contribution of the energy sector to GDP impact negatively the contribution of the industrial and public works sector and to a lesser extent the agricultural sector and the second point is the government focus solely on the energy sector and neglect other sectors hence the critical contribution of the energy sector to the economics aggregates, this point illustrates the persistent dominance of the energy sector and thus the vulnerability of the economy.

Nonetheless, and in contrast with the energy sector, there is a positive correlation in term of GDP contribution between the construction and public works sector and the industrial sector. The analysis shows another positive correlation between the agricultural sector and the contribution of the service sector towards the GDP. However, there is no obvious correlation between the service sector and that of industrial and energy sectors which reveals dangerous macroeconomic issues as the services sector is usually strongly related to the industrial and energy sectors and thus affected in the same manner.

In the second stage, we will analyse the individual plan where we can differentiate between three sub-periods:

Period (1982-1993): which is a part of three (03) strategic plans of five years each during the period (1980-1984) which were mainly devoted to investments notably; 46% into the combined industry sectors followed by construction and public works sectors with around 45% thus a total of 459.21 billion DZD from the total amount of investments. Afterward, an envelope of 550 billion DZD as part of the second five-year plan (1985-1989) allocated 45% to the energy sector and 14% to the Agriculture sector. Nonetheless, and following the arising circumstances in 1986 notably the global economic crisis which affected the production and supply capacity and thus the financial earning due to the very low oil prices, dropping from 34 billion USD to less than 28 billion USD, a strong pressure was weighting on Algeria's revenues which in turn led to the deterioration to the contributions of the agriculture sector, industry, construction and public works into the GDP.

Period (2000-2012): This period was characterized by the implementation of three development programs. The first two programs called "Economic Recovery and growth Support Programs" respectively (2001-2004 and 2005-2009)⁹ were dedicated to support agricultural activities by a share of 12% and strengthening public services such as the infrastructure and public works sector at unprecedented share of 40% along with other economic sectors end up benefiting from 15.2% of the GDP. Moreover, a third

⁹ The Supplementary Program to Support Growth (2005-2009), April 2005, available at: <http://www.premierministre.gov.dz/arabe/media/PDF/TexteReference/TexteEssentiels/ProgBilan/ProgCroissance.pdf>

development program was implemented for the period 2010-2014 which focus onto the Consolidation of Economic Growth by strengthening the public investments which represented one of the largest ever program accounting for 39.5% for infrastructure development and 16.05% for economic development. To sum up, this period was characterized by improved contributions of the industrial sector, construction and public works. Therefore, there was a real leap in the field of construction and infrastructure along with the establishment of SME (small and medium enterprises) but failed to achieve a real economic diversification that would be a substitute for energy export and thus ending the dependence. Finally, there is a significant contribution to the agriculture sector in GDP starting from **2014 upwards** well as the services, trade and transport sectors. Despite the efforts and initiatives introduced recently by the Algerian government, macroeconomic indicator are still showing poor performances in term of diversification which represent the main reason of this work aiming to elaborate a complete solution in form of comprehensive macroeconomic model. We conclude that the major factors influencing the contribution of the different economic sectors into the GDP are related to the energy sector and specifically the oil prices as well as the focus of effort into fossil energy extraction and exporting this sector and omitting other sectors. The presented analysis is very significant and consolidates other related researches as statistical analysis facilitates the reading of the data and representing them in a more readable and clear manner to enable the extraction of the most pertinent conclusions and recommendations.

3.3. Econometric analysis: Study of the predicted oil price fluctuation impact on the part of certain economic sectors to GDP by VAR model.

After studying and schematizing the relationship between the different economic sectors, we dedicate the remaining part of this work into the design (conception) of a model using an econometric approach.

3.4. Oil price overlap and the contribution towards economic sectors to GDP:

To address the problematic presented in this paper, the VAR model was used to analyse the relationship between changes in oil prices and the contribution of economic sectors to GDP on short and medium term basis. This approach intends to reveal and evaluate the impact of changing in oil prices onto the different sectors constituting the GDP along with the identification of prioritized economic sectors in order to be included into the design a new macroeconomic policy.

4. MODEL CONSTRUCTION:

This approach is based on official annual data collected by the researchers from the Algerian NOS (National Office of Statistics) and including data regarding the contributions of the different economic sectors towards the GDP. Moreover, data regarding the oil market

for the period between 1980 and 2017 was extracted from various OPEC officially released documentation. In this regards, we represent the different variables during the period 1980 to 2017 as follows:

- **OP:** Oil price in USD.
- **GDP:** Domestic gross production.
- **PARTHYDR:** the percentages of the hydrocarbon sector (part) contribution to the GDP.
- **PARTIND:** the percentages of the industry sector (part) contribution to the GDP.
- **PARTCPW:** the percentages of the construction and public works sector (part) contribution to the GDP.
- **PARTAGRT:** the percentages of the agriculture sector (part) contribution to the GDP.
- **PARTSERV:** the percentages of the services sector (part) contribution to the GDP.

The proposed model is: OP (Partagrt, Parthydr, Partindst, Partcpw, Partservs)

$$OP_t = \beta_0 + \beta_1 \text{Partagrtt}_t + \beta_2 \text{Parthydr}_t + \beta_3 \text{Partindstt}_t + \beta_4 \text{Partcpw}_t + \beta_5 \text{Partservs}_t + \varepsilon_t$$

The following summarised the different steps followed to dress the model:

First of all, we proceed to the stabilisation study in which we examined the stability of the series of variables according to (ADF) Advanced Dickey Fuller test as well as the (PP) Philip Byron test. The obtained results are summarized in the following table which provides a comparison of the output of both tests and shows the degree of the stationary of the different series.

Table N°1: original series stability test using Advanced Dickey Fuller rand Philip Byron tests

Series of variables	ADF		PP	
	t-calculated	t-tabulated	t-calculated	t-tabulated
PARTAGRT	-2.907376	-2.943427	-2.757665	-2.943427
PARTHYDR	-2.243201	-2.943427	-2.122615	-2.943427
PARTPWC	-0.146057	-1.950117	-0.085666	-1.950117
PARTINDST	-2.938041	-3.536601	-2.859877	-3.536601
PARTSERV	-3.455404	-2.943427	-3.464724	-2.943427
OP	0.023292	-1.950117	0.023292	-1.950117

Sources: results obtained by Eviews8 used by the authors

We notice from the table above that the majority of the series are unstable because the calculated values obtained are bigger than the values programmed (predicted or tabulated) with a percentage of 5% in both ADF and PP tests. The only noticeable exception is the PARTSERV which appears to be stable at the authorization level. Therefore, and in order

to make this series of variables stables, we need to proceed to the calculation of the differences on these variables as shown in the following table:

Table N°2: Stationary test after using 1st degree differentiation

Series	ADF		PP		Stationary degree
	t- calculated	t- tabulated	t- calculated	t- tabulated	
PARTAGRT	-7.200757	-2.948404	-7.920862	-2.945842	I(1)
PARTHYDR	-6.309711	-1.950687	-7.629029	-1.950394	I(1)
PARTCPW	-6.440213	-1.950687	-7.742416	-1.950394	I(1)
PARTINDST	-5.209722	-3.544284	-7.074834	-3.540328	I(1)
PARTSERVS	-3.455404	-2.943427	-3.464724	-2.943427	I(0)
OP	-5.718528	-1.950394	-5.718528	-1.950394	I(1)

Sources: results obtained by Eviews8 used by the authors

It is important to highlight that in this step we assume(exclude the hypothesis) that there is no long-run parallel equilibrium relationship between the excluded variables basing on the obtained results and thus we recourse to the establishment of the short and medium term relationship using VAR approach

5. ESTIMATING THE MODEL VAR (P):

Before proceeding to the estimation of the VAR model (p), we need to determine first the appropriate degree of the delay using a set of indicators. The following table validates the determined values:

Table N°3: Degree of the delay (L) used on the model VAR (p):

Lag	LogL	LR	FPE	AIC	SC	HQ
1	361.3320	NA	3.47e-16	-18.59040	-16.99061	-18.03815
2	415.2249	70.83068	1.45e-16	-19.61285	-16.41328	-18.50836
3	489.8754	72.51770*	2.58e-17*	21.82145*	17.02209*	20.16472*

Sources: results obtained by using EVIEWS 8 program

We can conclude the $p = 3$ is the appropriate degree of the delay according to obtained data so the rank of the model is VAR (3).afterward, we move to the estimation of the model VAR (3), which the results gathered are as follows:

Table N° 4: Estimating the model VAR (3):

OP	RPARTAG	PARTCPW	RPARTHY	RPARTIND	RPARTSER
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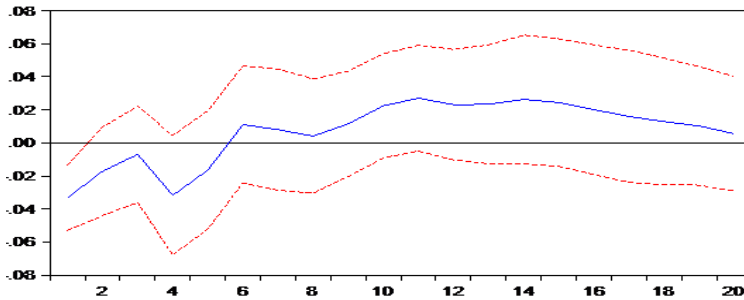
OP(-1)	0.519742 (0.37194) [1.39737]	-0.224458 (0.22425) [-1.00093]	-0.108691 (0.16131) [-0.67382]	0.216537 (0.23535) [0.92008]	-0.267122 (0.17683) [-1.51059]	0.000803 (0.16091) [0.00499]
OP(-2)	-0.473887 (0.43678) [-1.08496]	0.256959 (0.26334) [0.97577]	0.144548 (0.18942) [0.76309]	0.159702 (0.27637) [0.57785]	0.284576 (0.20766) [1.37041]	0.164897 (0.18896) [0.87267]
OP(-3)	0.337571 (0.39371) [0.85740]	0.189502 (0.23738) [0.79832]	0.248955 (0.17075) [1.45802]	-0.236545 (0.24912) [-0.94952]	-0.026241 (0.18718) [-0.14019]	0.015969 (0.17033) [0.09376]

Sources: results obtained by using Eviews8

6. STUDY OF THE IMPULSIONS FUNCTIONS:

In this section, we performed a macroeconomic study on the impact of the fluctuation and shocks of oil prices over the contribution of different sectors towards the GDP. This was done by studying the “response functions” used in the econometric approach and illustrated the output using graphs. In fact, we investigated the 20 years predicted reaction of the exposed sectors throughout to the random evolution of oil prices and then brought the forecast function to anticipate the different sectors perspective by 2030.

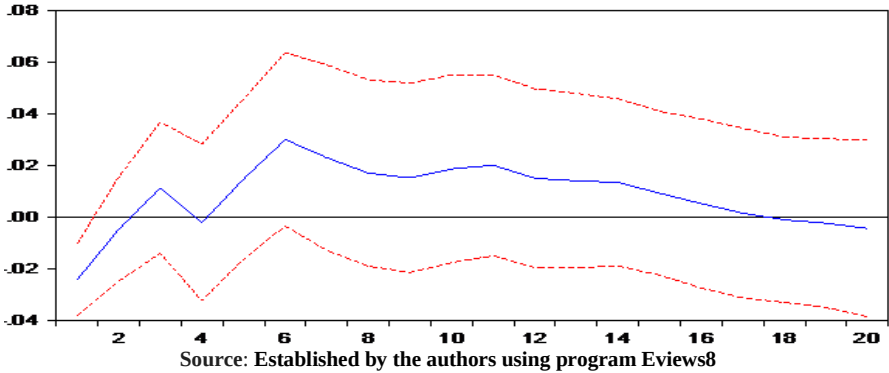
Graph N° 2: The impact of a random shock on the price of oil on the contribution of the agriculture sector in gross output



Source: Established by the authors using program Eviews8

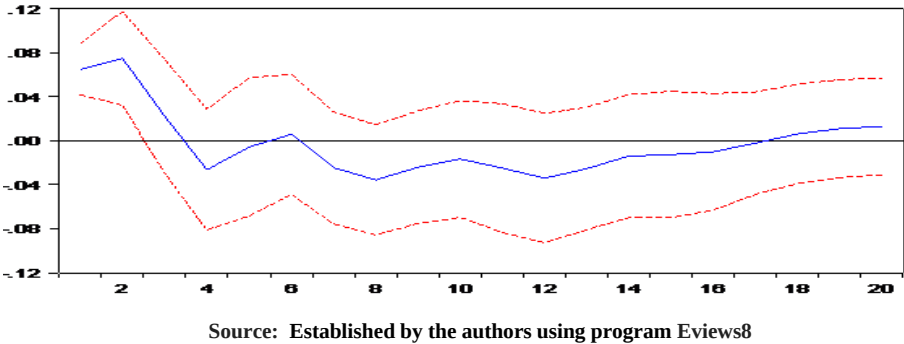
The line graph illustrates the weak effect of random shock in the oil prices over the contribution of the agriculture sector towards the GDP especially at the beginning of the predicted years and until the fourth year. As by the fifth year, we notice significant positive impact continuing until the twelfth year. After that, we notice the decline of the effect until disappearing gradually. Therefore, we can conclude that oil price fluctuation has a short-term effect not exceeding the 10 years period. Furthermore, the recent experienced shock related to the oil prices slump started late 2014 emphasis the provided readings during this research as the government intention of investing more in agriculture sector were revealed and implemented which improved considerably the intern production and registering a 34% in 2012 compared with 2011 situation.

Graph N° 3: The impact of a random shock on the price of oil on the contribution of the construction and public works sector in gross output



Regarding the impact of the shock on the price of oil on the contribution of public works and construction sector, we can see that there is a positive and increasing effect over the first six years and then showed a gradual decline (fell), so it can be said that the impact of oil prices on the contribution of the public works sector is at short run and it does not exceed 6 years.

Graph N° 4: The impact of a random shock on the price of oil on the contribution of the hydrocarbon sector in gross output

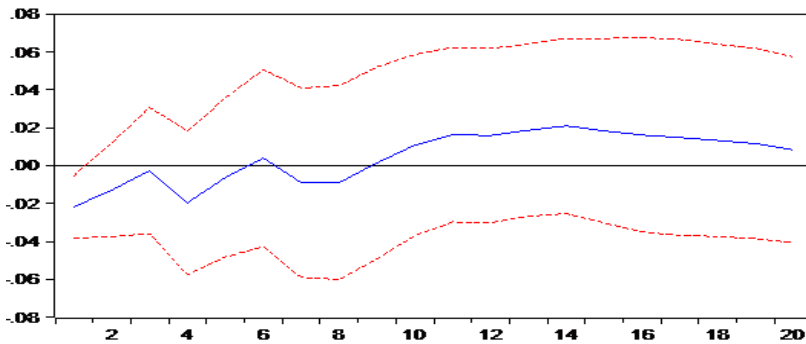


The line graph below shows the projected impact of the shock in oil price on the fuel sector, which experience major fluctuations during the first twelfth projected years where it reaches a low and then undergo an increase, meaning a positive reaction for the second period. Furthermore, we can extract that there is approximately a similar pattern of the shocks effect with significant peaks as well as lows each 4 years during the same period.

Afterwards, it keeps increasing (then it starts to improve) gradually in the following years (for the second period) until it remains steady 20 years later. So the price of oil has a short-term to medium effect on the hydrocarbon sector for only 12 years

This is explained by the fact that the shock of oil prices has in the beginning a negative effect on the contribution of the hydrocarbon sector to the GDP this is because this sector itself is less integrated to the rest of the economic sector. Furthermore, this results confirm the previous point of this paper when introduced the link between the sectors, which we found that the hydrocarbons sector negatively (inverse relation) correlated with each of the construction and public works and industry, that is mean, when oil prices rise, the Algerian authorities are giving more attention to these sectors by increasing the volume of investments and increasing support rates

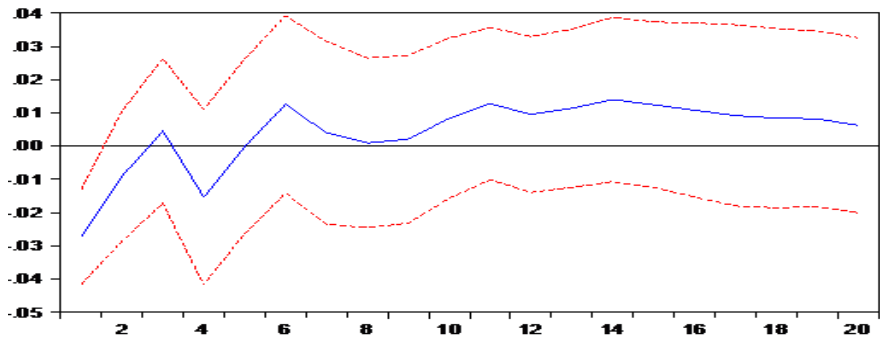
Graph N° 5: The impact of a random shock on the price of oil on the contribution of the industry sector in gross output



Source: Established by the authors using program Eviews8

To begin with the industry, we notice that this sector has a similar reaction as the other non-energy related sectors. The shock in the price of oil will initially have a minor fluctuating effect and slowly until the eighth year it begins to improve to continue until the fourteenth year then finishing the projected period by remaining steady and stable. This means that the effect is despairing by the time, and the expansion of the oil sector often leads to a decline in the manufacturer and industry sectors, which is often recorded in the renter countries.

Graph N° 6: The impact of a random shock on the price of oil on the contribution of the services sector in gross output



Source: Established by the authors using program Eviews8

Finally, for the services sector, the shock in oil prices has a positive effect for the first two years, which is well higher than the other part of sectors to GDP and then this effect becomes volatile until the twelfth year where it undergoes a slight decline throughout the rest of the projected period.

7. DECOMPOSITION OF THE VARIANCE:

The analysis and decomposition of the variance gave us a clear image about the expected effect of each economic sector influenced by the change in oil price for the next 20 years. It is clear from the results of the table that the contribution of oil prices to changes in the level of economic sectors in the beginning of the period is by far affecting at first degree the fuel (hydrocarbon) sector, accounting for 61.44% becoming at slightly over the fifth. Then it comes for second place the service sector by 34.72%, followed by the construction and public works with 29.40%

Table n° 6: Contribution of changes in oil prices to the expected impact of each sector in relation to the contribution of other sectors. (Analysis of variance)

NEXT PERIOD	PARTSERVS	PARTINDST	PARTHYDR	PARTCPW	PARTAGRT
1	34.72779	17.94925	61.44270	29.40967	27.46104
5	24.57134	9.601697	61.34743	15.54256	33.39957
10	21.42573	7.009180	54.45620	30.82753	34.28915
20	24.77527	15.40743	52.21386	32.83986	46.58012

Source: established by the authors from model results by Eviews8

While the share of the price of oil in the agricultural sector changes start with weak percentage, it showed an increase over time reaching the second place with 46.58%, followed by the sector of construction and public works with 32.83% Services. Furthermore, And noticeably the industrial sector is ranked and remained in the last row all

over the period. The narrowing of the industrial sector may be linked to one of the symptoms of the “Dutch disease” and often attributed to the “Nonchalance” in the development of this sector during periods of rising oil prices, which has a tendency to be neglected.

This contradiction has in one hand inspired many economists in the search about the abundance in natural resources and the development of certain sectors. Sachs and Warner (1995) and Torvik (2001)¹⁰ have linked learning to “Dutch disease” to a slowdown of economic growth in the industrial sector. And on the one hand it would be beneficial to devote a portion of the oil rent to the development of productive economic sectors through diversification as some economists consider (Lederman and Maloney, 2007).

It has been found that the dominant sector is the hydrocarbon sector, which is little integrated with the rest of the development of the other economic sectors. This proves again the high dependence on oil revenues and their fragility in the event of falling prices.

In our view, the least eco-sectors affected by oil price volatility are the least vulnerable to shocks so they in turn represent stronger sectors that consolidate the sustainable development of the national economy and maintain the diversification strategy. As examples, the new growth model¹ 2016-2019 is aiming to increase annually by 2030 by a rate of 6.5% for agriculture and 7.4% for market services, in favour of the non-energy sector to initiate the process of economic diversification.

8. CONCLUSIONS:

From the results obtained using econometric approach VAR modelling and from the multi-variable data analytics using PCA, the following remarks and conclusions can be enumerated:

The use of the PCA in our case work seems to be an important data analysis tool which gave us a better image of repartition of the sectors according to the most relevant years. Overall, there is an inverse relationship between the fossil energy sector and the industrial and agriculture sector with less impact for over the last one. This clearly indicates that when oil prices rise, the major part of investments and subsidies go for the fossil energy extractive industries instead of manufacturing industries, construction, public services, infrastructure and agriculture sector;

Therefore, the evolution of the contribution of the different economic sectors towards the GDP is heavily affected by oil prices fluctuation especially during the last three years. Unexpectedly, this impact remains minimal on the agriculture sector compared with the other sectors along with a slight improve from the seventh year which nearly disappeared

¹⁰ Torvik R, 2001, “Learning by doing and Dutch disease”, European economic review, 45 pg 285-306.

by the twelfth year. Regarding the impact of the shock on the public works sector, it shows a similar pattern as agriculture which has had a short positive effect and did not exceed the six year;

The most impacted sector is the energy sector which had been by far positive during the first two years, but the situation changed to become negative till the twelfth year where some improvement was noticed. In contrast to the others, the impact of oil prices fluctuation on the industrial sector was initially very weak but progressively improved between the seventh and fourteen years then faded later. When it comes to numbers, the proportion of oil prices fluctuation constitutes 52% of the total change in the growth of energy sector followed by the agriculture sector at 46%, then the public works sector at 33% and lastly the industrial sector accounting just for 15%.

To sum up, the absolute dependence on fossil energy continues to haunt the Algerian economy. The successive governments failed considerably to achieve the desired economic diversification. Achieving economic diversification in reality is a very complex and time consuming process that requires a combination of several policies, reforms and models. In view of the development and continuous performance of the measures to be implemented for sustainable diversification, it is necessary first of all to identify the sectors to be diversified; this study shed light on the relationship between the sectors and their behaviour regarding the fluctuation of the barrel prices and revealed us the modelling, in the first place the primary and secondary sectors. Through the development of these productive sectors which are responsible of wealth creation, increasing state revenues and avoiding bad shocks of oil prices fluctuation.

Furthermore, the oil prices crisis is the starting point to an enlarged debate including both economist and politics and it initiated several research and investigation which in their turn generate a rich output in term of observation, recommendation.

BIBLIOGRAPHY:

1. W. M. Corden , 1984; Booming Sector and Dutch Disease Economics: Survey and Consolidation; Oxford Economic Papers, New Series, Vol. 36, No. 3 pp. 359-380
Published by: Oxford University Press Stable URL:
<http://www.jstor.org/stable/2662669> . Accessed: 01/02/2011
internationals ISSN 0014-2123 (print) 1703-7891 (digital)
2. Ross M, 2004, “ How do natural resource influence civil war ? ” evidence from Thirteen cass”, international organization 58(1) , pg 35-67.
3. .Ross M, 1999, “The political economy of resources curse”, world politics, 51, p297

4. Gylfason, 2000, "Resources, agricultures and economic growth in economies in transition", working paper 157, the center for economic researchs and graduate education institute, prague.
5. SAMI Lylia, BELARBI Yacine, FERFERA Mohamed Yassine; 2014 ; "Regional Institutional Quality and Oil Dependence: What Effect on Economic Growth in Arab Countries? An econometric approach with spatial effect in PSTR models "; Economics & Strategic Management of Business Process (ESMB); Volume 2, pg 169-201.
6. Sachs J.D , 2007, "How to handle macroeconomics of oil wealth", Colombia university press, NY.
7. Jeffrey D, Sachs and Andrew M. ; 1995, 1997; "Natural resource abundance and economic growth"; Warner Center for International Development and Harvard Institute for International Development Harvard University Cambridge
8. Haifa Frad, Ezzeddine Zouari; 2014 ; "The Impact of Oil Price Change on Islamic Stock Market Returns An Empirical Study on the DJIoil & Gas Index"; Economics & Strategic Management of Business Process (ESMB), pg 125-129.
9. The Supplementary Program to Support Growth (2005-2009), April 2005, available at:
10. <http://www.premierministre.gov.dz/arabe/media/PDF/TexteReference/TexteEssentiels/ProgBilan/ProgCroissance.pdf>
11. Torvik R, 2001, "Learning by doing and Dutch disease", European economic review, 45 pg 285-306.
12. Sythese from Algerian ministry of finance, 2016, "The new economic model 2016-2019".
13. Abdel-Hamid Margit, "The decline of oil prices on the Algerian economy and the difficulties needed to cope with it Shock ", University of Jijel / Algeria, All Economics and Economics.
14. Daoud Saad Halala (2012) "The impact of oil price fluctuations on fiscal policy in Algeria 2000 -2010", Magister thesis in Economic Science, Economic Analysis, Faculty of Economic and Management Sciences, University of Algeria.
15. Mohamed Soudi, 2007, "Impact of the Program to Support Growth on Local Development in Algeria", magister thesis of Science in Economics, specialization: Money and Finance, University of Hassiba Ben Bouali, Chlef.
16. Mohamed Massai, 2012 , "The policy of economic revival in Algeria and its impact on growth", Journal of the researcher, No. 10, University of Qasdi Merbah, Ouargla, Algeria.
17. Nabil Bouflih, 2012 "Evaluation Study of the Economic Recovery Policy Applied in Algeria 2000-2010", Economic and Administrative Research, No. 12, University of Chlef, Algeria.
18. Nadia Khalafat ; 2010, «Diversification des exportations Quelles opportunités pour l'Algérie », University of Oran 2 Algeria, pages 57 à 59 et 70.

19. The Prime Minister's Interests, Annex to the Policy Statement, Annex III, Economic and Social Development Programs for the period 2010/2014, October 2010,
<http://www.premierministre.gov.dz/arabe/media/PDF/declarationpg2010.pdf>.
 20. National Statistics office, Statistical Analysis 1962-2011, Chapter 14, National Accounting.
 21. Oil prices on the OPEC website <https://www.opec.org>.
-