The Job Offer After the Oil Prices Fall in Algeria: A Spatial Analysis using Panel Data Approach (2014-2017)

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Received: 30/04/2020; **Revised:** 25/10/2020; **Accepted:** 16/12/2020

Summary: The present paper analyses the overall job offer by the four economic sectors offering employment (Industry, Agriculture, Services, and BTPH), based on a spatial analysis for all the Wilayas of Algeria grouped into eleven regional direction of employment (DREM), using panel data approach. The main objective of this research is to present one macro-econometric model that models the job offer in the eleven regional directions of employment in the same time, to figure out how it varies over the DREMs, and to define the significant job-creating sectors in all these areas after the all prices fall (from 2014 to 2017), using the division and the data of ANEM.

Based on the results, unlike the previous studies, the B.T.P.H sector is no more a job-creating sector, but the industrial and the services sectors becomes the most job-creating sectors in Algeria after the oil prices shock of 2014, the job offers (labor demand) are heterogeneous among the different regional directions of employment (DREM) except for the region of the center (Algiers) and the region of the East-center (Wilayas of the East-center), which is explained by the existence of the industrial poles and the strategic geographical locations of the two regions.

Keywords: Job offers; Job-creating sectors; Algeria; ANEM; Panel data.
Jel Classification Codes : E240 ; C490 ; E610.

I- Introduction :

Creating job opportunities constitute a preoccupation for all the governments and societies around the world because of its social and political impact. Algeria, like all the countries tries to improve the employment rate by a set of public policies and programs, however it still faces the problem of unemployment.

The current active population continues to grow in Algeria, from 11.453.000 in September 2014 to 12.298.000 in September 2017[1]. Nevertheless, if the labor demand does not grow with the same rhythm, a considerable increase in the unemployment rate will appear. In order to reduce the unemployment rate in the Algerian, the authorities have developed a national employment policy since the 80s, they have been strengthened in the meantime with the reorganization of the ANEM and its different contracts in addition to the creation of a several originations that support the entrepreneurial activities such as ANDI and ANSEJ…

As the Algerian economy is based on the hydrocarbon sector, the oil prices shock of 2014 has put the decision makers in a difficult situation where they were obliged to pass from an economy based on hydrocarbon to a productive economy based on income diversification by the production of goods and services, promotion of the national investment, and encouraging the entrepreneurial activities in order to ensure a certain employment rate.

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The problematic:

In order to achieve the objective of this research, we ask the following main questions:

- **Is the job offer homogeneous over the different regional directions of employment in Algeria? What is the job-creating sector after the oil prices shock of 2014?**

To answer the previous questions, the following hypotheses are suggested:

H2: The job offer is heterogeneous over the different regions in Algeria.

H1: Buildings, Public works and Hydraulics sector (B.T.P.H) is supposed to be the most job-creating sector in Algeria.

- **Objective of the study:**

This study aims to analyze and present one econometric model that models the job offers in the eleven regional directions of employment simultaneously, and show how does the job offers vary from DREM to another, as well as precising the job-creating sectors after the period of oil prices fall in 2014.

- **The plan of the paper:**

To conduct this study, our research is divided to two parts, the first is a literature review where we talked about a brief theoretical of the labor market and the job offer, after that about the Algerian labor market and its indicators according to ANEM. The second part, is an econometric study of the job offers by economic sector based on panel data models during the period 2014 to 2017 using Stata 14.2 software, to figure out how does the labor demand vary from regional direction of employment to another, and to determine which sectors are the most job-creating sectors in all the regions of Algeria after the oil prices fall in 2014.

- **The previous studies:**

Only few and old studies have dealt with the issue of the overall labor demand in Algeria, among the most important we mention:

- Zekane Ahmad[2], Analysis of the job offer, reality and prospects, case of Algeria. The study aimed to analyze the evolution of employment, its variant determinant, as well as the researcher prospects its evolution in the next 20 years. Finally, he concluded the following:
  - ✓ The industry remains the best-equipped sector in terms of qualified labor compared to other sectors;
  - ✓ The B.T.P.H sector, although it has recorded an improvement in the volume of labor, it still remains among the sectors under framing.
- More recently, Abaoub F-Z[3], Study of the evolution of the job offers during the period 2010-2014, case of ANEM. The researcher presented a study that aims to analyze the overall labor demand by economic sectors to define the job-creating sectors for graduates using PCA method. The researcher came up that:
  - ✓ The building and public works sector (B.T.P.H) is a dominant sector in the creation of employment for young graduates.

The previous studies have helped us to define the basic concepts of market labor, as well as the labor demand and its determinants, it also gave us an idea about the job-creation sectors in Algeria before the oil prices shock in 2014 which was the B.T.P.H sector. The previous studies did not present any mathematical nor econometric modeling of the job offers. However, through our study we will present an econometric model for the labor demand over all the Wilayas of Algeria in same time, and we will define the job creating sectors after the oil prices fall from 2014 to 2017.

I.1. Theoretical background: Brief overview of the labor market and the labor demand:

At this point we will explain the theory of market labor, the determinants of the labor demand, and the market labor in Algeria and its indicators according the national agency of employment (ANEM).

I.1.1. Theory of market labor:

Out of the traditional theories, more recently, Clower, Leijonhufvud and Malinvaud proposed, with the economy of the imbalance of demand and supply for labor, a more complex approach,

showing that Keynesian unemployment (linked to a lack of demand) and classic unemployment (linked to an insufficient wage flexibility) could coexist, causing lasting imbalances that no restoring force can easily eliminate.

From these bases, we see that the market labor has developed in two directions: by releasing some basic assumptions (homogeneity of work, perfect competition, the theories of job search and the sharing economy) and in introducing uncertainty (moral hazard, opportunism) and the segmentation of the labor market.

Undoubtedly, the synthesis is of quality: nothing is missing there, not even the regulations analyze, and the author emphasizes the limits, even the inconsistencies of the different approaches. But this maelstrom of theories leaves the reader speechless, because this desire for completeness (and the author's relativism), which is a quality for a textbook, makes us wonder whether economists have anything relevant to say on this subject[4].

I. 1.2 The main determinants of the job offer:

Macroeconomic works show that the tandems of the overall level of the labor demand in an economy depend both on growth prospects for production and on labor productivity. This latter variable summarizes the effects of technological progress assimilated, here, to the technological conditions of production.

Without going too far into the details and the theoretical debates, we will try to summarize it on three fundamental relations namely, growth of production-employment, productivity employment and Investment-Employment[5].

I.2. The labor market in Algeria and its indicators:

I.2.1 Sources of information in the Algerian labor market:

The analysis of the labor market requires a minimum of statistical information. This information usually comes from several sources that do not necessarily use the same concepts, definitions and nomenclatures.

The labor market observation system is generally composed of specialized survey systems with:

- Households, regarding labor supply through the concept of economically active population;
- Institutions, companies whose surveys do not provide information only on the job offer side (labor demand) and only concerns employees in general and in particular from a certain establishment size;
- Mixed (Households and institutions), in order to seize the informal employment; Administrative sources that can provide important data on the labor market (for example Social Security Fund)[6].

Among the agencies involved in the collection and processing of employment-related data in Algeria, we can mention: the ANEM (the national agency of employment), the ONS (the national statistics office and others.

I. 2. 2 The informal employment in Algeria:

The estimates of informal employment are straight forward by considering as informal workers and / or self-employed those who answered that they were not affiliated with the social security fund, either for employees or self-employed persons in all economy and non-agriculture for international comparisons.

In Algeria in 2010, out of almost 9.74 million (8.60 million excluding agriculture), 4.88 million (3.92 million excluding agriculture) are in informal employed. Over the last decade, the share of informal employment has varied between 46.6 and 53.1% in overall employment and between 36.5% and 45.6% in 2010 in non-agricultural employment. It should be noted that the non-

agricultural informal employment rate has been steadily increasing since 2001, reaching a peak of 45.6% in 2010, unlike the overall employment rate, which remained less volatile[7].

I. 2. 3 The Labor Market in Algeria and its indicators according to ANEM:

ANEM, through its local agencies of employment (ALEM) in all the Wilayas of the country, consolidates labor market data on a monthly basis and publishes them on a quarterly basis. These concern essentially:

- The received job applications;
- The performed placements;
- The received job offers.

a. Evolution of the job applications, the performed placements, and the job offers (2010-2017):

In Figure (1), we analyze of the number of registered job applications, the overall performed placements and the number of job offers during the period 2010-2017.

From this figure, we note that, during the period from 2010 to 2017, the number of job applications and the number of the job offers is increasing. For the number of the job applications we remark a rapid increase from 638368 demands in 2010 to 1232016 demands in 2014, this increase is explained by the amelioration of the economic conditions in the country during this period and the improvement of the number of the graduated population from the institutions of higher education especially in 2014, the number of graduates reached 1.200.000 individual[8], where they were oriented to register in ANEM to avoid unemployment. After that we note a moderate decrease from 1232016 to 1005506 in 2015, then it increases gradually until it reached 1142662 in 2017.

We can see that there is a mismatch between supplies and demands for employment, indeed the deviation between the number of job applications and the job offers is positive, whatever the year of the period 2010-2017.

We also observe that, the demands and supplies curves do not intersect, there is no intersection, therefore there is no equilibrium in the labor market, from the point of view of ANEM. Consequently, we have a deep and lasting imbalance between the job offers and the job applications, over the period 2010-2017, and by definition we face a structural unemployment[9].

In Figure (2), we analyze the number of performed placements and the number of job offers during the period from 2010 to 2017.

From this figure, we observe a steadily increase of the number of job offers coming from companies that demand jobs through ANEM every year, 234666 jobs offered in 2010 to 452844 jobs offered in 2017, say that twice of job offers in 2010, this increase is explained by the economic policy which supports the investment, the privacy of the public companies and the partnership with foreign companies during this period.

For the number of performed placements, we note that, the placements graph has the same deviation as the job offers graph because the two variables are positively correlated where the placements are a direct function of the labor demand with a positive relationship[10]. Therefore, if the job offers increase the performed placements increase as well, but the placements graph always situated under the job offers graph which proves that ANEM does not reach the full placements (a suitable placement for each job offer). The number of the performed placements increases every year, 179821 placements in 2010 to 350867 placements in 2017, say that twice of the placements in 2010.

II– Methods and Materials:

In our research, we were particularly interested in the data of the ANEM which was chosen thanks to the current status of quasi-monopoly in intermediation between the companies offering

employment and job seekers. To decentralize the management of functions and means, ANEM divided the 48 Wilayas of Algeria to eleven regional direction of employment (DREM), using the criteria of distance and number of populations in each Wilaya, where the number of Wilayas differs from a DREM to another. The DREMs and the Wilayas included are described in table (1).

II.1. The chosen model for the study:

As our study aims to analyze the overall job offer by the four economic sectors (Industry, Agriculture, Services, and B.T.P.H) that offering employment in the eleven regional direction of employment, to figure out the job-creating sectors after the oil prices fall in 2014 until 2017, and to see how does the labor demand vary from DREM to another. Our research does not aim to determine the impact of the explanatory variables (Job offers by economic sector) on the dependent variable (the overall job offer) or provide previsions. Consequently, in this type of studies (analysis studies among different regions) the application of a **static panel data** is more suitable. This methodology was chosen thanks to the ability of this model for controlling for individual's heterogeneity, and it provides more informative data, besides, it is very useful to analyze the labor mobility[11]. And in order to perform this model, we used the software STATA, version 14.2.

II.2. Data of the study:

ANEM is the only institution that provides official data on the labor market in Algeria, even though these data are often incomplete and do not reflect the full reality of the Algerian labor market. Otherwise, it is not the case for the job offers. According to the workers of DIED during my internship in ANEM, "thanks to the application of the provisions of the law n ° 04-19 (25 December 2004) relating to the control and placement of the workers, this instruction obliges the employers (companies) to deposit their job offers at the level of the network agencies of the ANEM for 5 days and if these job offers are not satisfied the companies are free to deposit and recruit the way they prefer". Consequently, all the job offers in Algeria are calculated by ANEM.

II.3. Sample and variables of the study:

In our study we used 11 DREM (as explained in table 1) and 16 periods of time (from 2014 to 2017 quarterly) which means we have 176 observations for each variable.

We considered in our study the number of companies registered in the ALEM* or AWEM** of each Wilaya to offer employment as the overall labor demand (each company offers at least one job), and the job offer by economic sectors as explanatory variables. We used the number of companies per quarter format during the period from 2014 to 2017 to see how the overall job offer is divided by the different economic sectors in the different regions in Algeria during this period, where we denoted each variable as the following:

Num_Comp = The number of jobs demanded (labor demand) by the companies via the ALEM or AWEM of each Wilaya;
Service = The number of job offers in the Services sector;
Indus = The number of job offers in the Industrial sector;
Agri = The number of job offers in the Agricultural sector;
BTPH = The number of job offers in the Buildings, Public works and Hydraulics sector (B.T.P.H).

III- Results and discussion :

III.1. Descriptive statistics of the variables:

The table (2) shows the descriptive statistics of each variable used in our study for all regional directions with overall variation (variation over time and individuals). From this table we note that the number of observations for the different variables is identical ($N = n \times T = 176$ observation for each variable), which is explained by the balanced panel data that we have. The maximum and the

* ALEM: Local Agency of Employment.

** AWEM: Wilaya Agency of Employment

minimum values may allow us detecting the existence of outliers, such as in the agriculture sector where we have at least one job offered in a quarter, whereas, in the services sector 532 jobs offered (531 job offer in difference), in other hand, we note that the maximum number of jobs offered is 12144 in the BTPH sector against only 1322 job offered in the agricultural sector.

From the mean / standard deviation, we note that the mean and the standard deviation of each variable differs from other, and from the number of registered companies offering employment, we note that there is at least 386 registered company per quarter at ANEM, if we add the minimum of jobs offered in different sectors, we will have at least 1045 job offered (287+225+1+532) in a quarter, depending on these points, one registered company offered at least 3 jobs per quarter (1045/386).

III.2. Choosing the more appropriate model for the study:

To estimate the more appropriate model for the study, there is a several stages to perform (tests). First of all, we should examine the data structure to specificity the homogeneity or the heterogeneity of the panel data and see whether the structure is accepted or not, based on Hsiao (1986) test. Then, we will pick the suitable model from the different types of panel data models (Fixed Effects, Random Effects). Finally, we will perform a diagnostic checking to see whether the model suffers from estimation issues or not.

III.2.1. Hsiao test 1986 (Homogeneity test) :

Before performing the panel data models, we need to consider the data structure first and see whether its form is accepted for panel data or not. The test procedure[12] and its application are shown in table (3).

From the test results, we note that, $\boldsymbol{H_0^1}$ is rejected (the coefficients are heterogenous), as a result we move to the second test. As the $\boldsymbol{H_0^2}$ is accepted, we accept the data structure form for panel data and we move to test3. Finally, as $\boldsymbol{H_0^3}$ is rejected (the constants are heterogenous across panels) we conclude that we have **heterogeneous panel data with individual effects.**

III.2.2. Fixed effects model or Random effects model (FEM or REM):

In the panel data models it is preferred to apply Hausman test to determine whether fixed or random effects[13], where the null hypothesis is that the favored model is random effects versus the alternative the fixed effects. It basically tests whether the unique errors are correlated with the regressors or not, and the null hypothesis is they are not correlated.

As we observe from table (4), the Hausman test refuses the hypothesis of no correlation between the random terms and the regressors (P-value = 0.0000, i.e. significant), therefore the estimators of REM are biased. As a result, the more appropriate mode for our study is **the fixed effects model.**

As the more appropriate model for our study is the Fixed effects model. To provide a better way for understanding the fixed effects and show the special features that may exist for each DREM and allow the (fixed effect) intercept to vary between individuals, we used the dummy variables technique, particularly the **Least Square Dummy Variable model (LSDV).**

In the LSDV modeling, if a qualitative variable has n categories, we introduce only (n - 1) dummy variables. If we do not follow this rule, we will fall into what is called the dummy variable trap (perfect multicollinearity)[14]. Since the qualitative variable “region” has eleven categories, we introduced only ten dummies, and we are treating the first DREM as the benchmark (d1= DREM1 to represent Algiers, the capital) or reference category in order to show how much the intercept

coefficient of each DREM differs from the benchmark region although any individual can be chosen for that purpose, otherwise the reference category was chosen thanks to the huge number of populations and the companies there (theoretically, a pole of employment).

III.2.3. Diagnostic checking for the Fixed effects model (LSDV Model):

a. The Wald test for fixed group effects:

Right after running the LSDV model we have to know if there is a significant fixed group effect, to do so, we should perform the F-test alternatively the Wald test to confirm that. For our comparison the null hypothesis of this test is that all dummy parameters except for one are equal to zero[15]: $\boldsymbol{H_0: d_1 = d_2 = ... = d_{n-1} = 0}$.

From the Wald test results in table (5), we stress that the null hypothesis is rejected at the threshold of five percent, then we have statistically significant group effects, in other words each regional direction has its own intercept value (individual effect) for the number of jobs offers.

b. Pesaran's test for cross-sectional dependence:

The impact of cross-section dependence appears generally in dynamic panel data estimators and it causes a large decrease in estimation efficiency, and the cross-sectional dependence test is valid only when T < n.[16], where T is the number of time observations and n is the number of the individuals (regions). (**A**)

Cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). This is not much of a problem in micro panels[17]. (**B**)

From (A) and (B), we can say that the Cross-sectional dependence test cannot be applied in the case of our study (test is not valid) as we have T=16 (<20 years) and n=11.

c. Residual diagnostics:

Finally, after choosing the LSDV model as the most appropriate model, there are a several diagnostic checking to do, to confirm that the model is well estimated, and how well does the model explains our phenomena. To do that, we should perform the **modified Wald's test** to confirm that the error terms are heterogeneous across time and DREMs (regions), and the **Wooldridge's test** to confirm that there is no first-order autocorrelation of the error terms (no serial correlation).

- **The modified Wald's test for heteroskedasticity:**

The error process may be homoscedastic within cross-sectional units, but its variance may differ across units: a condition known as groupwise heteroskedasticity. Where the null hypothesis of all the error terms variances are equal across units[18]. In other words, the errors terms variances should be heterogenous across the eleven regions (DREMs).

The modified Wald test results in table (5), illustrates that the fixed-effect model residuals are heterogeneous across the regional directions of employment.

- The **Wooldridge**'s **test for serial correlation:**

Serial correlation will not affect the unbiasedness or consistency of OLS estimators, but it does affect their efficiency. With positive serial correlation, the OLS estimates of the standard errors will be smaller than the true standard errors. This will lead to the conclusion that the parameter estimates are more precise than they really are. There will be a tendency to reject the null hypothesis when it should not be rejected[19].

The null hypothesis indicates that the first order correlation between the error terms equal to zero.

According to the Wooldridge's test results shown in table (5), we fail to reject the null and conclude that the there is no first-order autocorrelation between the error term (no serial correlation).

III.3. Interpretation of the chosen model:

III.3.1. Model estimation:

From the previous results, we conclude that there are no estimation problems in the fixed effects model (Least squares dummy variables), and it is the more appropriate model to explain our phenomena. The estimation result of the chosen model is as the following:

$$\widehat{Num\_Comp} = 955.6534 - 535.993\ d_{2t} - 585.5433\ d_{3t} - 476.9132\ d_{4t} - 605.6625\ d_{5t} - 567.958\ d_{7t} - 386.4466\ d_{8t} - 645.9859\ d_{9t} - 523.2649\ d_{10t} - 201.6865\ d_{11t} + 0.0288 * Service + 0.0412 * Indus. \quad \text{Eq 1, see table (6).}$$

III.3.2. Results:

We have used 10 dummy variables (d_{2t} to d_{11t}) to represent each regional direction of employment, where we treated the first DREM (d1=DREM1) as a benchmark category to compare how much the intercept of each DREM will differ from the reference (Algiers), for example DREM9 which differs from the benchmark by – 646 jobs offer per quarter, despite the DREM 9 contains 6 Wilayas, but it situated in the south of Algeria where the number of companies and the population there is small comparably to Algiers, certainly there is big companies there like SONATRACH, SCHLULMBERGER…, but the recruitment is national and not only for the residents of the Wilayas of DREM9.

We can see from the (Eq 1) that each DREM has its special features that may differ it from the others, except for the DREM 6 which is not significant, that can be explained by the similarities between the two DREMs, these similarities are explained by the industrial poles especially in the Wilayas of Bordj Bou Arreridj, Setif, M'sila and Constantine, it is also explained by the geographical location of these Wilayas which are close to ports and airports (port of Jijel) that facilitate the economic exchanges there, and by the advantages and the concentration of the investment in this DREM[20], as is it also explained by the advantages gained from the investment in the highlands (such as Bordj Bou Arreridj and Setif)[21]. Therefore, the sum of the number of job offers in the industrial and services sector is close to Algiers.

From the first visual analysis of the model, we note that the services and the industrial sectors are significant in all the regions of Algeria, which means that these two are the main sectors that offer the most employment in the country (job-creating sectors), and they are the most developed ones, this could be explained by the change of the economic policy in the country, that promote the investment of the industrial sector and give facilities and advantages to industrial companies especially in the last two years, in 2016, 2509 projects invested in the industrial sector which created 94134 job offers (more than 32 employment per project), and 3555 projects invested in the services sector, which created 51430 job offers[22], and as the invested capital increases the production which goes hand in hand with the employed labor force, consequently, if the production increases, the necessary employment for this production will increase as well, which creates employment. Therefore, any investment in the industrial sector (expansion or new projects) will create job offers in both sectors, services and industrial sectors, because any project needs an administration and management for its continuity.

We also observe from the (Eq 1) that, the agricultural sector is not significant, which is explained by the non-education of the most Algerian farmers. "Education appears as a protection against informal employment: the probability is decreasing with regard to the level of education"[23], which means that the non-significance is explained by the informal employment in the sector where the most workers are not declared, so they will not use the ANEM or other official agencies in the recruitment process.

The job offers in the B.T.P.H sector are not significant in comparison with the number of companies offering employment through ANEM, this is explained by the concentration of the market of Building and public works, which means that the job offers in this sector are coming from the same companies every time in different regions. The non-significance of the labor demand in this sector is also explained by the informal employment, "Informal employment is more common in companies operating in the construction sector"[24], especially the use of the African refugee's work force by the Algerian entrepreneurs in the construction sites, where we have as an example 10.000 workers of African refugees non-declared in construction sites in 2014 [25] . Depending on these bases, we can't consider the B.T.P.H and the agricultural sectors as a job-creating sectors.

As discussed, the previous studies did not present any mathematical nor econometric modeling of the labor demand. However, through our study we captured the heterogeneity of the job offers and present it in one econometric model that models the JOs over all the eleven regional directions of employment in the same time, as well as we defined the job creating sectors after the oil prices fall from 2014 to 2017, which are the industrial and the services sectors.

IV- Conclusion:

The objective of this research is to analyze and provide one econometric model that models the job offers in the eleven regional directions of employment (DREMs) in the same time, as well as precising the job-creating sectors after the period of oil prices fall and show how does the labor demand vary from DREM to another. To achieve this objective, we used the method of panel data which allowed us to analyze the job offers (labor demand) by economic sector in the different regions of Algeria using the regional division of ANEM that divided Algeria to eleven regional directions of employment. Finally, we have come up with a set of results that can be summarized as the following:

Unlike the previous studies, the economic sectors significant in the model after the oil prices shock of 2014 until 2017 is no more the B.T.P.H sector, but the industrial and the services sectors, which means that the job creating sectors over all the regions of Algeria (DREMs) are: the services and the industrial sectors, depending on these bases, we reject the first hypothesis: The B.T.P.H sector is the most jobs creating sector in Algeria. The B.T.P.H sector is no more a job creating sector in the period 2014 to 2017 according to the number of registered companies offering employment through ANEM, because this sector suffers from the informal employment and the concentration of the market of public works and buildings. According to this we can say that this sector still an under-framed sector.

According to the study, all the DREMs are significant in the model, p-value< 0.05, except for DREM6, this leads us to confirm that the job offers in all the DREMs are different from the benchmark category (DREM1), Algiers, which means that the labor demand in the different regions of Algeria is different from Algiers except for DREM6. Depending on this point, we confirm the second hypothesis: The labor demand is heterogeneous over the different regions of Algeria. The non-significance of the DREM6 is explained by the close number of job offers in the two DREMs thanks to the industrial poles and the economic exchanges facilities in the two locations.

For the agricultural sector still not a job-creating sector because it suffers from the informal employment too and the non-education of the Algerian farmers, consequently they don't rely on ANEM or other official agencies in the recruitment process.

Finally, we also conclude from our study that the number of job offers in the period of the third quarter of each year (the period of graduation) is very law, which explained why lot of young graduates suffer from unemployment at least two or three months before starting their first job.

After this work there are several recommendations to propose:

a. For the Algerian authorities, we suggest the control and the framing of the B.T.P.H sector, the government should find solution to integrate and register the African refugees exploited by the Algerian entrepreneurs in the B.T.P.H and the agricultural sectors.

b. We also recommend for the Algerian authorities to give more advantages and facilities for the investment in the Wilayas of each DREM according to the special features of the area, especially the DREM 11 to create another industrial pole there (employment pole).

c. The Algerian government should make an adequation between the professional trainings, the higher education and the requirements of the labor market.

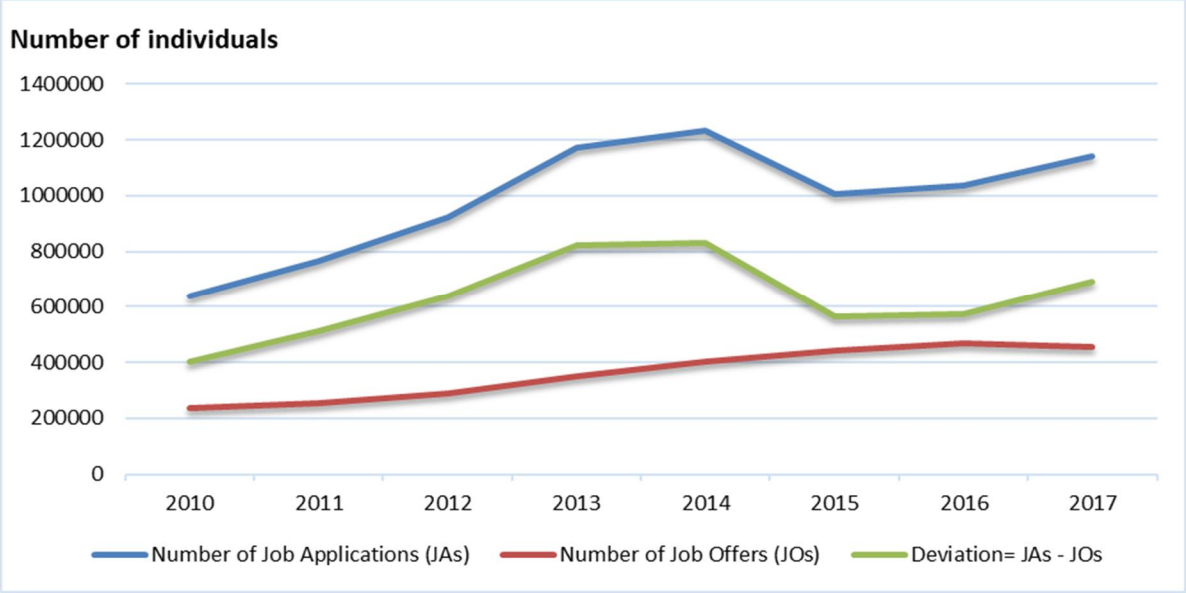
d. We propose to the National Agency of Employment (ANEM) to distinguish between the administration and trade, transport, communication and other market services, because in nowadays the market services becomes a job creating sector such as the case in digital marketing or in the IT in general.

e. The Algerian government should invest in the agricultural sector to reach Self-sufficiency, after that it should be oriented to invest in the industrial and the services sectors to meet the new generation sector -Digitalization-.

For the future works, we propose a deeper study to determine the determinants of the labor demand (Job Offers) in the different regional directions of employment each according to its special features to meet the requirements of the labor market of the DREM.

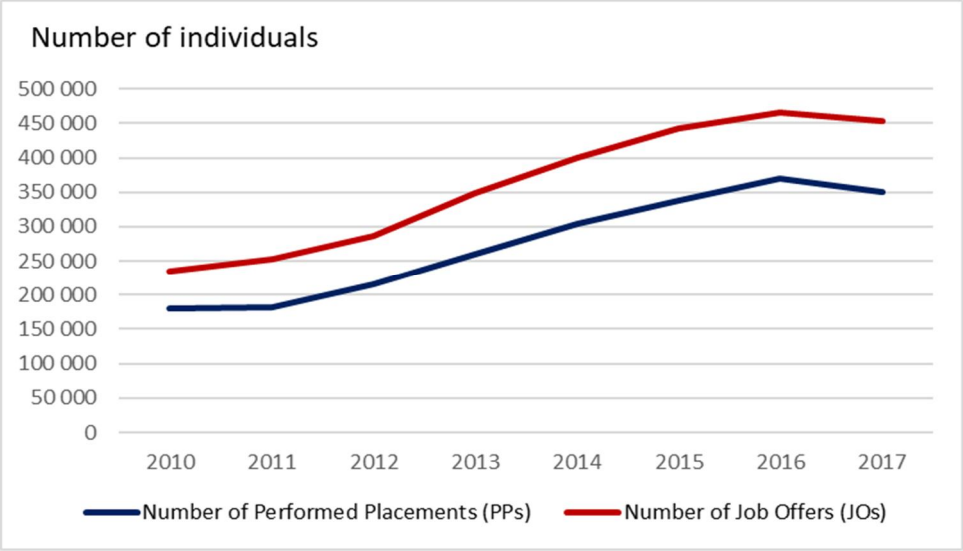
- Appendices:

Figure (1): Evolution of the job Applications and the job offers (2010-2017).



The source: Based on the data of ANEM.

Figure (2): Evolution of the performed placements and the job offers (2010-2017).



The source: Based on the data of ANEM.

Table (1): Representation of the DREMs

DREM:	Wilayas of each DREM:
DREM1	Algiers
DREM2	Annaba, El Tarf, Guelma, Skikda and Souk ahras.
DREM3	Bechar, Adrar, Naama and Tindouf.
DREM4	Blida, Djelfa, Medea and Tipaza.
DREM5	Chlef, Mascara, Relizane and Ain defla.
DREM6	Constantine, Mila, Jijel, M'sila, setif and Bordj Bou Arreridj.
DREM7	Khenchela, Batna, Biskra, Oum el bouaghi and Tebessa.
DREM8	Oran, Ain temouchent, Mostaghanem, Sidi bel abbes and Tlemcen.
DREM9	Ouaregla, El ouad, Ghardaia, Illizi, Laghouat and Tamenrasset.
DREM10	Saida, El bayedh, Tiaret and Tissemsilt.
DREM11	Tizi Ouzou, Bejaia, Bouira and Boumerdes.

The Source: Internal documents of ANEM.

Table (2): Descriptive statistics of panel data.

Variable	Obs	Mean	Std. Dev	Min	Max
Num_Comp	176	786.7614	366.5834	386	1765
Indus	176	3468.608	2174.56	287	9611
Btph	176	3935.347	2617.814	225	12144
Agri	176	388.1534	248.2921	1	1322
Service	176	3317.392	1927.462	532	8636

The Source: STATA 14.2 outputs.

Table (3): Hsiao test.

Test	Test Hypothesis	P-Value
Test 1	$\boldsymbol{H_0^1}$**:** Perfect homogeneity of the coefficients	0.000 <0.05
Test 2	$\boldsymbol{H_0^2}$**:** Homogeneity of the slope coefficients	0.962 > 0.05
Test 3	$\boldsymbol{H_0^3}$**:** Total homogeneity of the constants	0.000 < 0.05

The Source: STATA 14.2 outputs.

Table (4): Hausman test.

Test	Test Hypothesis	P-Value
Hausman	H_0^1: There is no correlation between the error terms and the X's	0.000 <0.05

The Source: STATA 14.2 outputs.

Table (5): Diagnostic checking Tests for.

Test	Test Hypothesis	P-value
Wald's test	H_0^1: The coefficients for all dummies are jointly equal to zero (d_i = 0; i =2 to 11).	0.000 <0.05
The modified Wald test	H_0^1: Constant variance for all individuals	0.000 <0.05
Wooldridge's test	H_0^1: ρ = 0 : No first order autocorrelation between the error terms	0.528 >0.05

The Source: STATA 14.2 outputs.

Table (6): Estimation of the LSDV model (FEM).

Regress Num_Comp d2-d11 Btph Agri Service Indus

Source	SS	df	MS
Model	22332532.4	14	1595180.90
Residual	1184563.58	161	7357.53775
Total	23517096	175	134383.406

Number of Obs	176
F (14, 161)	216.81
Prob> F	0.0000
R-squared	0.9496
Adj R-squared	0.9452
Root MSE	85.776

Num_Comp	Coef.	Std. Err	t	P> | t |	95% Conf.	Interval
d2	-535.993	78.42205	-6.83	0.000	-690.8615	-381.1245
d3	-585.5433	94.76142	-6.18	0.000	-772.6789	-398.4076
d4	-476.9132	74.92582	-6.37	0.000	-624.8773	-328.9491
d5	-605.6625	81.1713	-7.46	0.000	-765.9603	-445.3648
d6	42.35212	45.16708	0.94	0.350	-46.8442	131.5484
d7	-567.958	73.89829	-7.69	0.000	-713.8929	-422.023
d8	-386.4466	61.3677	-6.30	0.000	-507.636	-265.2572
d9	-645.9859	75.08776	-8.60	0.000	-794.2698	-497.702
d10	-523.2649	92.66013	-5.65	0.000	-706.2509	-340.279
d11	-201.6865	50.08393	-4.03	0.000	-300.5926	-102.7803
Btph	-0.0219032	0.081519	-0.25	0.802	-0.0181457	0.014051
Agri	0.0219032	0.0407984	0.54	0.592	-0.0586658	0.1024723
Service	0.028802	0.011559	2.49	0.014	0.0059751	0.0516288
Indus	0.0412367	0.0118509	3.48	0.001	0.0178335	0.0646399
_Cons	955.6534	105.4979	9.06	0.000	747.3153	1163.992

The Source: STATA 14.2 outputs.

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How to cite this article by the APA method:
Abdallah Hamdini, Lazhar Chine (2020), **The Job Offer After the Oil Prices Fall in Algeria: A Spatial Analysis using Panel Data Approach (2014-2017)**, El-Bahith Review, Volume 20 (Number 01), Algeria: Kasdi Marbah University Ouargla, pp. 75-88.