

## Analysis of employment policy under economic recovery programs Case study of Algeria

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### Abstract:

This article aims to analyze the most important indicators of employment policy in Algeria, as well as examining the true impact of economic recovery policy combating unemployment. We have also tried to build a mathematical model for the workforce that helps us in finding the number of jobs that can be created during the period 2015 - 2019 according to the available financial capabilities, using the method of linear programming.

By analyzing the estimated model we conclude that the labor force in Algeria will increase by 1.4%, and therefore the government should raise public expenditures by 5% annually.

**Keywords:** Economic recovery programs; employment; unemployment; labor market; Algeria

**Jel Classification Codes:** C01, C02, C13, F62, F68

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### 1. INTRODUCTION:

Since independence, Algeria has undertaken several economic reforms in an effort to achieve economic growth and raise the standard of living and address the problem of unemployment, which experienced a significant increase in the nineties as a result of the deteriorating economic conditions at that time and the exposure of the national economy to many crises, including the drop in oil prices in 1986, the political and security crisis in the nineties, the crisis of high external debt, prevented the achievement of the underlined goals .

With the increase in oil prices again in the year 2000, Algeria entered a new stage based on reviving the national economy through a Keynesian economic policy that relies on raising government spending to support growth and employment, and huge amounts of money have been allocated to these programs. (Chohra .B, 2009, p. 45)

This study aims to evaluate the programs of the economic recovery policy applied in Algeria during the period 2001 - 2019, and these programs have included a lot of investments and projects, the aim of which is to stimulate the national economy and raise growth rates and from it create new jobs and thus reduce unemployment levels besides building a mathematical model for the workforce that help us in finding the number of jobs that can be created in the future during the period 2015 - 2019 by using the linear programming method, we also tried to test this model by the prediction process.

#### The Problem:

**What is the reality of employment policies in Algeria in light of the economic recovery programs?**

### 2. The hypotheses of the study:

- The operational policy is to enable a person to obtain work and work in various economic activities after receiving an amount of training, training and qualification;
- The policy of economic recovery is to increase the volume of government spending in order to stimulate the production machine, this is reflected in the job application;

- The ability of the economy to provide all financial, political and fiscal privileges to work to raise the level of national production;
- The most important variables affecting the workforce are: the total size of the population, gross domestic product, and public expenditures.

### **3. Objectives of the study:**

The objectives of the study are reflected in an analytical aspect of employment policy in Algeria in light of government spending programs and an attempt to link the study to the economic reality through the following :

- Determining the reality of the employment policy to reduce unemployment;
- Evaluating the effects resulting from the implementation of economic development programs and the effects of economic recovery programs on employment;
- Determine the number of jobs that can be created in the period 2015-2019.

### **4. Study methodology:**

To answer the problem, we divided our study into four main axes:

**The first axis:** the concept and objectives of the economic recovery policy.

**The second axis:** the programs of the economic recovery policy in Algeria during the period 2001-2014.

**The third axis:** the implications of the economic recovery policy on employment and unemployment in Algeria during the period 2001-2014.

**The fourth axis:** employment policy programs in Algeria for the five-year 2015-2019 We will try within this axis to build a mathematical model for the reality of the workforce to help us find a number of jobs that can be created during the period 2015 - 2019, according to the available financial capabilities and expected taxes, using the programming method Linearity, as we tried to test the model with a predictive study.

### **5. The concept and goals of the economic recovery policy:**

Since 2001, Algeria has pursued an expansionary fiscal policy based on increasing government spending in order to revitalize the national economy and support the development movement, and thus achieve jobs and reduce unemployment.

#### **5.1 The concept of economic recovery policy:**

The economic recovery policy is considered the most important means of the budget policy that the state uses to influence the economic conditions by adopting programs to stimulate aggregate demand by increasing private and public spending to increase production, thus supporting growth and absorbing unemployment. (n, 2010, p. 28)

#### **5.2 The objectives of the economic recovery policy:**

The objectives of the economic recovery support programs are defined as follows:

- Stimulating aggregate demand and supporting productive activities of value added and jobs;
- To create and implement basic structures that allow the resumption of economic activities and cover the basic needs of the population;
- Improving the living conditions of the population, supporting local development, developing human resources, and strengthening and developing public services;

## 6. The economic recovery policy programs in Algeria during the period 2001-2014:

The strategy of economic growth in Algeria has been incorporated into the internal support the country gives to this process through the following programs: (Ahmed, 2014, p. 14)

### 6.1 The Economic Recovery Support Program 2001-2004:

This program was approved in April 2001 and it is a financial allocations distributed over the period 2001-2004 in varying proportions, with a total value of about 525 billion dinars and aims to reduce poverty and create jobs and Supporting regional balance and rural development. The contents of this program are detailed in Table N° 01 as follows:

**Table N° 01: Details of the contents of the economic recovery program for the period 2001- 2004**

The year Sectors	2001	2002	2003	2004	Total	Percentages
<b>Structural work and basic structures</b>	100.7	70.2	37.4	2.0	210.5	40.1
<b>Local and human development</b>	71.8	72.8	53.1	6.5	204.2	38.8
<b>Supporting the agriculture and fishing sector</b>	10.6	20.3	22.5	12.0	65.4	12.4
<b>Support for reforms</b>	30.0	15.0	-	-	45.0	8.6
<b>Total</b>	<b>205.4</b>	<b>185.9</b>	<b>113.9</b>	<b>20.5</b>	<b>525.0</b>	<b>100</b>

Source: The National Economic and Social Council, Report on the Economic and Social Situation of the Second Six-Year of 2001, Twentieth General Session, Algeria, 2001, p. 139.

### 6.2 The Supplementary Program to Support Growth 2005-2009:

This program aims to put the largest possible number of local and foreign investments to accelerate the pace of growth and thus reduce unemployment. This program is considered large in the economic history of Algeria in terms of its value, which amounted to 4203 billion DZD. Distribute them as shown in Table N° 02:

**Table N° 02: Supplementary Program for Growth Support 2005-2009**

The years Programs	2004	2005	2006	2007	2008	2009	Total
<b>Recovery planner Economic</b>	1071	/	/	/	/	/	<b>1071</b>
<b>Supplementary program To support growth</b>	/	1273	3341	260	260	260	<b>5394</b>
<b>South program</b>	/	/	250	182	/	/	<b>432</b>
<b>Highlands Program</b>	/	/	277	391	/	/	<b>668</b>
<b>Treasury account transfers</b>	/	227	304	244	205	160	<b>1140</b>
<b>Total</b>	<b>1071</b>	<b>1500</b>	<b>4172</b>	<b>1077</b>	<b>465</b>	<b>420</b>	<b>8705</b>

Source: Government Presidency, Supplementary Program to Support Economic Growth 2005-2009, at: [www.cg.gov.dz](http://www.cg.gov.dz)

### **6.3 The Economic Growth Consolidation Program 2010-2014:**

It represents a scenario of expenditures of 21214 billion dinars, and it was distributed as shown in Table N° 03:

**Table N° 03: Distribution of Credits for the Economic Growth Consolidation Program In the period 2010-2014**

	The value is in billion dinars	The ratio %
<b>Human Development</b>	10122	49,59
<b>Basic installations</b>	6448	31,59
<b>Improve public service</b>	1666	8,16
<b>Economical development</b>	1566	7,67
<b>Combating unemployment</b>	360	1,76
<b>Scientific research and new communication technologies</b>	250	1,22
<b>Total</b>	<b>20412</b>	<b>100</b>

**Source:** Dif Ahmed, The Impact of Economic Recovery and Supporting Growth Programs on Employment in Algeria, Intervention Forum for Employment Policies in the Framework of Development and Economic Recovery Programs in Algeria 2001-2014, Bouira University, on November 11 and 12, 2014, p. 11

Through the credits allocated to this program, we note that it focused on the following objectives:

- Achieving human development as a main pillar of the program,
- Focusing on basic facilities and the public works sector,
- Improving public service,
- Contribute to supporting economic development,
- Attention to the problem of unemployment,
- Attention to the field of scientific research and new technologies.

### **7. The implications of the economic recovery policy for employment and unemployment in Algeria:**

Economic recovery policy programs aim to refinance the economic wheel, leading to the creation of jobs by supporting economic sectors that generate employment.

#### **7.1 Implications of implementing the 2001-2004 economic recovery programs at the employment level in Algeria:**

The implications of the program for employment in the extent of job creation during this period are evaluated according to Table N°04.

**Table N° 04: Employment Ratios during the Economic Recovery Program Period 2001-2004**

Year	2001	2003	2004
<b>Percentage of workers (%)</b>	72.7	76.3	82.3
<b>Distribute them by sector of activity</b>			
<b>Agriculture (%)</b>	21.06	21.13	20.74
<b>Industry (%)</b>	13.82	12.03	13.60
<b>Building and public works (%)</b>	10.44	11.97	12.41
<b>Trade and services (%)</b>	54.68	54.87	53.25

**Source:** Prepared by the researcher according to data from the National Statistics Office

Through Table N°04, it becomes clear to us that the year 2004 witnessed the largest increase in the employment rates for this period, which witnessed a steady development, as it moved from 72.7% in 2001 to 82.3% in 2004,

We also note that the largest creation of jobs was in the trade and services sector at 54%, followed by the agriculture sector at 21%. As for the participation of the rest of the sectors in creating jobs, it remains weak, especially in the construction and public works sector, which recorded 12% and the industrial sector that scored 13%. We can say that this program allowed the creation of 728,666 jobs. (Mezouaghi, 2009, p. 18)

In addition to this, we can explain the effect that the economic recovery support program for the period 2001-2004 had on unemployment rates, according to Table N° 05.

**Table N° 05: Unemployed persons and the unemployment rate during the period 2001-2004**

The year	2001	2002	2003	2004
Unemployed in millions	2.58	2.41	2.078	1.672
Unemployment rate %	27.30	25.70	23.72	17.70

Source: Prepared by the researcher according to data from the National Statistics Office

From Table N°05, we note that during the period 2001-2004, unemployment rates decreased significantly.

## 7.2 Implications of implementing the 2005-2009 growth support program at the employment level in Algeria:

The most important repercussions of this program can be recorded through job creation created by sector, through Table N° 06:

**Table N° 06: Operating Ratios during the Growth Support Program 2005-2009**

The Year	2005	2006	2007	2008	2009
Percentage of workers (%)	84.7	87.7	86.2	88.7	89.8
<b>Distribute them by sector of activity</b>					
Agriculture (%)	17.16	18.15	13.62	13.69	13.11
Industry (%)	13.16	14.25	11.96	12.48	12.61
Construction and public works (%)	15.07	14.18	17.73	17.22	18.14
Trade and services (%)	54.61	53.42	56.69	56.61	56.14

Source: Prepared by the researcher according to data from the National Statistics Office

We see from Table 06 that the operating rates in the period 2005-2009 are constantly increasing, It also shows us the positive impact of the growth support program on the volume of employed workers, which generates an increase in aggregate demand, but it did not lead to an increase in the operation of the local production system, but rather benefited from the economies of other countries, which is confirmed by the volume of imports of goods and services, which amounted to about 50 One billion dollars in 2008, an increase of about 191.3% compared to 2005.

## 7.3 Implications of implementing the quinquennial program 2010-2014 at the operational level in Algeria:

Since 2014, the total employed population reached 10239,000 people, or 26% of the total population and 89.4% of the total workforce, and the female labor force constitutes 16.8% of the total employed population, that is 1722,000 employed.

This development in employment ratios is due to the economic recovery policy applied during this program, which is reflected in the employment ratios through sectors, where it is noted that the dominant percentage of the labor force is the trade, services and

public administration sector, which represents on average more than 50% , and this sector is not considered a productive value-added sector, but only an assistant to the productive sectors represented in agriculture and industry, followed by the construction and public works sector, which represents on average more than 15%. (ONS, 2015, p. 10)

#### **8. Algeria's employment policy programs for the 2015-2019 term:**

In the context of completing the development process that the state implemented in early 2001, the government built a new program to revitalize the sectors that are still in progress and work to implement new attempts that can advance the national economy .

The public investment program for the period 2015-2019 will be embodied thanks to a foreign exchange reserve of approximately \$ 200 billion, income control fund balances estimated at \$ 5600 billion and virtually zero external debt. (Algeria, 2019, p. 8)

#### **9. The main themes of the government program 2015 - 2019:**

Through these axes, the state seeks to build a reliable economy in the future through:

- Eliminate dependency on the hydrocarbon sector and ensure solid economic growth;
- Dependence on productive investment. (Algeria, Quarterly Statistical Bulletin N° 42 , 43 , 44 , 45 , 2018, pp. 10 , 7 , 9 , 12)

To work on developing the south, the state has redoubled efforts on all sectors of development through:

- Reconciling supply and demand.
- Encourage small enterprises.
- Encouraging and multiplying work in the south.

#### **10. Sources of data collection and model estimation:**

The aim of the study is to analyze the effect of increasing spending and reducing taxes as the most important tools for economic recovery at the workforce level, using a partial adjustment model that aims to estimate the flexibility of the LL workforce in the short and long term with respect to the explanatory variables represented in the LDEP and Limp.

In addition to estimating the self-resilience of the workforce in the t-period with respect to the workforce in the t-1 period in order to demonstrate the stability of the workforce's time path during the study period and trying to build a model to predict the size of the workforce during the end of 2019.

##### **10.1 Data sources:**

The data source is the World Bank and the Bank of Algeria regarding operating statistics in Algeria for the period 2001-2014. (Algeria, Quarterly Statistical Bulletin , 2016 and 2017, pp. 7 , 11 , 14 , 10)

##### **10.2 Model Estimation:**

In estimating the model, we used a double linear logarithm formula for the LL workforce, the LDEP overhead, the Limp tax, and the delayed workforce with a single time period LL (-1), to display the estimation of short and long-term elasticity's of the workforce with respect to the variables. Then the estimated short-term adjustment of the workforce is:

$$LL = \alpha\varphi + (1 - \varphi)LL(-1) + \beta\varphi LDEP + \gamma\varphi Limp$$

##### **10.3 Estimate the formula for the partial adjustment of the workforce:**

The least squares method of the workforce was used using the explained variables and Table 7 shows the results:

**Table N° 07: Results of estimating the model using the least squares method**

Variable	Coefficient	Std.Error	t-statistic
C	10.61	2.77	3.81
LL(-1)	0.22	0.20	1.08
LDEP	0.069	0.06	2.81
Limp	-0.21	0.03	-5.88
F=50.44	R <sup>2</sup> = 0.94	Dw=1.38	SSR= 0.028

Source: prepared by the researcher based on the outputs of Eviews

#### 10.4 Statistical analysis:

From Table N° 07, we can interpret the model according to several tests as follows:

##### 10.4.1 The residual correlation test for residues:

Given the delay value of the labor force LL (-1) within the explanatory variables, the estimated DW statistic expresses a problematic existence of the self-correlation of errors, and therefore the model is biased, so it was better to approach the DW statistic to the optimal value 2.

##### 10.4.2 The total significance test for the model:

The calculated Fischer value was  $F = 50.44$ , which is greater than the Fischer value, which is estimated at 3.59, and therefore we reject the hypothesis  $H_0$ , which states that all parameters do not differ significantly from zero, and therefore the model in its entirety is statistically significant.

##### 10.4.3 Parameters' significance test:

It is noticeable that the parameters of the bulk of the resuscitation variables C, LDEP and Limp were significant, as the calculated t-student value for each of them was 3.81; 2.81; 5.88 respectively, and it is less than the scheduled t-student at the significance level of 0.05, despite the large value Coefficient of determination  $R^2 = 0.94$

#### 10.5 Economic interpretation of the modulus $\varphi$ :

From the final version of the estimated model, it is possible to obtain the partial determination coefficient, or the so-called self-elasticity of the workforce, since the coefficient of the slowing workforce is  $(1 - \varphi)$ , therefore:

$$1 - \varphi = 0,22$$

$$\varphi = 0,1 - 0,22 = 0,78$$

This value of the determining factor indicates that 78% of the gap between the workforce and the desired workforce will be covered in the first year and it is a relatively high value, which indicates that in previous years the country moved to a policy of economic recovery by increasing costs The public and this is what made the workforce on the path of the desired workforce.

#### 10.6 Study of the expectation of the workforce in Algeria for the period 2015-2019:

We use the estimated long-term model to predict the level of the future workforce in Algeria and from it we used the logarithm to predict the long-term due to the link of the variables and that after we estimate the variables without the logarithm. (Hasnawi, 2002, p. 63)

We obtained illogical and statistically unacceptable results. For example, the coefficient of determination was negative,  $R^2 = -1.14$ , and also DW is greater than the coefficient of determination. This leads us to have a false regression.

By analyzing the estimated model for the long term and based on the government's expectations for both public expenditures and future taxes during the economic recovery

program, we conclude that the labor force in Algeria will increase by 1.4%, and the government should raise public expenditures by 5% annually.

## **11. CONCLUSION**

The Algerian economy has witnessed a remarkable development in the last decade, which is what we have seen through the three development programs extending from 2001 to 2014, through several indicators that suggest the existence of a financial abundance, perhaps the most important of which is economic growth that reached 3% in 2011, while the volume of investments witnessed Foreign improvement in 2011 to reach 570 billion dollars compared to 291 billion dollars in 2010, this improvement is due to a combination of adjustments and government support.

In the same context, the unemployment rate at the beginning of the new millennium witnessed a noticeable decrease, moving from 17.7% in 2004 to 10.6% in 2014, from here it becomes clear to us the role of the operational policy pursued by the government, which is one of its most important institutions, the National Employment Agency, the National Agency for Youth Employment Support and an agency Social development, where these institutions play the role of mediator between job officers and applicants, and the role of helping young people to create new productive projects.

And through the standard study that manifested itself in dropping both the spending and tax variables on the current and future workforce, there is a direct relationship between spending and the workforce, and this is not reflected on the tax side only. The Ministry of Finance expects a relative increase in the workforce of 1.4% for each year during this quintile.

### **• The results:**

Through this study, we concluded a number of results, the most important of which are:

- The absence of clear sectoral strategies according to sectoral priorities, as dictated by economic reality.
- Inefficiency and resilience of the production system to the changes in the increasing total demand.
- An imbalance in the distribution of the employed workforce, where we find a large proportion of employment based in the non productive (service) sectors instead of the productive sectors (industry and agriculture).
- Unemployment rates vary between the various age groups of the workforce, where we find a large proportion among young people.

### **• Recommendations:**

After presenting our study, we suggest some recommendations as follows:

- To develop and support the role of the private sector in creating job opportunities and encouraging it by providing incentives as being the most attractive to the labor force.
- Diversification of exports outside of hydrocarbons and activation of the national economy will have positive effects in stimulating economic growth.
- Bringing closer to job officers and job seekers by activating the role of youth employment offices and job search offices
- To accelerate the reforms of the tax system and investment laws in order to adapt to international economic developments.

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## 13. Appendices:

### Appendix N° 01: Study data in logarithms

Obs	LDEP	LIMP	LL
2001	7.186166	12.95593	13.72354
2002	7.346427	13.29648	16.05328
2003	14.34036	13.34439	16.07919
2004	14.45304	13.38857	16.10380
2005	14.53433	13.49172	16.12941
2006	14.71282	13.64175	16.15367
2007	14.94965	13.63291	16.17665
2008	15.24845	13.83737	16.20064
2009	15.26156	14.04924	16.22082
2010	15.32243	14.21281	16.24402
2011	15.58257	14.40906	16.27012
2012	15.76969	14.58330	16.29452
2013	15.62250	14.63211	16.31741
2014	15.68379	14.67653	16.41266

### Appendix N° 02: Estimation of the Multivariate Linear Model after using the logarithm

Dependent variable : LL				
Method : least squares				
Date: 07/05/2019 Time: 13:58				
Sample(adjusted): 2002 2014				
Included observations: 13 after adjusting endpoints				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	10.61221	2.778779	3.819019	0.0041
LL(-1)	0.225393	0.208108	1.083062	0.3069
LDEP	0.069386	0.068645	2.810803	0.0385
LIMP	-0.214806	0.036517	-5.882305	0.0002
R-squared	0.943871	Mean dependent var		16.20432
Adjusted R-squared	0.925161	S.D. dependent var		0.103295
S.E of regression	0.028258	Akaike info criterion		-4.047213
Sum squared resid	0.007187	Schwarz criterion		-3.873382
Log likelihood	30.30688	F-statistic		50.44836
Durbin-Watson stat	1.386399	Prob(F-statistic)		0.000006

**Appendix N° 03: Estimate of the long-term workforce model after using the logarithm**

Dependent variable : LL				
Method : least squares				
Date: 07/05/2019 Time: 14:30				
Sample(adjusted): 2002 2014				
Included observations: 13 after adjusting endpoints				
Variable	Coefficient	Std Error	t-Statistic	Prob
LL(-1)	1.017302	0.027080	37.56702	0.0000
DLDEP	0.330565	0.009106	36.30105	0.0000
DLIMP	-0.339381	0.025210	-13.46217	0.0000
R-squared	0.852912	Mean dependent var		16.20432
Adjusted R-squared	0.823494	S.D. dependent var		0.103295
S.E of regression	0.043397	Akaike info criterion		-3.237677
Sum squared resid	0.018833	Schwarz criterion		-3.107304
Log likelihood	24.04490	Durbin-Watson stat		1.337474

**Appendix N°04: Estimate the model without the logarithm**

Dependent variable : L				
Method : least squares				
Date: 07/05/2019 Time: 15:46				
Sample(adjusted): 2002 2014				
Included observations: 13 after adjusting endpoints				
Variable	Coefficient	Std Error	t-Statistic	Prob
L(-1)	1.056666	0.150159	7.036979	0.0000
DEP	-2.347107	0.777923	-3.017147	0.0130
IMP	7.028756	2.124637	3.308216	0.0079
R-squared	-1.147118	Mean dependent var		10954963
Adjusted R-squared	-1.576542	S.D. dependent var		0.115254
S.E of regression	0.185002	Akaike info criterion		31.89847
Sum squared resid	3.42E+13	Schwarz criterion		-32.02884
Log likelihood	-205.3400	Durbin-Watson stat		1.236701