

When Active Labor Market Policies Increase Unemployment: An Assessment of The Impact of The Employment Agencies Program in Algeria

Ali Souag and Ragui Assaad

**WHEN ACTIVE LABOR MARKET POLICIES
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AN ASSESSMENT OF THE IMPACT
OF THE EMPLOYMENT AGENCIES PROGRAM
IN ALGERIA**

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Abstract

This paper examines the impact on labor force behavior of the employment agencies program adopted by the Algerian government in 2008. Using pooled cross-sectional labor force survey data on employment and unemployment from 2004 to 2014, we estimate a two-way fixed effects difference-in-difference model with geographic access to an employment agency as the treatment variable. Our findings indicate that access to an employment agency reduces the rate of transition from unemployment to employment and the rate of transition from out of the labor force to employment for both male and females. The impact is more pronounced for older workers and for more educated workers. The program has a positive and significant effect on women's labor force participation, but much of that effect is through increased unemployment rather than employment. We attribute these results to job seekers using registration at an employment agency to queue for public sector jobs that make up the majority of jobs available through the employment agencies.

Keywords: Algeria, Active Labor Market Programs, Heterogeneous Effect, Labor Force Behavior.

JEL Classifications: J38.

ملخص

تبحث هذه الورقة في تأثير برنامج وكالات التوظيف الذي اعتمدته الحكومة الجزائرية في عام 2008 على سلوك القوى العاملة. باستخدام بيانات مسح القوى العاملة المجمعة عبر القطاعات حول التوظيف والبطالة من 2004 إلى 2014، نقدر نموذجًا ثنائي الاتجاه للاختلاف في الوصول الجغرافي إلى وكالة التوظيف باعتباره متغير العلاج. تشير النتائج التي توصلنا إليها إلى أن الوصول إلى وكالة التوظيف يقلل من معدل الانتقال من البطالة إلى العمالة ومعدل الانتقال من قوة العمل إلى العمالة لكل من الذكور والإناث. يتضح التأثير بشكل أكبر على العمال الأكبر سنًا والعاملين الأكثر تعليمًا. للبرنامج تأثير إيجابي وهام على مشاركة المرأة في القوى العاملة، ولكن الكثير من هذا التأثير يتم من خلال زيادة البطالة بدلاً من التوظيف. نعزو هذه النتائج إلى الباحثين عن عمل والذين يستخدمون التسجيل في وكالة توظيف للوقوف في طابور لوظائف القطاع العام، التي تشكل غالبية الوظائف المتاحة من خلال وكالات التوظيف.

1. Introduction

Active labor market policies aim to combat unemployment, support job creation and/or ensure the sustainability of existing jobs (L'Horty, 2013). There is increasing interest in evaluating the effectiveness of such policies. For instance, increasing the flexibility of employment is presumed to lead to a lower level of unemployment (Nickell, Nunziata, & Ochel, 2004; Bassanini & Duval, 2009). Similarly, training provided to unemployed youth is presumed to have a positive impact on their long-term employment outcome. However, some of these policies have been criticized as cost ineffective (Bunel, Emond, & L'horty, 2012).

Labor market interventions could be described as either passive or active (Betcherman, 2002). Passive programs include income support to compensate workers for the short-term loss associated with the interruption of labor income during unemployment as well as possible long-term loss associated with having to accept jobs that pay lower wages. Active labor market programs include the provision of employment and job search assistance services, training and retraining, public works, wage subsidies and self-employment assistance (Betcherman, Olivas, & Dar, 2004).

The assessment of active labor market policies is challenging due to the need to identify a convincing counterfactual approximating what would have happened in the absence of the program (Khandker, Koolwal, & Samad, 2010). The method used must allow for the identification of the causal effects of the policy by comparing the treated group to a control group that is presumably unaffected by the policy, while taking into account potential bias due to selection into treatment. Among the quasi-experimental methods that address selection bias in treatment effects models, the difference-in-difference method using two-way fixed effects (TWFE) regressions is probably the most-commonly used in economics (De Chaisemartin & D'Haultfoeuille, 2022).

In Algeria, a threefold typology of ALMPs has been implemented: (i) support for business creation or self-employment, (ii) professional inclusion with fixed-term contracts or temporary jobs, and (iii) training and job search assistance for the unemployed to improve their access to the labor market. These programs can in turn be classified into three generations. The first generation (1989-1997) attempted to mitigate the negative effects of the Structural Adjustment Plan on labor market outcomes. In the second generation (1998-2007), the National Employment Agency (ANEM) attempted to match vacancies to labor supply and the National Agency for Microcredit Management (ANGEM) provided subsidized credit to small businesses. The third generation of ALMPs in Algeria was introduced in 2008 with the implementation of the Action Plan for Promoting Employment and consists of providing incentives for employers and subsidized social security coverage for employees.

All the ALMPs that have been implemented in Algeria so far aim to foster entrepreneurship and stimulate the private sector. However, the Algerian public sector is very large, and the State still plays a substantial role in economic activity through its fiscal and social policies. The weight of the private sector in the economy is still modest (less than 60 % of GDP and 62

% of total employment in 2019) and it coexist with SOEs³ in almost every sector of the economy. SOEs are utilized as instruments for implementing economic or social policies without being subject to competitiveness or profitability criteria. In many cases these companies are forced to sell their products and services at administered prices that do not fully cover costs. SOEs typically receive loan buybacks to cover the differences between their costs and revenues. All of these features can be explained by the deep and persistent dualism that characterizes the Algerian labor market (Hammouda & Souag, 2012) that resulted from the use of labor markets as tools of political appeasement in the context of the “authoritarian bargain” social contract (Assaad R., 2014).

In this study, we seek to assess the effects of ALMPs on labor market dynamics. We contribute to the literature by investigating the impact of ALMPs on labor market insertion and labor force participation. Most of the literature that assesses employment policies in Algeria has employed descriptive analyses with very few rigorous empirical studies of ALMPs. This paper focuses on the third generation of ALMPs in Algeria and their impact on labor market behavior. It is the first attempt to evaluate the impact of labor policies in Algeria on labor force behavior. The action plan was supposed to reduce unemployment, but it could also have a positive impact on participation by pushing more people into administrative registration in order to be placed by the employment agencies. Because some groups in the population (women and certain educational and age groups) could be more reliant on public sector jobs and are less mobile, the impact of the ALMPs is likely to be heterogeneous across population groups.

We find that increased access to employment agencies reduces the rate of transition from unemployment to employment and from out of the labor force to employment for both men and women, but it also increases participation rates among women. Since most of the jobs offered by employment agencies are public sector jobs, we interpret these results as suggesting that access to employment agencies encourages labor market entrants to queue for public sector jobs by either entering unemployment at higher rates and staying longer in the unemployment state. It also encourages women who often strongly prefer public sector jobs to enter the workforce in the hope of obtaining such jobs.

This paper is structured as follows. Section two tackles the related literature and explains the context of Algerian labor market policies. Section three describes the role of employment in matching supply and demand in the labor market. Section four gives the conceptual framework and research methodology and section five presents data sources and empirical specifications. Section 6 presents the results, and section 7 concludes and discusses policy implications.

³ law of January 12th 1988 on the orientation law on SOEs.

2. Background

2.1. Related literature

Following the global financial crisis of 2007-2008, vocational training programs were the most common ALMPs used by governments around the world (McKenzie & Robalino, 2010). Typically, these programs target unemployed workers and cover a wide range of occupations. The only evaluation of such a program in a developing country setting is Hirshleifer, McKenzie, Almeida, & Ridao-Cano (2016), who conducted a randomized control trial (RCT) to evaluate Turkey's program for the unemployed. There have also been a large number of RCTs evaluating programs focused on youth in developing countries, for example in Argentina (Alzúa, Guillermo, & Carolina, 2016), Colombia (Attanasio, Kugler, & Meghir, 2011), Dominican Republic (Card, Ibararán, Regalia, Rosas-Shady, & Soares, 2011; Ibararan, Kluge, Ripani, & Rosas Shady, 2018), India (Maitra & Mani, 2017), Kenya (Honorati, 2015), Malawi (Cho, Kalomba, Mobarak, & Orozco, 2013), and Peru (Díaz & Rosas-Shady, 2016). The typical evaluation measures program impact 12 to 18 months after the conclusion of the training program by using surveys administered to the treatment and control groups.

Wage subsidies have also been used to support labor market insertion. In some countries, minimum wages and subsistence constraints set a lower bar on the amount that firms can pay for labor, and additionally the presence of hiring and firing frictions means that if there is uncertainty about the productivity of a worker, firms may prefer not to hire them. Therefore, some jobseekers may remain unemployed for a long time, particularly youth. A temporary wage subsidy given to employers who hire these workers could lower hiring costs sufficiently to increase hiring (Levinsohn & Pugatch, 2014). In the context of Argentina, and using randomized experiments, Galasso, Ravallion, & Salvia, (2004) showed that wage subsidies have a significant impact on wage employment but no overall impact on employment, which they interpret as a reluctance of firms to face the labor regulations associated with hiring workers. A similar situation has arisen in South Africa (Levinsohn & Pugatch, 2014). In contrast, Groh, Krishnan, McKenzie, & Vishwanath (2016) find that in the case of Jordan there is an increase in employment during the subsidy period, but there was no significant long-term impact on employment.

Another way to lower labor cost is to provide subsidies to firms, to encourage them to hire more workers. DeMel, McKenzie, & Woodruff (2012) checked that providing wage subsidies to randomly chosen microenterprises in Sri Lanka to test whether hiring additional labor would benefit such firms. The study finds that firms increased employment during the subsidy period, but there was no lasting impact on employment, profitability, or sales.

Search and matching assistance has also been used by many governments to reduce unemployment. It is about providing employment services to assist job-seekers, such as hosting labor exchanges, and helping to match firms with workers seeking employment. The review by Betcherman, Olivas, & Dar (2005) was relatively favorable to these types of programs, but mostly for emerging and transition economies, and not for countries with large informal

sectors. If these programs work at all in developing country contexts, they are only effective for more educated job-seekers.

We now move to studies that examine program that provide labor market information in developing country contexts. In the case of Peru, Dammert, Galdo, & Galdo (2015) tested the causal impacts of providing information about job vacancies on employment outcomes. The results show positive and significant short-term effects of public labor market intermediation on employment, while the impacts from traditional labor-market intermediation are not large enough to be statistically significant. Others studies on the effects of providing information to jobseekers have been done in others contexts; including studies on job fairs in Ethiopia (Abebe, et al., , 2016b) and the Philippines (Beam, 2016); on reducing monetary costs of search for job seekers in Ethiopia (Franklin, 2015) and on reducing information frictions for firms in Ethiopia (Abebe, Caria, Fafchamps, Falco, Franklin, & Quinn, 2016a) South Africa (Abel, Burger, & Piraino, 2016), and Uganda (Groh, McKenzie, Shammout, & Vishwanath., 2015; Bassi & Nansamba, 2017).

2.2 Algerian Employment Policies

Following the implementation of the Structural Adjustment Program (SAP) in 1994, Algeria experienced dramatic changes in its labor market, including increasingly large cohorts of new entrants in the labor market, a rise in female labor force participation, and increased layoffs due to economic restructuring. Layoffs have been particularly notable in the public sector, where more than 413 000 jobs were eliminated between 1990 and 2000 (Souag & Assaad, 2018). These changes have triggered a significant increase in unemployment, which peaked in 2000 due to the spread of informality and growth in the share of non-permanent jobs. The growing unemployment rate for youth and young graduates has likely contributed to destabilization and political unrest. However, the reversal of the oil price decline and the concomitant increase in receipts from the export of hydrocarbons allowed the government to substantially increase its spending from 2000 to 2013.

Algeria opted for a series of programs to increase investment, growth and employment, starting with the Support Plan for Economic Recovery (2001-2004), followed by the Supplementary Support Plan for Growth (2005-2009), and the Five-year Development Plan (2010-2014). According to the OECD typology (2015), active labor market policies have emerged in Algeria in three forms: (i) support for business creation or self-employment, (ii) integration through fixed-term contracts jobs and (iii) improving the employability of the unemployed through training/retraining and assistance with job search.

Musette (2014) classifies these interventions into three generations. The first generation covers the period 1989-1997 and aims to cushion the negative effects of SAP in the labor market. It results in the creation, since 1994, of the National Unemployment Insurance Fund (CNAC), the Social Development Agency (ADS) and the National Youth Employment Support Agency (ANSEJ). The second generation (1998-2007) led to the establishment of the National Employment Agency (ANEM) and the National Agency for Microcredit Management

(ANGEM) in addition to the ADS. The third generation started in 2008 and corresponds to the implementation of the Action Plan to Promote Employment and Fight Unemployment by creating a new program called *Dispositif d'Aide à l'Insertion Professionnelle* (DAIP).

Since 2002, the unemployment rate in Algeria has declined (Figure 1). In 2001, the unemployment rate was 27.3 percent, with 2.3 million unemployed individuals. It began declining in 2002, dropping to 13.8 percent, eventually reaching 1.4 million unemployed individuals by 2007. This decline, however, was insufficient in light of the government's target unemployment rate of 10 percent. The unemployment rate was around 10 or 11 percent between 2009 and 2014.

Figure 1. Algeria's unemployment rate trends in %

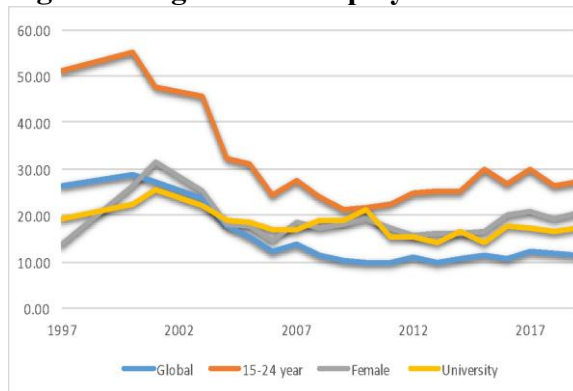
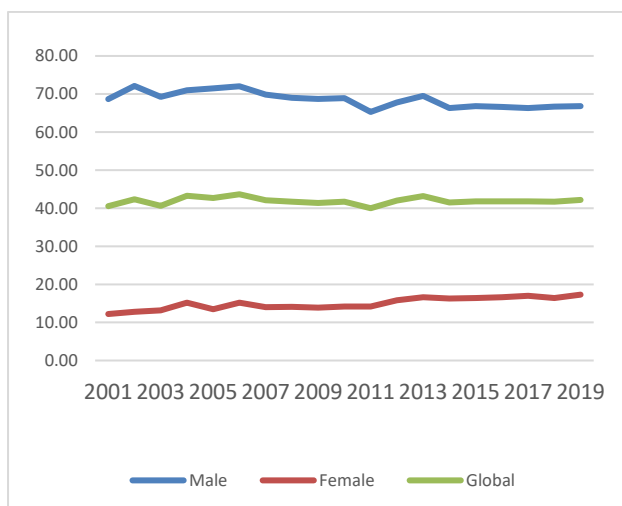


Figure 2. Algeria's labor force participation trends in %



Source: Authors' calculation based on ONS data.

Starting in the 2000s, there was a substantial increase in labor force participation. Between 2001 and 2019, the activity rate increased by 1.2 percentage points (p.p), going from 41% in 2001 to 42.2% in 2019. In absolute value, the active population was multiplied by 1.48 from 8,568,000 people in 2001 to 12,730,000 people in 2019. For men, the activity rate decreased by 2.5 p.p. during this period (69.3% in 2001 vs. 66.8% in 2019). On the other hand, for women,

the activity rate increased by 4.9 p.p. (12.4% in 2001 vs. 17.3% in 2019). Despite this increase, the activity rate of women in Algeria remains very low.

Most literature that assesses employment policies in Algeria has employed a descriptive analysis. The (CNES, 2002, 2010) conducted two studies on employment policy assessment that did not include impact evaluation. The World Bank (2010) conducted an assessment of Algeria's employment policies without studying the impact on the labor market. The ILO undertook a comparative analysis of labor market intermediation in the three Maghreb countries (Barbier , 2007). In 2010, the ILO undertook a synthesis of labor market policies for some Arab countries including Algeria (Musette , 2014). Moreover, Adair & Bellecahe (2012) assessed the policies tackling job creation in very small businesses (microenterprises), whereas Hammouda (2009) focused on the impact of employment policies by using aggregate data without micro econometric analyses. Souag & Assaad (2018) investigated the effects of active labor market policies on formalizing employment in the Algerian economy.

3. Labor Market Matching in Algeria

Algeria has long had public institutions, first and foremost the employment services, whose missions are to bring together the supply and demand sides of the labor market. In recent years, the role of these institutions has been evolved, including of private operators.

Besides the implementation of active labor market policies and the management of unemployment compensation, other possible functions in labor market intermediation include job brokerage and labor market information (Thuy, Hansen, & Price, 2001). The notion of job brokerage refers to the connection, in its simplest form, between job supply and demand. It is preferred here to the term "placement", which is used in conjunction with job search assistance services, which are therefore not examined as active measures, on the grounds that they are now an inseparable part of the basic activity of employment services.

In law, the National Employment Agency (ANEM) was created as a National Labor Office for job intermediation in 1962.⁴ It was then changed to an employment agency in 1990 that was given a monopoly over employment services. In 2006, the legal status of the ANEM was changed from a public institution of an administrative nature to a public institution with special management. The decree that was enacted specified its mission and the way in which the agency was organized. It was placed under the supervision of the Ministry of Labor, Employment and Social Security. The decree also defined the agency's functions regarding the regulation of the labor market.

At the end of 2006, the ANEM has benefited from the rehabilitation program for the development of its network (various operating agencies, state or local), as well as the strengthening of management skills for its frameworks, particularly the development of

⁴ Decree No. 62-99 of November 29, 1962.

management and service delivery. The number of its local agencies has continued to increase in order to improve its national representation.

The new employment policies passed into law in April 2008 called the Mechanism for Professional Integration Assistance (DAIP)⁵. The program has started in the end of 2008, and was amended in 2010 by entrusting its management, monitoring, evaluation and control to ANEM in relation with the wilaya⁶ Directorate of Employment (DEW). The new program was designed to assist young, new entrants in the labor force to find jobs by proposing wage subsidies, as described in Table 1. In order to benefit from this program, people should be unemployed, registered in the employment agency (ANEM), and should not be more than 35 years old and not less than 18 years old. The program is intended for three categories of people: (i) young graduates of higher education and young technicians from vocational training institutions under the contract of insertion of graduates (CID), (ii) young people from secondary education, vocational training or having completed an apprenticeship under the professional integration contract (CIP), and (iii) young people without training and without qualification under the contract training insertion (CFI). After having one type of subsidy (CID, CIP or CFI), people can apply for CTA where the costs are shared between the government and employers. Other subsidies can be offered by other interventions (such as social inclusion programs) managed by the ADS, which is designed to fight poverty.

Table 1. Description of the DAIP policy

Program	Nature	Duration	Compensation	Comment
DAIP vocational inclusion assistance mechanism for young people, run under the Ministry of Labor, consists in three categories:				
Graduate inclusion contract (CID)	First-time jobseekers, graduates of tertiary education or senior technicians who receive support for recruitment, priority within public and private sector	Economic enterprises: 1 year Administration: 1.5 year	University graduates: DA ⁷ 15,000 ⁸ per month Senior technicians: DA 10,000 ⁹ per month The employer's contribution to social security is paid by the State.	Only benefit first-time job seekers. This measure replaces the pre-employment contract for graduates (CPE).
Professional inclusion contract (CIP)	Young, first-time jobseekers leaving secondary education or vocational education and training (VET) centers (CFPA) (including apprentices)	Firms: 1 year, nonrenewable Public and administration: 1 year, renewable	In firms: DA 8 000 ¹⁰ per month In public and administration: DA 6,000 ¹¹ per month The employer's share contributions to Social security is covered by the State.	Only benefit first-time job seekers. At the end of the CIP contract ANEM may propose a subsidized work contract (CTA) in firms. In case of refusal, the person loses the right to remain in the CIP.

⁵ *Dispositif d'Aide a l'Insertion Professionnelle* Executive Decree No. 08-126 of April 19, 2008

⁶ Governorate.

⁷ Algerian Dinar: 1 \$ =140 DA in 2022.

⁸ It presents around 62.5 % in the The National Mean Wage.

⁹ It presents around 42 % in the mean national wage.

¹⁰ It presents around 33% of the mean national wage.

¹¹ It presents around 25% of the mean national wage.

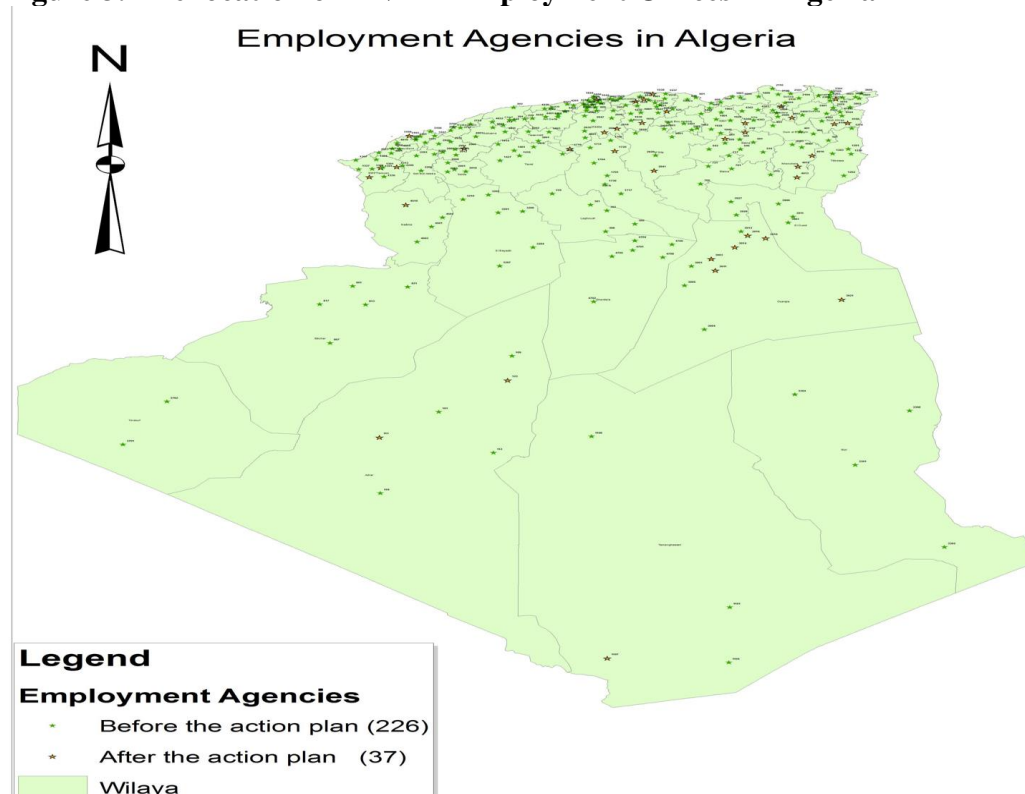
Table 1. Description of the DAIP policy (contd.)

Program	Nature	Duration	Compensation	Comment
Training Inclusion contract (CFI)	Targets young Jobseekers without training or qualifications; they are placed in various work projects initiated by local authorities or by different sectors for the duration of the project	1 year, non-renewable	DAIP vocational integration assistance mechanism for young people, run under the Ministry of Labor, Employment and Social Security, consists of three categories)	
Subsidized work contract (CTA)	Proposed when one of the above contracts comes to an end (and sometimes earlier if the employer agrees)	3 years	Labor costs shared between government and employer:	

Notes: *The National Guaranteed Minimum Wage in January 2008 was 12000 DA, 15000 DA in January 2010 and it is 18000 from January 2012. Source: Executive Decree No. 15-177 of July 6, 2015 supplementing Executive Decree No. 15-59 of February 8, 2015, setting out the constituent elements of the guaranteed minimum wage in Algeria. The compensation for CID was 12000 DA in 2008 and becomes 15000's after the DAIP amendment in 2010.

From its creation to the present, the number of ANEM local offices is constantly increasing to improve its national representation (see figure 3). Before the action plan, there were 226 local offices and after the action plan and its modification, 37 new local offices were created between 2008 and 2010, resulting in 263 offices in total.

Figure 3. The location of ANEM Employment Offices in Algeria

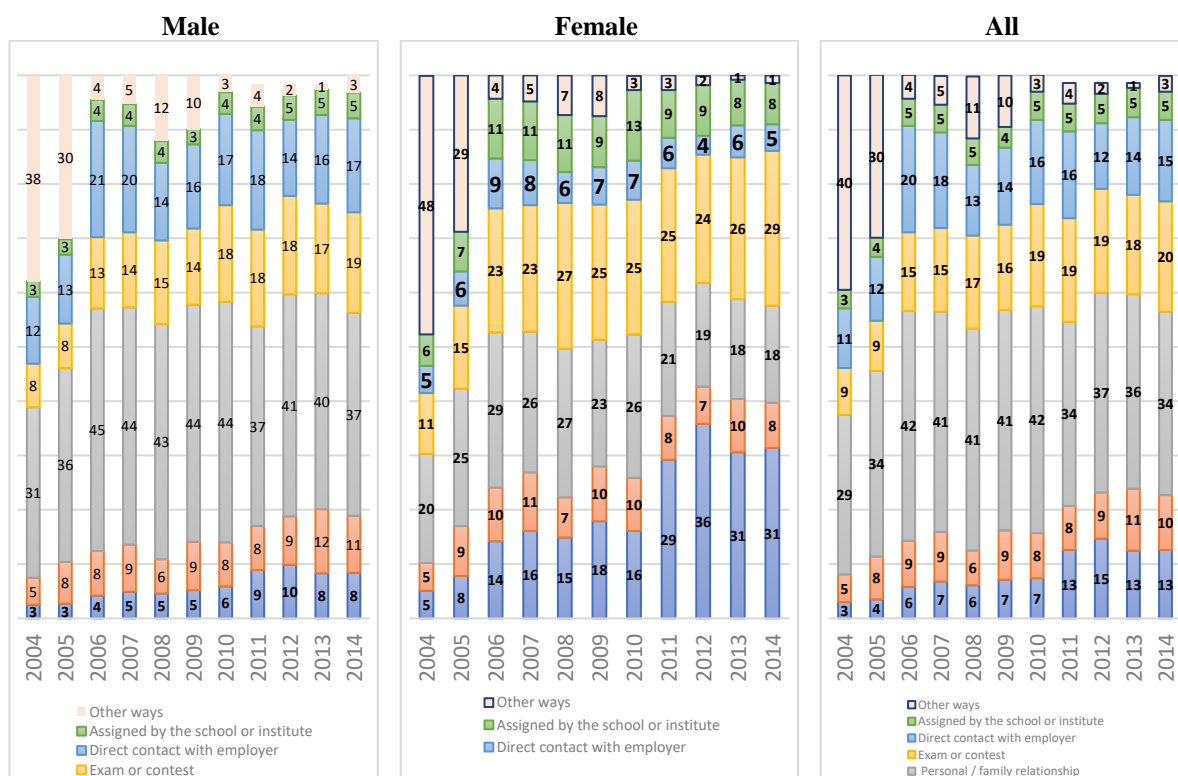


However, the role of the ANEM in intermediation in the labor market in Algeria is still very weak, especially for men (see Figure 4). The share of individuals who responded that they found a job through the ANEM in 2004 was less than 3%. In 2014, 10 years after the

implementation of the rehabilitation program, use of ANEM services remained low; 13 percent of respondents found a job through ANEM. The most common methods to find jobs included personal/family relationships (33.8%), direct contact with employers (15.9%), or through entrance and professional exams and certifications (19.4%).

Women are more likely to use public employment services, particularly in the last few years. The percentage using ANEM services in finding a job is higher among women than men especially after the introduction of the Action Plan of 2010: the share of women who used the ANEM services increased from 16 percent in 2010 to 29 percent in 2011 then to 31 percent in 2014.

Figure 4. Distribution of employees by ways of finding their jobs in Algeria by year in Percent

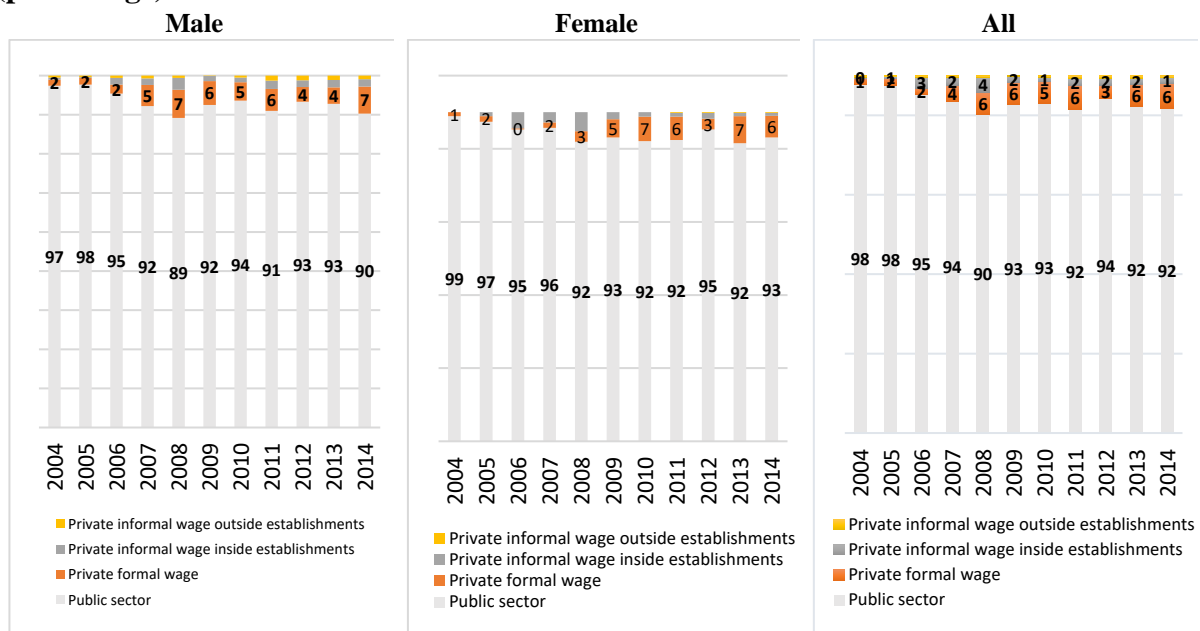


Source: Authors calculations based on ONS's data.

More than 90% of ANEM initial placements were in public administration and the public enterprise sector. A large fraction of these placements later become permanent. The operation is done first by a census of all vacant positions in the public sector in order to integrate individuals eligible for ANEM contracts (including their three types of CID, CIP and CFI and CTA) by order of seniority. It must be kept in mind that despite the privatization process that started in the 1990s, the Algerian public sector is still very large, and the State continues to play a substantial role in economic activity through its fiscal and social policies. The weight of the private sector in the economy is still modest (less than 60% of GDP and 62% of total employment in 2019) and it coexist with SOEs in almost every sector of the economy. Despite a partial retreat of the State from several economic sectors in the 2000s, private sector growth

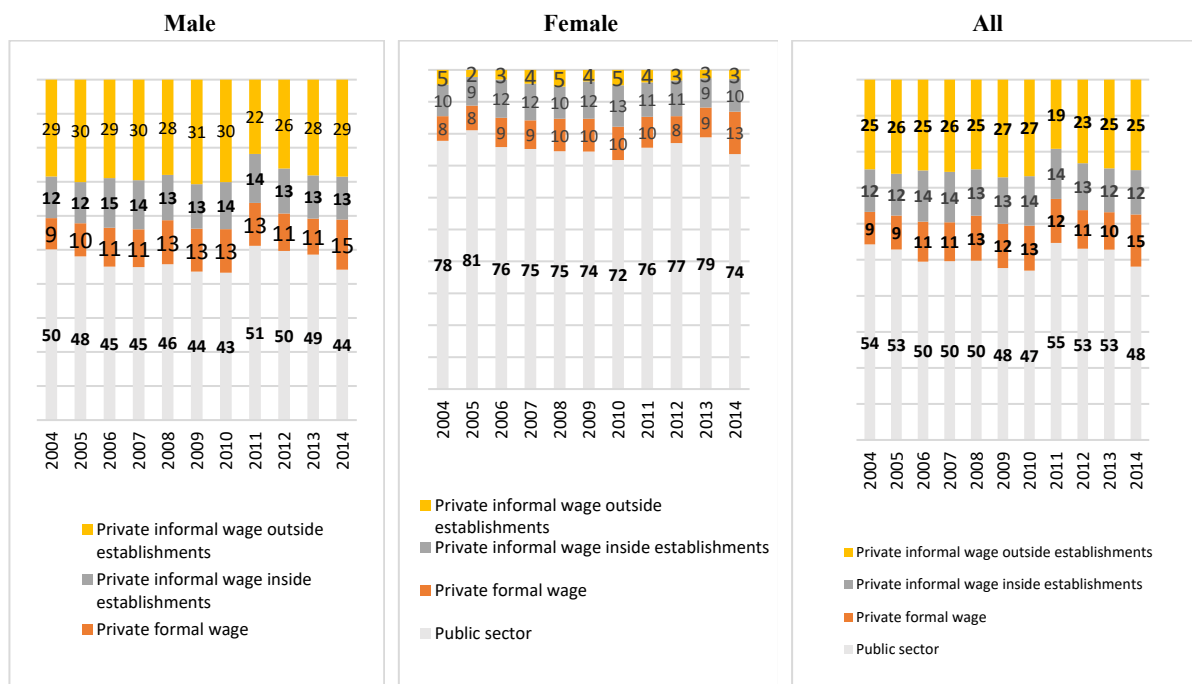
has not filled the void and absorbed very little of employment demand (Souag *et al* 2016). Although the share of the public sector in total employment has been declining, the withdrawal of the State from the economy was not accompanied by sufficient dynamism in private formal employment. Instead, it has resulted in the growth of informal employment (Souag and Assaad 2018).

Figure 5. Distribution of type of Employment for those who were placed by ANEM (percentage)



Source: Authors from ONS data bases.

Figure 6. Distribution of type of Employment for those who were not placed by ANEM in %



Source: Author from ONS data bases.

4. Data source

The data used in this study consists of labor force surveys conducted by the National Statistics Office (ONS) during the period ranging from 2001 to 2014. For this survey, the sample is a stratified random sample of households drawn from the population and housing census (RGPH) carried out every 10 years. The purpose of this survey is to provide statistics on employment, unemployment and labor force participation, but it contains no income data (Table A1). The data contains a one-year retrospective question on labor force status with information on current and previous labor force mobility of individuals. We exploit this question to investigate the labor market dynamic in response to the DAIP.

With regard to the treatment variable, ONS data started in 2004 including information on the employment of people who were placed by the ANEM. We can identify what type of subsidy (CID, CIP or CFI) individuals have benefited from by knowing their educational attainment. The treatment variable for these subgroups of employees comes from the interaction of the two variables (placed by the ANEM or not and educational attainment). For unemployed individuals, we also have information on their ANEM registration starting in 2004 and whether they are waiting their turn to be placed.¹² However, the treatment variable is unobservable for those who are out of the labor force, and we don't have any information indicating if they are using ANEM services or not.

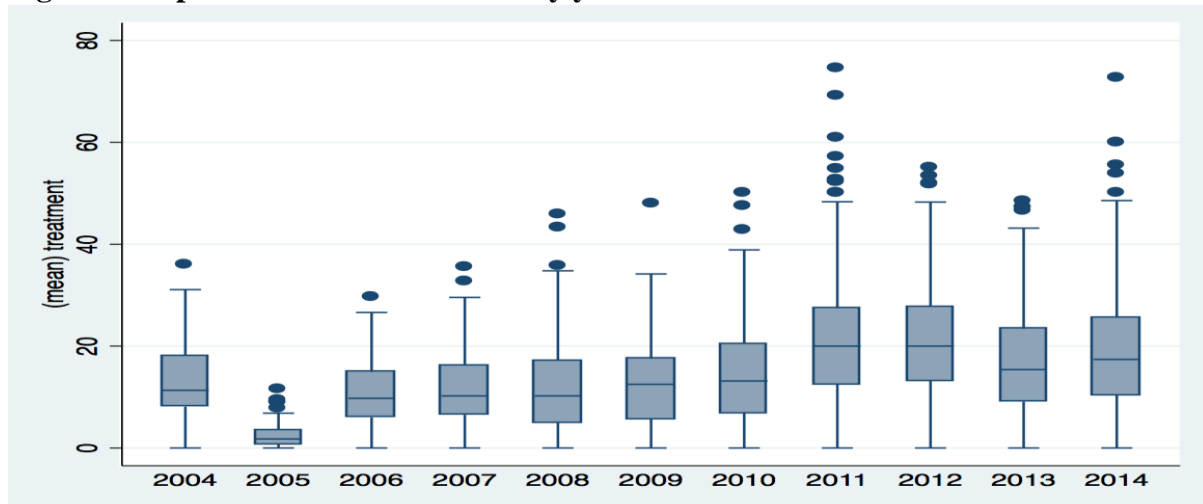
Since we do not have information on the treatment for all individuals, we use a proxy variable which captures the degree of exposure to ANEM services at the municipality level. We account for the proportion of people in the labor force who are treated (placed through ANEM) or registered at ANEM by municipality. The treatment proxy becomes:

$$T_r = \frac{\text{Number in labor force 18 – 35 treated or registered in employment agencies}}{\text{Total labor force 18 – 35}}$$

Where $r = 1$ to R indexes the 891 municipalities in Algeria that are covered by the labor force survey out of a total of 1541 municipalities in Algeria.

¹² For equity reasons, job placement is made according to the duration of registration with the ANEM (the Law No. 04 1-19 of December 25th 2004 corresponding to placement of workers and employment control by the employment agencies).

Figure 7. Exposure to ANEM services by year



Source: Author's calculations using ONS data.

Figure 7 shows the level and distribution of exposure to ANEM services by year across municipalities. The median share clearly shows that, since 2004, ANEM has not ceased to register a substantial number of individuals looking for ANEM services, with the exception of 2005, which appears somewhat aberrant. We later exclude 2005 from our analysis due to this apparent aberration. Although the DIAP was established in 2008, it was modified in 2010, after which the share of ANEM applicants in the labor force starts to rise substantially.

Algeria is a large country geographically, with only 263 ANEM offices serving 1541 municipalities. Registration with ANEM requires the individual to be physically present, making the distance from the place of residence to the ANEM office a potential obstacle for registration. Thus, individuals living near ANEM offices are more likely to use ANEM services than those farther from the office. We make use of this fact and the likely exogeneity of placement of ANEM offices to instrument for municipal-level exposure to ANEM, which is potentially endogenous.

The DAIP targets individuals from 18 to 35 years of age. Each program targets a specific level of education. The effect is expected to be less pronounced among people living far from the employment agencies, particularly if they are less geographically mobile such as women and youth. As mentioned above, the DAIP was implemented in 2008 but modified in 2010. The main difference that has been made is the program after 2010 became managed by the ANEM with a greater local presence (more than 250 local agencies). Therefore, for purposes of our analysis, we consider the program to have been initiated in 2010. Our estimation therefore covers the period from 2004 to 2014, with a pooled cross sectional annual dataset, with the pre-period defined as 2004 to 2009 and the post-period defined as 2010 to 2014.¹³

¹³ We drop 2005 data due to the anomalously low ratio of exposure to ANEM services in that year.

Table 2. Descriptive statistics

Variables	Observations	Mean	Std. Dev.
Treatment in %	891	18.465	10.491
Distance in Km			
0	891	0.242	0.429
> 0 & <=20	891	0.342	0.475
> 20 & <=50	891	0.331	0.471
>50	891	0.084	0.278
Region			
North_Center	891	0.331	0.471
North_East	891	0.155	0.362
North_West	891	0.173	0.378
Highlands_Centrer	891	0.067	0.251
Highlands_East	891	0.121	0.327
Highlands_West	891	0.062	0.241
South	891	0.091	0.288
Gender			
Female	381,461	0.467	0.499
Male	381,461	0.533	0.489
Age group			
[18_24]	381,461	0.448	0.497
[25_29]	381,461	0.282	0.45
[30_35]	381,461	0.27	0.444
Education			
Primary	381,461	0.577	0.494
Secondary	381,461	0.245	0.43
University	381,461	0.178	0.383

Source: Authors' calculations using ONS Data.

5. Conceptual framework and research methodology

The main contribution of this study is to provide an impact evaluation of the effects of active labor market programs on labor force behavior in Algeria. We evaluate the impact on employment and labor force participation. We start by providing a diagnosis on the dynamics of labor market flows in Algeria across the three distinct labor market states: unemployment, employment and labor force inactivity. Using retrospective data, we model the mobility process of individuals between the three states on the labor market as a homogeneous Markov chain.

5.1 Labor market dynamics

The following equations describe the evolution of the stock of the employed E and the stock of the unemployed U . The pool of the inactive is denoted by O . Adding the three stocks gives us the working-age population W , while the sum of employment and unemployment corresponds to the labor force L . The unemployment rate is defined as $u = \frac{U}{L}$ and the participation rate as $p = \frac{L}{W}$.

Let Y_t be a process defined on a three space of discrete states mutually exclusive and exhaustive $S = \{E, U, O\}$.

Changes in employment evolve according to the following equations:

$$\begin{aligned} \Delta E_t &= E_t - E_{t-1} \\ &= P\left(\frac{Y_t=E}{Y_{t-1}} = O\right) O_{t-1} + P\left(\frac{Y_t=E}{Y_{t-1}} = U\right) U_{t-1} - [P\left(\frac{Y_t=O}{Y_{t-1}} = E\right) + P\left(\frac{Y_t=U}{Y_{t-1}} = E\right)] E_{t-1} \end{aligned}$$

(Eq 1)

Change in unemployment is given by:

$$\begin{aligned} \Delta U_t &= U_t - U_{t-1} \\ &= P\left(\frac{Y_t=U}{Y_{t-1}} = O\right) O_{t-1} + P\left(\frac{Y_t=U}{Y_{t-1}} = E\right) E_{t-1} - [P\left(\frac{Y_t=O}{Y_{t-1}} = U\right) + P\left(\frac{Y_t=E}{Y_{t-1}} = U\right)] U_{t-1} \end{aligned}$$

(Eq 2)

The change in the economically inactive populations is given by:

$$\begin{aligned} \Delta O_t &= O_t - O_{t-1} \\ &= P\left(\frac{Y_t=O}{Y_{t-1}} = U\right) U_{t-1} + P\left(\frac{Y_t=O}{Y_{t-1}} = E\right) E_{t-1} - [P\left(\frac{Y_t=U}{Y_{t-1}} = O\right) + P\left(\frac{Y_t=E}{Y_{t-1}} = O\right)] O_{t-1} \end{aligned}$$

(Eq 3)

Therefore, the change in the labor force is given by:

$$\begin{aligned} \Delta L_t &= L_t - L_{t-1} = \Delta E_t + \Delta U_t \\ &= \left[P\left(\frac{Y_t=E}{Y_{t-1}} = O\right) + P\left(\frac{Y_t=U}{Y_{t-1}} = O\right) \right] O_{t-1} - P\left(\frac{Y_t=O}{Y_{t-1}} = U\right) U_{t-1} \\ &\quad - P\left(\frac{Y_t=O}{Y_{t-1}} = E\right) E_{t-1} \end{aligned} \quad (Eq 4)$$

Where $P\left(\frac{Y_t=j}{Y_{t-1}} = i\right)$ for $i, j \in \{E, U, O\}$ the transition probability between the states.

We are interested in examining the causal effect of DAIP on labor force behavior in Algeria. We evaluate the impact on labor market insertion and participation. The main idea behind our identification strategy is that the DAIP will likely affect the insertion of unemployed people but it could also push more people to participate in the labor force by offering sought after public sector jobs. The impact on insertion is captured through its effects on the probability of moving from U to E. However, the impact on participation is driven by the combined effect of moving from U to E and from O to E. Because the DAIP is unlikely to discourage people searching for a job (moving from U to O) and is not likely to push people to leave their jobs (exit from E), we restrict our focus here on three main transitions: O to E, U to E, O to U and the combined effect O to E + O to U to capture the effect on participation.

A number of previous studies focused on estimating transition probabilities between two periods of time in the context of a discrete time Markov chain (Fougère & Kamionka, 1992). Other works, including Maloney's contributions (Maloney, 1999; Maloney, 2004) estimate the transition probabilities from an underlying continuous rather than a discrete Markov process for a number of reasons. First, the natural time scale for many mobility processes is not a discrete sequence of intervals such as generations or decades but a continuum of time points (Bosch & Maloney, 2010). Labor market status mobility can be viewed more realistically as a process in which state changes occur at random time points, and probabilities of moves between particular states are governed by Markov transition matrices. Secondly, as suggested by Fougère & Kamionka (2003), individual data in general, do not generally provide observations of continuous labor market histories, and they do not allow to directly identify measures of duration of individual employment and unemployment spells, or the probability to become unemployed at the end of an employment spell. Bosch & Maloney (2010) suggest that drawing statistical inference of such parameters is to assume that the observed discrete-time mobility process is generated by a continuous-time homogeneous Markov process.

Let Y_t be a homogeneous Markov process defined on a three space of discrete states mutually exclusive and exhaustive $S = \{E, U, O\}$. The fundamental characteristic of the Markov chain is that the conditional probability of each Y_t at time t depends only on the previous value Y_{t-1} , that is to say:

$$\begin{aligned} P(Y_t = j/Y_{t-1}, Y_{t-2}, \dots, \dots, X_1) &= P(Y_t = j/Y_{t-1}) \\ P(Y_t = j/Y_{t-1}, Y_{t-2}, \dots, \dots, X_1) &= P(Y_t = j/Y_{t-1}) \end{aligned} \quad \text{where } j = \{E, U, O\} \text{ (Eq 5)}$$

Discrete time matrices are computed as the maximum likelihood estimator for transition probability is $\hat{p}_{ij} = \frac{N_{ij}}{N_i}$ $\hat{P}_{jj'} = \frac{N_{jj'}}{N_j}$ where $N_{jj'}$ is the total number of transitions from state j to state j' and N_j is the total number of observations initially in the state.

5.2 Impact Evaluation

Employing a Two-Way Fixed Effects (TWFE) Differences-In-Differences approach, the heterogeneous causal effect of the treatment T_r across genders on various outcomes can be first estimated using the following model:

$$Y_{it}^* = \beta_0 + \theta_r + \delta_t + \beta_1 \text{Female} + \beta_2 \text{Post} * T_r + \beta_3 \text{Post} * \text{Female} * T_r + \varepsilon_{it} \quad \text{Eq (6)}$$

where Y_{it}^* is the utility derived by the individual at time t when they moved from state j to state j' . Individuals make a choice between the three states structuring the labor market. This choice is made by comparing the utilities from the various possibilities, and it focuses on the option that corresponds to the maximum utility. The coefficient β_0 is a constant, and the coefficients θ_r and δ_t are the municipality and year fixed effects, respectively. The coefficient

β_1 captures the female impact and the variable *Post* is a dummy variable which takes on the value of 1 if the observation is post the introduction of the DAIP action plan in 2010 and 0 otherwise. β_2 is the coefficient of interest that captures the effect DAIP and β_3 is also of interest, capturing the heterogeneous effect of the DAIP for women compared to men. Finally, the ε_{it} is the random error term.

Since it is possible that unobserved local socioeconomic conditions could be correlated with our treatment variable, the municipal-level proportion of the labor force accessing ANEM services, we show in a second model results from two-stage least squares (TSLS) estimation that corrects for the possible endogeneity of the treatment. Similar to the literature (Del Carpio & Wagner, 2016; Fallah, Krafft, & Wahba, 2019; Alhawarin, Assaad, & Elsayed, 2021), we instrument for the treatment using the distance in kilometers from the municipality of residence to the closest ANEM office. In a first stage regression, we regress our municipality-level treatment variable T_r on the distance variable in categories so as not to assume linearity, and a series of regional dummies:

$$T_r = \alpha_0 + \sum_{k=1}^K \alpha_k Distance_{kr} + \sum_{l=1}^L \delta_l Region_l + v_r \quad Eq(7)$$

where $r = 1$ to 891 and v_r is an error term.¹⁴

In a third model, we add to Model 2 region-specific time trends specified as δ_{lt} where l indexes the seven regions of Algeria, which we include to account for the possibility of differential time trends across regions that may result from time-varying unobservable (see Tumen, 2019). This term is included to relax the common-trends assumption to one that only holds across treated and control areas within regions. In a fourth and final model, we include controls variables such as education and age group.

To test the heterogeneous effect by age group and education, we interact the coefficients of interest β_2 and β_3 with a dummy variable for different age groups and for different levels of education.

To test our identifying assumption that labor market transitions across treated and control groups would have followed parallel trends in the absence of the action plan, we conduct placebo tests using data from the period prior to the introduction of DAIP (2004 to 2009). We alternatively specify the post dummy as being 2006, 2007, and 2008 and later, as opposed to 2010 and later. These placebo tests are carried out exclusively for Model 4. If any of these placebo post-treatment interactions turn up as significant, this would suggest that the parallel trends assumption is violated.

¹⁴ The coefficient estimates for the first stage equation are shown in Table A2 of the appendix. All three distance dummies have the requisite negative sign on the use of ANEM services. Overall, the three instruments are highly significant, with an F-statistic of 13.75, well above the 10 that is typically required for a strong first stage.

6. Results

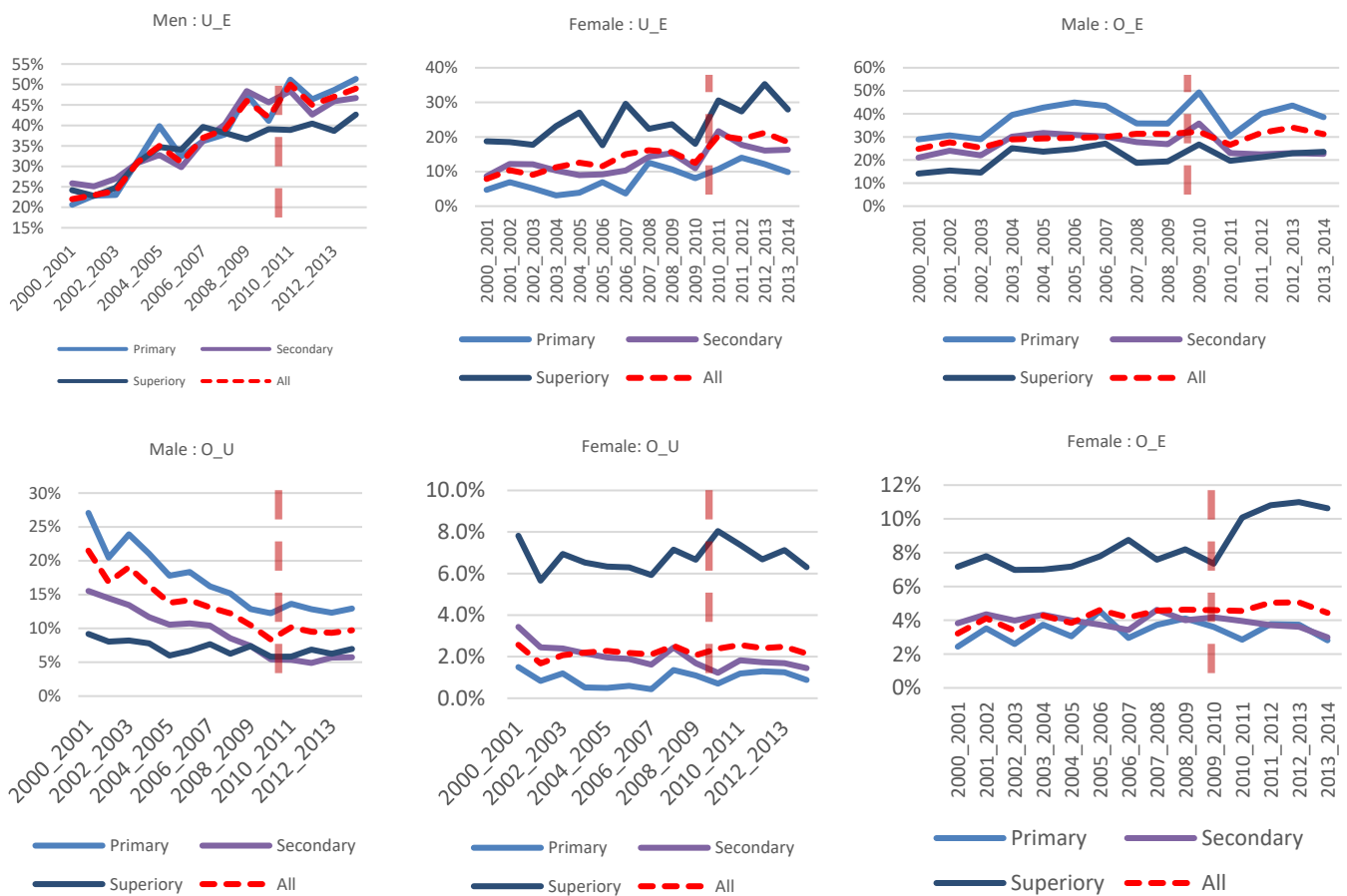
6.1 Evolution of labor market transitions over time

We begin by discussing descriptive trends in the transition probabilities across labor market states and then move to the results of our causal models. As shown in Figure 8, transitions from unemployment to employment from 2000 to 2003 were quite low, reflecting the difficulty of finding jobs in Algeria at that time. In 2004 the situation had improved somewhat but only for men, with transitions from unemployment to employment reaching around 38% just before the implementation of the action plan. This improvement is the consequence of the rise in oil prices which increased both export earnings and public expenditure throughout development plans: 2001-2004, 2005-2009 and 2010-2014. For women, the improvement in transition rates from unemployment to employment is noticed after the modification of the DIAP action plan in 2010, where rates went from 12% percent to more than 20%. Before the implementation of DIAP action plan, the transition rates out of unemployment for men were the same across education level for men, with around 30 % of individuals who were looking for a job in the previous year finding one. After the modification of the action plan, the ability of the Algerian economy to absorb jobseekers had increased, but only for people with a primary or secondary level of education. The insertion problem persisted for individuals with higher levels of education. For women, the situation is reversed -- women with postsecondary degrees were more likely to be employed, followed by women with secondary education.

Moving from outside the labor force to employment is very critical because it reflects the capacity of the Algerian economy to create new jobs. Such an economy is primarily based on public expenditure and public employment creation. In general, transition probabilities remain very low before and after the expansion of the action plan, especially for women, whose transition rates were less than 5 % (figure 8). A separate analysis by education and gender shows that men with a low level of education are more likely to get jobs just after just leaving school, without transitioning into unemployment. The implementation of the action plan in 2008 does not change this probability, but the modification of the plan in 2010 does. However, the effect was temporary; one year after its implementation unemployment returned to its initial level. Women with higher levels of education were more affected by the modification of the action plan, with rates of transition from out of the labor force to both unemployment and employment rising sharply in 2010. The increase in the transition to unemployment was temporary, but the increase in the transition to employment persisted through 2014.

The action plan does not appear to substantially affect the probability of transition from out of the labor force to unemployment for men. After a long downward trend in this probability, the implementation in 2008 and the modification in 2010 of the action plan have contributed to a smaller recovery than a stabilization of the probability of this transition at around 10 %. By education, Figure 8 shows that after the modification of the action plan, individuals with a secondary level of education are less likely to move from outside the labor force to unemployment compared to other individuals.

Figure 8. One-year labor market transition rates in Percentage, 2001-2004



Source: Authors' calculations based on ONS data.

7.2 Results from Difference-in-Difference Analysis of the Impact of ANEM on Labor Market Transition Rates

We estimate both linear probability versions of the model shown in equation (6) above as well as multinomial logit (mlogit) versions. The linear probability model results are shown in Table 3, whereas the mlogit versions are shown in the appendix. As a reminder, we pool data from 2004 to 2014 with the post action plan period defined as 2010 to 2014. We estimate models for all three probabilities of transition: U to E, O to E and O to U, but also show results for the last two transitions combined O to (E or U) or O to P for short. Model 1 uses the municipality-level exposure to ANEM services as a treatment variable as it is. Model 2 instruments it with distance to the closest ANEM office and therefore shows TSLS results. Model 3 adds to Model 2 province-specific time trends, and Model 4 adds age group and education controls.

As discussed above the coefficient of the post-treat coefficient in Table 3 provides an estimate of the effect of the action plan on men, and the post-treat-female interaction tests whether there is a significantly different effect for women. The “test female impact (1) + (2)” coefficient provides the full female impact.

Table 3. Impact of Exposure to ANEM Services on one-year labor force transition rates: Coefficients from a Linear Probability Model

Linear Probability Model : coefficients	U to E				O to P				O to E				O to U			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
post_treat (1)	0.009***	0.011***	-0.009*	-0.008*	0.002***	0.004***	-0.001	0.000	0.001***	0.003***	-0.002**	0.001	0.000	-0.001*	-0.002**	-0.001
	(0.001)	(0.002)	(0.003)	(0.003)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
female	0.137***	0.127***	0.128***	0.119***	0.080***	0.082***	0.082***	0.110***	0.055***	0.056***	0.034***	0.071***	0.032***	0.034***	-0.034***	0.049***
	(0.009)	(0.009)	(0.009)	(0.016)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)
post_treat_female (2)	0.001	-0.001	0.000	0.000	0.003***	0.003***	0.003***	0.003***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls included	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Municipality Fixed Effects included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed effects included	Yes	Yes	Yes	No	Yes	Yes	Yes	NO	Yes	Yes	Yes	NO	Yes	Yes	Yes	NO
Region-specific year fixed effects included	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Intercept	0.370***	0.458***	0.329***	0.319***	0.115***	0.124***	0.064**	0.071**	0.084***	0.094***	0.054***	0.018	0.038**	0.037**	0.038**	0.058***
	(0.065)	(0.065)	(0.083)	(0.083)	(0.020)	(0.020)	(0.024)	(0.025)	(0.016)	(0.016)	(0.016)	(0.020)	(0.013)	(0.013)	(0.013)	(0.016)
Test female impact (1)+(2)	0.009***	0.011***	-0.009**	-0.009*	0.001***	-0.0002	0.003***	0.003***	0.000	-0.001**	0.000	0.003***	0.001***	0.001**	0.000	0.000
	(0.001)	(0.002)	(0.003)	(0.003)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
R square	0.112	0.109	0.128	0.133	0.038	0.038	0.044	0.051	0.039	0.039	0.026	0.049	0.023	0.023	0.023	0.036
																1.02E+0
N	2.79E+04	2.79E+04	2.79E+04	2.79E+04	1.08E+05	1.08E+05	1.08E+05	1.06E+05	1.05E+05	1.05E+05	1.03E+05	1.04E+05	1.03E+05	1.03E+05	1.03E+05	5

* p<0.10, ** p<0.05, *** p<0.01

Source: Authors' calculation based on ONS data.

The results indicate that access to ANEM services after the implementation of the action plan significantly reduced the probability of transition from unemployment to employment for both males and females by about 1 percentage point (0.8 to 1.1 p.p. depending on the model). The results for women are not significantly different from those of men. The results are not particularly sensitive to instrumenting for the potentially endogenous treatment variable, the inclusion of region-specific time trends, or the inclusion of age and education controls. These results suggest that access to ANEM services since the introduction of the action plan tends to encourage job seekers to remain unemployed longer, probably the result of queuing for the public sector jobs that ANEM provides. The contribution to higher unemployment rates of this sort of queuing behavior in response to an increased probability of public sector employment was first noted by Assaad (2014).

Moving to transitions from out of the labor force to either employment or unemployment (O to P), we can see that the action plan has had heterogeneous effects by gender on such transitions. Exposure to ANEM for men slightly reduces the probability of transition into economic activity in Models 1 and 2, but the effects dissipate for Models 3 and 4, when region-specific time trends and individual controls are included. The effect for men is primarily due to a reduction in the probability of transition from O to E rather than from changes in the probability of transition from O to U. The effect for women is significantly different from that of men and is in the opposite direction. Exposure to ANEM services raises women's transition from outside the labor force to economic activity by 1-3 p.p. depending on the model. Whether the positive effects on participation for women comes from an increase in the probability of O to E or O to U depends on the model. In Models 1 and 2, it is primarily due to an increase in O to U, but in Model 4, it is primarily due to an increase in O to E.

7.3 Analysis of Heterogeneity by Educational Attainment and Age Group

We now move to an analysis of the heterogeneity of our results by educational attainment and age groups, while maintaining the distinction by gender. Since the programs target different educational groups are substantially different, as indicated in Table 1, it is particularly important to conduct heterogeneity analysis by educational attainment. We show in Table 4, results from our previous Model 4, but with interactions between the treatment variable and educational attainment.¹⁵

The first thing to note is that there are statistically significant differences in the effects of access to ANEM services on all four transitions across education levels for both males and females, with the possible exception of the O to E transition for females. The results are therefore heterogeneous by educational level.

¹⁵ Each post-treatment interaction with an educational level (primary, secondary or university) indicates the impact of the program on that specific education level for men. An additional set of interactions with the female dummy show the differential impact at each level for females, but the full female impact at each level is also shown. A series of statistical tests test the equality of the effects across educational levels for men and women, as the difference in effects across each pair of educational attainments.

The impact of increased access to ANEM services on reducing the probability of transition from unemployment to employment (U to E), likely our most important result, is strongest for university-educated males and females, who experience a 1.1 p.p. reduction in this probability. Primary and secondary educated males experience smaller but still significant effects in the same direction (0.8 p.p.). Primary educated females also experience smaller but significant effects relative to university-educated females, but secondary educated females experience no significant effects for this transition, although differences with primary educated females are insignificant. These results confirm that the impact on queuing is greatest for university-educated workers who are the ones most likely to obtain public sector jobs.

Table 4. Heterogeneity of Impact of exposure to ANEM services on one-year labor force transitions by educational attainment: coefficients from a Linear Probability Model

	Linear Probability Model : coefficients			
Education heterogeneity	U_E	O_P	O_E	O_U
Primary #post_treatment_hat (1)	-0.008* (0.003)	-0.002* (0.001)	-0.001* (0.001)	-0.002** (0.001)
Secondary #post_treatment_hat(2)	-0.008* (0.004)	0.00 (0.001)	0.00 (0.001)	-0.001* (0.001)
University #post_treatment_hat (3)	-0.011** (0.004)	0.002* (0.001)	0.002** (0.001)	0.000 (0.001)
Primary #post_treatment_hat # female (4)	0.000 (0.001)	0.006*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Secondary #post_treatment_hat# Female (5)	0.004* (0.002)	0.003*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
University #post_treatment_hat# Female (6)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Controls included	Yes	Yes	Yes	Yes
Municipality Fixed Effect	Yes	Yes	Yes	Yes
Region specific year fixed effect	Yes	Yes	Yes	Yes
_cons	0.312*** (0.083)	0.097*** (0.025)	0.070*** (0.016)	0.070*** (0.016)
Pseudo R- squared/R- squared	0.133	0.053	0.037	0.037
N	2.79E+04	1.06E+05	1.02E+05	1.02E+05
Female impact primary	-0.007* (0.004)	0.001*** (0.000)	0.003*** (0.001)	0.000 (0.001)
Female impact secondary	-0.004 (0.004)	0.002*** (0.000)	0.003** (0.001)	0.000 (0.001)
Female impact university	-0.011** (0.004)	0.003*** (0.001)	0.003*** (0.001)	0.000 (0.001)
P value of Test (1)=(2)=(3)	0.012	0.000	0.000	0.000
P value of Test (1)-(2)=0	0.801	0.000	0.000	0.000
P value of Test (1)-(3)=0	0.003	0.000	0.000	0.000
P value of Test (2)-(3)=0	0.015	0.000	0.000	0.000
P value of Test : (1)+(4) = (2)+(5)=(3)+(6)	0.001	0.000	0.129	0.008
P value of Test[(1)+(4)] – [(2)+(5)]	0.139	0.000	0.167	0.002
P value of Test [(1)+(4)] – [(3)+(6)]	0.059	0.000	0.969	0.008
P value of Test [(2)+(5)] – [(3)+(6)]	0.000	0.000	0.058	0.60

Source: Authors' calculations based on ONS data.

The impact of increased access to ANEM services on the participation decision (the O to P transition) is not only heterogeneous across educational groups, but actually changes signs, at least in the case of men. While there is a negative impact on participation for less educated men, reducing their probability of O to P transition by 2 p.p., there is an opposite impact on university-educated men, whose probability of O to P transition increases by 2 p.p. The negative effect for the less-educated males comes through negative effects on both transitions to E and U, but the effect on transition to U is stronger. The positive effect on the participation of university-educated males comes primarily from a positive effect on the transition to E rather than U.

The impact of the program on the participation decisions of women is also heterogeneous by educational level, although positive on all three levels. As expected, the effect is three times larger for university-educated women than for primary-educated women, mostly because they are the ones who are likely to be eligible for the public sector jobs made available through ANEM. The entire effect for women at all education levels is due to an increase in the probability of transition from O to E rather than from O to U, but this result should be interpreted with caution since it was different in the other models.

We move next to a heterogeneity analysis by age group rather than educational attainment. We categorize individuals into three categorical age groups, namely 15-24, 25-29, and 30 to 35 and report in Table 5 the effect of exposure to ANEM services for each of these, separately for men and women.

Table 5. Heterogeneity Impact of exposure to ANEM services on one-year labor force transitions rates by age group: coefficients from Linear Probability Model

Linear Probability Model : coefficients				
Education heterogeneity	U_E	O_P	O_E	O_U
[15_24] # post_treatemnt_hat	-0.009** (0.003)	0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)
[25_29] #post_treatment_hat	-0.008* (0.003)	-0.001 (0.001)	0.001 (0.001)	-0.002** (0.001)
[30_35]# post_treatment_hat	-0.007* (0.004)	-0.001 (0.001)	0.001 (0.001)	-0.001* (0.001)
[15_24] # post_treatemnt_hat # female	0.000 (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
[25_29] #post_treatment_hat # female	-0.001 (0.001)	0.006*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
[30_35] #post_treatment_hat # female	0.001 (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.002** (0.000)
Controls included	Yes	Yes	Yes	Yes
Municipality Fixed Effect	Yes	Yes	Yes	Yes
Region specific year fixed effect	Yes	Yes	Yes	Yes
_cons	0.333*** (0.083)	0.069** (0.025)	0.017 (0.020)	0.057*** (0.016)

Table 5. Heterogeneity Impact of exposure to ANEM services on one-year labor force transitions rates by age group: coefficients from Linear Probability Model (contd.)

	Linear Probability Model : coefficients			
Education heterogeneity	U_E	O_P	O_E	O_U
Pseudo R- squared/R- squared	0.13	0.05	0.05	0.04
N	27906	106000	104000	102000
Female impact [15_24]	-0.010** (0.004)	0.002*** (0.001)	0.003*** (0.001)	0.000 (0.001)
Female impact [25_29]	-0.009** (0.004)	0.005*** (0.001)	0.004*** (0.001)	0.002* (0.001)
Female impact [30_35]	-0.006 (0.004)	0.003*** (0.001)	0.004*** (0.001)	0.000 (0.001)
P value of Test (1)=(2)=(3)	0.008	0.000	0.016	0.000
P value of Test (1)-(2)=0	0.08	0.001	0.017	0.000
P value of Test (1)-(3)=0	0.002	0.001	0.061	0.109
P value of Test (2)-(3)=0	0.133	0.000	0.938	0.264
P value of Test : (1)+(4) = (2)+(5)=(3)+(6)	0.099	0.000	0.002	0.000
P value of Test[(1)+(4)] - [(2)+(5)]	0.825	0.000	0.001	0.000
P value of Test [(1)+(4)] - [(3)+(6)]	0.043	0.013	0.238	0.469
P value of Test [(2)+(5)] - [(3)+(6)]	0.062	0.898	0.314	0.000

* p<0.10, ** p<0.05, *** p<0.01

Source: Authors based on ONS data.

As shown in Table 5, the patterns of differences in effects across age groups are much less systematic than the patterns across groups of educational attainment. Younger men and women have a greater reduction in the probability of transition from U to E than older men and women, meaning that they are more willing to queue for a longer time to obtain public sector jobs through ANEM. Older individuals, with greater family responsibilities, are likely less able to wait for such jobs to materialize. With regards to transitions from out-of-the-labor force to economic activity, the effects are mostly insignificant for men across age groups, but highest for the middle age group (25-29) for women. These are therefore the women that are most likely to be pulled into the labor force as a result of exposure to ANEM services. Again, the positive effect comes mostly from transitions from O to E rather than O to U.

7.4 Robustness and Placebo Tests

The first robustness test we conduct is to check whether our results are robust to the functional form we selected for our TWFE models. We repeat all estimations using a multinomial logit regression model for all three transition probabilities (U to E, O to E and O to U) instead of separate linear probability models. The models show the impact of exposure to ANEM services on the log-odds of the three transitions. We report the exponentiated coefficients which can be more easily interpreted as marginal effects in Table A3 in the appendix. Generally, we find that the results we report above are qualitatively unchanged when using multinomial logit rather than a linear probability model. For instance, a exponentiated coefficient of 0.956 for the post-treat interaction in Model 1 for the U to E transition suggests that the probability of this transition is reduced by 0.044 or 4.4 p.p. when exposed to ANEM services, a result that is somewhat larger but qualitatively in the same direction as the 1 p.p. reduction we found using

the linear probability model. This is consistently the case across models for the different transitions we examine.

As mentioned above, we conduct a placebo test to investigate whether the parallel trends assumption holds in the pre-treatment period. We limit our estimation to period from 2004 to 2009 and run the same linear probability regressions using the more elaborated Model 4 specification, with the post variable alternatively specified as 2006, 2007 and 2008 and later as opposed to 2010 and later. The results are shown in Table A4 in the appendix. None of the coefficients of the post*treatment interaction terms are statistically significant when post is alternatively specified as 2006, 2007 or 2008 and later. This is also true of the post*treatment*female interaction terms, with the exception of two coefficients that are significant at the 10% level when post is set as 2008 and later. These results essentially confirm that the parallel trends assumption holds for the pre-treatment period and is therefore likely to also hold in the post-treatment period.

7. Conclusions and policy implications

The objective of this study was to evaluate the impact on labor force transition rates of being exposed to Algeria's employment agency (ANEM) services after the expansion of the action plan to facilitate labor market insertion (DIAP) in 2010. The action plan consists of a series of active labor market programs designed to facilitate the labor market insertion of job seekers into available jobs by providing wage subsidies and vocational integration support. It should be kept in mind, however, that over 90 percent of the jobs that the employment agency ANEM is able to place people in are public sector jobs.

Using pooled cross-sectional labor force survey data for the period 2004 to 2014, we estimate two-wage fixed effects difference-in-difference models to estimate the causal effects of being exposed to ANEM services on the one-year transition rates from unemployment to employment and from out-of-the-labor force to employment and to unemployment. Since the individual-level use of ANEM services would clearly be endogenous, we use a municipality-level average exposure to ANEM services among members of the workforce as our treatment variable. Cognizant that even this aggregated measure can be correlated with local unobservable linked to labor force outcomes, we further instrument this municipal-level treatment by the distance between the municipality of residence and the closest ANEM office.

We begin the analysis with a descriptive examination of the transition probabilities from unemployment to employment, and from out-of-the-labor-force to both employment and unemployment for the period 2001 to 2014. We note that although the action plan for the insertion of new entrants was introduced in 2008, it was effectively implemented starting in 2010. The descriptive results show that although the effects of the program on male transition rates were limited, it appeared to have substantial effects on women's transitions rates, especially those of university-educated women – a group that is particularly dependent on public sector jobs.

Our multivariate TWFE results show that greater exposure to ANEM services after the program was introduced leads to declines in the transition rates from unemployment to employment for both men and women. This seemingly paradoxical result for a labor market insertion program designed to facilitate people's insertion into the labor market can be explained by the fact that exposure to ANEM services raises the probability that job seekers will eventually access public sector jobs and therefore encourages them to hold out for such jobs. Through this queuing effect, the program can therefore paradoxically raise rather than lower unemployment rates. This effect is substantially larger for university-educated male and female new entrants, who are more likely to be eligible for public sector jobs than their less educated counterparts. The effect is also larger for younger groups of new entrants compared to older groups since younger new entrants can better afford to remain unemployed while queuing for public sector than their older counterparts.

Besides slowing the transition from unemployment to employment, the program also appears to increase the transition from inactivity to activity, thus increasing participation, for women. As in the case of transitions from unemployment to employment, effects on transitions from inactivity to activity are larger for higher-educated women compared to their less educated counterparts. Effects on women's participation are also strongest for women of an intermediate age (25-29) compared to younger women and older female new entrants. We get somewhat mixed results on whether the participation effects of the program are mostly through its effects on transition from inactivity to employment or to unemployment. Different specifications of the model give different results on which of these two transitions is more salient, suggesting some caution in interpreting these results.

For men, the effects of the program on participation are smaller but also of opposing direction depending on education level. The program appears to have negative effects on participation for lower-educated men, but positive effects on participation for higher educated men. For lower educated men, the program reduces transitions from inactivity to both employment and unemployment, but for higher educated men, the positive effect on participation appears to come primarily from increasing transitions to employment. There are no significant differences in effects on participation for men by age group.

The results confirm that a government employment assistance program designed to reduce unemployment by encouraging labor market insertion could in fact have just the opposite effects on unemployment if most of the job search assistance it provides targets public sector job. It is well established that public sector jobs are much more attractive to Algerian job seekers than private sector jobs. Anything that increases the probability of accessing such jobs might encourage these job seekers to hold out longer for them, thus delaying their transition to employment. Despite the partial retreat of the State from several economic sectors in the 2000s, private sector growth has not filled the void and private sector jobs remain informal (Souag and Assaad 2018). The preference for public sector work is even more pronounced for women, whose reservation wage and reservation working conditions are often above what they can obtain in the private sector. It is therefore not surprising that a program that raises the

probability of obtaining public sector jobs will draw more women to participate in the workforce, which is exactly what we observe. It is also not surprising that these effects are stronger for educated groups that have greater eligibility and likelihood of landing the public sector jobs.

So long as the Algerian government is able to provide a steady stream of public sector employment for the growing number of educated new entrants, this kind of active labor market program can result in desirable labor market outcomes for job seekers even if it increases unemployment. However, the problem lies in the sustainability of such policies in the face of fiscal pressures. The Algerian government has been providing fiscal support to SOEs, with the most common form being subsuming the non-performing loans of SOEs and the coverage of loans with subsidized interest rates by paying the interest rate differentials. At the same time, the SOEs have an obligation to implement the government's social policies, which weighs on their financial situation, negatively affecting their financial performance.

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Appendix

Table A1. Comparison of labor force surveys methodologies from 1997 to 2014

Years	1997	2001(A)	2001(B)	2002	2003	2004	2005	2006
Sample Size (Households)	6457	6923	6360	6596	6457	14847	14939	14323
Base of survey	RGPH 87	RGPH 98	RGPH98	RGPH 98	RGPH98	RGPH 98	RGPH 98	RGPH 98
Reference period	Last week in September	Last week in September	Last week in December	Last week in March	Last week in September	Last week in September	Last week in September	Last week in September
Individual situation on T	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more
Individual situation on T-1	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more
Years	2007	2008	2009	2010	2011	2012	2013	2014
Sample Size (Households)	14866	14000	14000	14592	14939	14323	14866	14000
Base of survey	RGPH 98	RGPH 2008	RGPH 2008	RGPH2008	RGPH 2008	RGPH 2008	RGPH 2008	RGPH 2008
Reference period	Last week in September	Last week in September	Last week in September	Last week in September	Last week in September	Last week in September	Last week in September	Last week in September
Individual situation on T	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more
Individual situation on T-1	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more	15 year and more

Source: Authors from ONS 's databases.

Table A2. First stage estimation: Coefficients from a municipality level regression of the rate of exposure to ANEM services as function of the distance from the municipality of residence to the closest ANEM office

Y = Share of labor force with access to ANEM services	b/se
Distance : 0 km reference	
Distance_[1km_20km]	-3.687*** (0.894)
Distance_[21km_50km]	-5.577*** (0.882)
Distance_>50km	-2.023 (1.375)
Region North_Center reference	
North_East	6.814*** (1.016)
North_West	0.711 (0.973)
Highlands_Centrer	3.308* (1.448)
Highlands_East	-1.588 (1.112)
Highlands_West	4.047** (1.471)
South	7.143*** (1.318)
_cons	19.636*** (0.846)
N(obs)	891
R-squared	0.1403
F-statistic for significance of instruments F(3,891)	13.75***

* p<0.10, ** p<0.05, *** p<0.01

Source: authors' calculation based on ONS data.

Table A3. Impact of Exposure to ANEM Services on one-year labor force transition rates: Exponentiated coefficients from a multinomial logit regression model

Mlogit : RRR coefficients	U to E				O to E				O to U			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
post_treatment (1)	0.956*** (0.004)	0.953*** (0.008)	0.963** (0.016)	0.964** (0.016)	0.976*** -0.006	0.948*** -0.012	1.016 -0.025	1.02 -0.025	0.99 (0.006)	0.967*** (0.012)	0.933** (0.025)	0.964 (0.026)
female	0.494*** (0.023)	0.517*** (0.025)	0.505*** (0.025)	0.528*** (0.045)	0.351*** -0.012	0.353*** -0.013	0.350*** -0.013	0.239*** -0.015	0.348*** (0.016)	0.335*** (0.016)	0.334*** (0.016)	0.122*** (0.011)
Post_treatment *female(2)	1.004 (0.003)	0.999 (0.004)	1.001 (0.004)	1.001 (0.004)	1.016*** -0.004	1.015*** -0.004	1.014*** -0.004	1.022*** -0.005	1.048*** (0.004)	1.060*** (0.004)	1.061*** (0.004)	1.030*** (0.004)
Controls included	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Municipality Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed effect	Yes	Yes	Yes	NO	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Region specific fixed effect	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
_cons	0.551** (0.162)	0.818 (0.239)	0.427** (0.167)	0.404** (0.158)	0.089*** (0.035)	0.102*** (0.041)	0.028*** (0.016)	0.030*** (0.017)	0.035*** (0.018)	0.034*** (0.018)	0.056*** (0.035)	0.057*** (0.036)
Female impact (1) * (2)	0.960*** (0.005)	0.952*** (0.009)	0.964* (0.017)	0.965* (0.017)	0.991 (0.006)	0.962** (0.012)	1.03 (0.024)	1.041 (0.024)	1.037*** (0.006)	1.025* (0.012)	0.989 (0.027)	0.993 (0.027)
Pseudo R- squared	0.14	0.138	0.154	0.16	0.096	0.096	0.106	0.126	0.096	0.096	0.106	0.126
N	30457	30457	30457	30439	108000	108000	108000	106000	108000	108000	108000	106000

* p<0.10, ** p<0.05, *** p<0.01

Source: Authors calculations based on data from ONS.

Table A4. Placebo tests. Coefficient estimates from Linear Probability Models on data from 2004 to 2009, with varying definitions of the post dummy

Linear Probability Model	2006				2007				2008			
	U_E	O_E	O_U	O_P	U_E	O_E	O_U	O_P	U_E	O_E	O_U	O_P
Post_2006_treatment_hat	0.01 (0.006)	-0.002 (0.001)	0.000 (0.001)	-0.003 (0.002)								
Post_2006_treatment_hat # female	-0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)								
post_2007_treatment_hat					-0.01 (0.008)	0.005 (0.002)	0.003 (0.001)	0.005 (0.002)				
post_2007_treatment_hat #female					-0.002 (0.001)	0.000 (0.000)	-0.001 (0.000)	-0.001 (0.000)				
post_2008_treatment_hat									-0.01 (0.010)	0.002 (0.002)	0.002 (0.001)	0.003 (0.002)
post_2008_treatment_hat # female									0.003* (0.001)	0.00 (0.000)	-0.001 (0.000)	-0.001* (0.000)
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region specific fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_cons	-0.089 (0.127)	0.080** (0.028)	0.057* (0.022)	0.123*** (0.034)	0.087 (0.133)	0.013 (0.031)	0.02 (0.022)	0.029 (0.036)	0.299 (0.184)	0.083 (0.043)	0.029 (0.031)	0.103* (0.050)
N	13581	62266	61065	64129	14278	62396	60814	63966	14119	61656	60023	63056
Pseudo R- squared	0.125	0.059	0.045	0.065	0.136	0.063	0.049	0.068	0.123	0.059	0.042	0.062

* p<0.10, ** p<0.05, *** p<0.01. Estimates are for Model 4, which includes age and education controls, region-specific year fixed effects, and instruments for the exposure to ANEM services variable.

Source: Authors' calculations based on ONS data.