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Hiring Discrimination on the Algerian Labour Market: an Assessment with Testing

Lamia Benhabib[*] and Philippe Adair[**]

Abstract

We present the results of a *correspondence testing*, designed to measure the effect of gender on the probability of obtaining a job interview in the region of Oran (Algeria). The experimental protocol consists in responding to job offers in the accounting profession with 300 fictitious applications from identical profiles of distinct gender. Against conventional wisdom, the analysis of gross and conditional discrimination reveals a marked favouritism towards female candidates applying for various job positions in the accounting profession, which is experiencing some shortage. Beyond this paradox of positive discrimination favouring women, the explanation may be found in the presumed acceptance of lower wages by female applicants, driving to entrenchment in low-skilled jobs.

Keywords: Algeria, discrimination, gender, labour market, inequalities, *testing*

JEL:C93, J71, J16, J82.

Introduction

The Algerian labour market is marked by significant gender disparities. Discrimination against women is tackled to explain the existence of such inequalities (Talahite, 2009, Musette, 2011, 2013, Donnat, 2012, Lassassi and Hammouda, 2012, Lassassi and Muller, 2013). However, all professional disparities do not automatically result in discriminatory behaviour from recruiters, discrimination being a subset of the concept of inequality (Petit, 2013).

The economic literature has provided different insights into the theory of discrimination (Edgeworth, 1922, Becker, 1957, Phelps, 1972, Arrow, 1972, 1973), whether based on gender, ethnicity or the place of residence. According to Heckman (1998), discrimination on the labour market refers to differential treatment (access to hiring, wage levels, training, promotions, etc.) affecting two individuals on the basis of differences in non-productive characteristics while they have perfectly identical observable productive characteristics. Identifying what is or is not discrimination still remains a complex exercise simultaneously involving labour supply and demand. On the supply side, it is difficult to discern the boundary between discrimination and personal choice (Havet and Sofer, 2002). On the demand side, it proves uneasy to single out a discriminatory fact from objective differentiation on the part of employers.

There are persisting gender disparities on the Algerian labour market (low participation rate and high female unemployment) despite changes in the behaviour of women in recent decades who marry later on and experience higher educational attainment. One major issue is whether the origin of the breakdown of equality between sexes on the Algerian labour market may have a discriminatory ground. So far, the hypothesis of discrimination against women accessing employment has not been subject to empirical investigations in Algeria. This paper bridges the gap and explores hiring discrimination in Algeria by testing the gender issue.

We first sketch the main characteristics of gender inequalities on the Algerian labour market. In the second place, we present a literature review regarding the analysis and measurement of discrimination. Last, we carry on an experiment in the region of Oran, in order to test the

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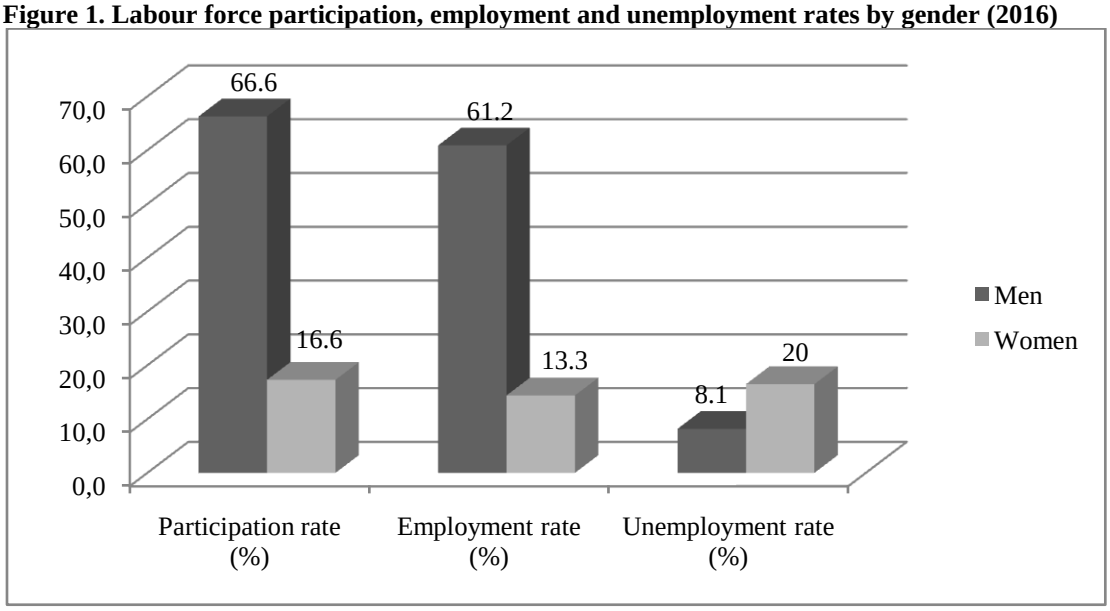
effect of gender on the chances of getting a job interview, all other things being equal. We start first with gross discrimination, before we turn to conditional discrimination and we sketch an alternative explanation for discrimination.

1. Gender inequalities on the Algerian labour market: participation, employment and unemployment

We fist portray the main features of the labour market, whereby three indicators are commonly used to assess the extent of the inequalities: the participation rate, the employment rate and the unemployment rate. Data for the year 2016 (see Figure 1) show significant disparities between men and women that stand among the highest in the world (ILO, 2009, 2016): 50 percentage points as for participation rate and 47.9 percentage points as for the employment rate. Algerian women are more affected (20%) by unemployment than men (8.1%) and take an increasing share of total unemployed population, which rises from 11.4 per cent in 2000 up to 37.7 per cent in 2016 (ONS, 2001, 2016). These disparities are even more pronounced when age is taken into account: young women (15-24 years old) are more exposed to unemployment (rate is 49.9%) relative to their male counterparts (rate amounts to 22.3%). The gender gap is 27.6 percentage points in the young age group (15-24 years old) and only 6.6 percentage points for those over 30 years old (ONS, 2016).

Figure 1. Labour force participation, employment and unemployment rates by gender (2016)



Source: Household Employment Survey (ONS, 2016)

In addition to inequalities based on gender and age among the unemployed, educational attainment reinforces these disparities: 56.1 per cent unemployed women experience higher education compared with only 13.6 per cent unemployed men for all age groups (ONS, 2016). The interaction between age, gender and level of education highlights a multiple vulnerability (Beale, 1970) of women in the Algerian labour market. Women aged at least 15 are increasingly participating in the labour force: 19.5 per cent in 2016 from only four per cent in 1966 (RGPH, 1966, in Musette et al, 2003), and a rise of seven percentage points since 2000when participation rate was 12.5 per cent (ONS, 2001). However, 17 per cent active women (aged at least 15) access the labour market through unemployment and 23.3 per cent experience informal employment (ONS, 2014). It should be noted that the increase in female enrollment in the employed population is fueled by a significant proportion of informal employment. In 2013, almost 28 per cent of female employment (aged at least 15) was informal (ONS, 2014). According to a survey in the region of Bejaia, women have a higher

risk to access the informal sector than men (Bellache et al, 2014); although higher educational attainment reduces the likelihood of a woman working in the informal sector (Gherbi, 2014).

2. Hiring discrimination: Theory and empirics

Theoretical approach

According to Cain (1986), initial versions of the theories of discrimination fall into two broad categories of models. Becker (1957) bases discrimination upon taste, considering that some employers, because of prejudice, exclude workers from certain categories or hire them at lower wages, while their productivities are identical to those of non-discriminated workers. Statistical discrimination proposed by Arrow (1972, 1973) and Phelps (1972) predicts an unobserved component of applicants' productivity at hiring due to a lack of information. The employer will therefore refer to the average productivity of the group to which the worker belongs, which reflects imperfectly his/her true abilities.

Evaluation by testing

Assessing discrimination in hiring on the basis of statistical data usually available from survey data or administrative data proves difficult in the absence of variables such as job search, motivation of applicants and the level of productivity of individuals (Du Parquet and Petit, 2011). Only an experimental approach, namely *testing*, makes it possible to highlight the potential existence of discrimination in hiring (Duguet et al, 2007), designing a situation wherein the experimenter would control the individual characteristics of applicants.

Testing is a tool for measuring discrimination in two ways: a test of access to job interviews (correspondence testing) and a test of access to employment (audit by couple). However, the main limit of testing lies in the non-representativeness of results on the whole labour market (Heckman, 1998). According to Du Parquet and Petit (2011, 5) "the testing data are partial (some professions tested), punctual (a few months of experimentation) and localised (some employment areas examined)".However, testing remains the only empirical methodology able to capture discrimination "on the spot" (Delattre et al, 2013).

Main empirical results

Empirical studies that use evaluation by testing were initially concerned with gender-based discrimination. Petit (2004) and Duguet and Petit (2005) test the financial sector, highlighting the recruiters' willingness to allocate low-skilled positions to young women and skilled managerial positions to young men. Firth (1982, cited in Petit et al, 2011) and Riach and Rich (1987; 1995) observe that women are discriminated in the accounting and finance as well as in the IT job positions. Neumark et al (1996) found significant discrimination in the United States against female waiters (*vs.* male waiters) in high (low) category restaurants that offer higher lower) wages. Beyond the aforementioned sexual discrimination, Riach and Rich (2002) point to discrimination based on stereotypes. Indeed, the signaling of a male would slightly reduce the unfavourable treatment of women in the traditionally male professions (Weichselbaumer, 2004). Nevertheless, discrimination in hiring prevails in "gender-biased" occupations (Riach and Rich, 2006).

3. The application of testing to the Algerian labour market

Despite their changing behaviour with respect to participation and their rising educational attainment, women remain a minority on the labour market in Algeria. There is still an unexplained share in inequalities experienced by women, particularly during recruitment. In order to verify the hypothesis of discrimination based on gender, we compare the chances of women and men to get job interviews. We detail the protocol of data collection, main results of the experiment and their implications

The experimental protocol

Experimentation consists in answering job offers through fictitious applicants that are designed as identical with the exception of one single characteristic: feminine or masculine gender. The purpose of this test by correspondence is to detect the potential existence of hiring discrimination against women, all other things being equal. To our knowledge, no testing experiment have yet been carried out in Algeria or in the MENA region. Hence, this is pioneering paper addressing the contours of discrimination on the Algerian labour market.

We chose the Accounting profession that is facing a potential shortage in labour supply. Experiment took place within the region of Oran, which is the second most populated city in Algeria. It is worth noticing that there are no statistics regarding the distribution of Accountant workers by occupation and gender. However, we were able to access the tables of the National Accounting Council (CNC, 2016) that listed countrywide Accounting professionals, which are own account and not salaried job positions. The share of women is respectively 9.7, 10.1 and 4.9 per cent among Chartered Accountants, Statutory Auditors and the Accountants. Hence, we have an overview of the low rate of female workers in the accounting profession for skilled jobs.

Consistent with our experiment, we have designed two identical fictitious applicants that gender only distinguishes (Table 1). Candidates have the same individual characteristics (age, family situation, etc.) and similar human capital profiles (educational level, work experience). The CV and cover letter (CL) of the two applicants is identical as regards content and differ only in presentation (layout, writing style, font size) according to the usual protocol.

Table 1. Identities of the fictitious applicants

	Fatiha	**Mohamed**
Gender	Female	Male
Age	25 years old	25 years old
Marital status	Single	Single
Place of residence	Carteaux (El Mactaa, Oran)	Gambetta (Es-Seddikia, Oran)
Educational attainment	Master degree (five years higher learning)	Master degree (five years higher learning)
Domain	Accounting & Management	Accounting &Audit
Work experience	2 years	2 years
Job status	Looking for a job	Looking for a job

Source: experimentation conducted by authors

Job offers related to accounting (accounting secretary, accounting assistant or accountant) have been collected throughout the press, websites managed by Private Authorised Placement Organisations (OPAP) and dedicated websites; they were processed daily over a period of 100 days from December 2014 to March 2015. We applied simultaneously two methodological approaches in order to avoid any risk of detection and build the most reliable dataset: (i) sending applications at regular intervals with systematic rotation; (ii) permutations between applicant identities and written materials. Four CV / CL combinations were designed for each applicant based on two different formats for the CV and CL.

It is worth mentioning that methodology for exploiting situational test results differs between surveys and remains a key topic for researchers (Riach and Rich, 2002). As regards the processing of responses of recruiters in our experiment, a response is considered positive in the case the employer invites the applicant to a job interview and negative if application is rejected or if there is a lack of response. The exploitation of the responses from the testing leads to four possible situations:

A = the number of cases where the majority candidate receives a positive response, whereas the minority candidate is not invited or is rejected;

B = the number of cases where the minority candidate receives a positive response, whereas the majority candidate is not invited or is rejected;
C = the number of cases where both candidates are selected for a job interview;
D = the number of cases where both candidates are rejected or ignored.
We use the discrimination assessment method below. The result indicates the gap in success between the majority candidate and the minority candidate.

$$\text{Gross discrimination rate} = \frac{A+C}{A+B+C+D} - \frac{B+C}{A+B+C+D} = \frac{A-B}{A+B+C+D}$$

The two perfectly comparable candidates were thus confronted with the same positions for the same job offers from the same companies. Any significant difference in the invitation to job interviews between the two candidates can only result from the effect of non-productive characteristic that distinguishes them (Petit et al, 2013), which represents gender and can be attributed, by definition, to discrimination (Weichselbaumer, 2004).

Key findings and interpretation

A sample of 150 companies was audited, with each one receiving two applications. In response to the 300 fictitious applications, 47 received a call for a job interview of employers from 36 companies, a success rate of 15.6per cent for a 24 per cent response rate of recruiters. The small size of the sample may be due to the lack of dynamism in the Algerian official labour market (ILO, 2013). It should be noted that access to employment goes through personal networks in almost 80 per cent of cases in Algeria (ONS, 2014), which suggests that many applications went this way.

In order to measure the statistical significance and robustness of the results, we used the bootstrap method, which is commonly used to maximize the sample size by performing thousands of random draws of all the responses.

Gender discrimination in hiring

According to results, there are large discrepancies between male and female candidates (Table 2). The woman is invited to a job interview almost twice as much as her male counterpart and almost two thirds of the responses concerned only the woman (without contacting the man). The difference in the success rate between the pair of fictitious candidates, which represents an indicator of discrimination, is 10 per cent against men. This difference is significant (at the 1% threshold (Student: 2.94) and stands between 4.1and 14.5 percent with a10 per centerror risk (90% confidence interval).

Table 2. Success rate

Groups	Response rate	Standard deviation	T student	P-value	[90% confidence interval]	
					Lower threshold	Higher threshold
Women	20.67%***	0.033	6.130	0.000	0.146	0.254
Men	10.67%***	0.025	4.260	0.000	0.066	0.148
Difference	**10%*** **	**0.032**	**2.940**	**0.003**	**0.041**	**0.145**

Statistics are calculated using the bootstrap method with 10,000 replications. Field: 300 fictitious applications sent and responses from 36 employers. * p<0.1; ** p<0.5; *** p<0.01.
Source: experimentation conducted by authors

The ILO has developed another indicator to calculate the ratio between the success rate of the minority candidate and that of the majority candidate (Cédiey et al, 2007). This ratio (DM / F = 25%) indicates that discrimination occurs three times out of four against men, ignoring cases of double rejection. For example, a male candidate with an equivalent CV receives fewer hiring calls than the female candidate.

In a second step, we carry out a binomial test to evaluate the discrimination between female and male candidates (Table 3). This test is valid upon small samples (Duguet et al, 2010, 21). The test procedure consists in considering only pairs of candidates who have differentiated responses (either the woman is retained and the man is refused, the woman is refused and the man is retained). The analysis excludes cases where women and men are retained or rejected simultaneously.

Upon the overall sample, there are 25 cases where men and women obtain different responses for the same job offers. Out of these 25 cases, there are 20 where the woman is preferred, which is a rate P1 = 80%. In the five remaining cases, the man is preferred.

Table3. Binomial test of discrimination

Woman favourite	Man favourite	P1=N1/(N1+N2)	Hypothesis H0: P1=50%		
(N1)	(N2)		P-values alternative hypotheses:		
			Ha1: P1<50%	Ha2: P1>50%	Ha3: P1<> 50%
20	5	80%	0.999228	0.003305***	0.006611***

Exact binomial test of egalitarian treatment. Field: 300 fictitious applications sent, 25 different responses obtained by the two applicants upon the same offers (when one candidate is accepted and the other rejected).
* p<0.1; ** p<0.5; *** p<0.01.
Source: experimentation conducted by authors.

The probability associated with Ha3 (P1 ≠ 50%) is 0.0066 (or 0.6%). This probability being significant, the hypothesis Ha3 is therefore valid. This means that there is a difference in treatment between women and men. The probability associated with the hypothesis Ha2 (P1> 50%) is 0.0033(or 0.6%). Below 1%, the assumption is valid. The binomial test demonstrates that there is significant discrimination against men for invitations to a job interview. Thus, the chances of obtaining job interviews are significantly lower for men in the accounting profession: the average number of applications allowing the male profile to get a job interview is nine compared to five for women. Equal treatment during the hiring process was only respected in 11 cases out of 150 job offers.

Hence, there is a preference for female applications (Benhabib, 2017). The results of our experimentation can be explained - in part - by the gender norms prevailing in the Algerian society. Gender stereotypes are generally used to explain the status of women in the labour market (Meurs, 2014). The lower bargaining power of women-compared with men (Rosen, 1998; Babcock et al, 2003) may explain the preference of employers for female candidates. Women would be less demanding in terms of wage expectations relative to men who often have the role of head of household by supporting the household. The ONS (2013) time use survey shows that 88 per cent of Algerian households are managed by men compared with only 11 per cent by women. In addition, women behave less risky than men (Breda, 2015), which represents a notable quality in Accounting. The results obtained are obviously neither representative of overall Algeria labour market, nor of all occupations.
Among explanations for the choice of hiring women It is worth mentioning wage discrimination on the demand side (reduced wage cost for the employer). Indeed, recent studies upon the Algerian labour market suggest the existence of wage discrimination based on gender (Gherbi, 2016; Benhaddad et al., 2017).

Conditional discrimination

Descriptive statistics allowed us to measure gross discrimination between the two fictitious candidates. However, the characteristics of testing, the company, or the supply side variables may influence discrimination in hiring. This is conditional discrimination. According to the methodology adopted by Duguet et al. (2010), we include an ordered Probit model to gauge

the influence of some explanatory variables upon the measurement of discrimination and obtain adjusted discrimination, withstandingno other effect.
The variables from our sample are grouped into three categories: those related to testing, employment and the firm. Each of the 17 variables contains several modalities. Only significant variables are used in the calculation of adjusted discrimination.
The first step in our analysis is the construction of a variable that characterizes the difference between the two candidates in terms of access to job interviews. This variable takes three values: (-1) if the man is preferred while the woman is refused; (0) if both have the same results (accepted or refused); (1) if the woman is preferred.
In the second step, we estimate an ordered Probit model that relates the difference between the responses obtained by each candidate and the explanatory variables (order of submission of applications, type of CV / CL, job position, requested diploma and work experience, industry and the legal status of the company). We transform these qualitative variables with several modalities into binary variables which are then used in the estimation of the model. For each variable, the reference modality is the first one. The corresponding binary variable is therefore absent from the model.
The last step consists in calculating adjusted discrimination with the following formula[1]:

$D = 1-\Phi(c2) - \Phi(c1)$, where Φ is the distribution function of the normal distribution, *c1* and *c2* being the constants in the ordered Probit regression.

Table 4 presents the results of the Probit estimation, the explanatory power of which is low (R2 = 30.2%). Net difference between applications between women and men lessens from 10 to 5.7 per cent after adjustment, all other things being equal: this difference is significant at the 1% threshold. Thus, the advantage of female response rate is almost 6 percentage points relative to that of her male counterpart.

Some potential explanatory variables of conditional discrimination exert a significant negative influence on the likelihood of women being preferred. Sending the female application first would have a negative significant (at the 1% threshold) effect on the likelihood that the woman would be preferred to her reference modality (male application first). The same applies to the extractive industry (significant at the 1% threshold) as well as other market and non-market services (significant at the 1% threshold and 10% respectively), which would have a negative influence. These results corroborate official data for the secondary sector, but contradict those for the tertiary sector, which remains the main source of female employment (ONS, 2016). Required professional experience (all durations combined) also seems to diminish the chances that the woman is preferred to the man, which proves significant (at the 1% threshold). This reinforces the hypothesis that choices of recruiters are based in part on assumed female wages pretensions; with less professional experience, wages offered to a candidate are lower and would be better accepted by a woman than by a man.

Accountant and accounting secretary positions have a positive and significant (at the 1% threshold) impact on gaps in access to hiring interviews for women in relation to the accounting position. The required vocational training diploma (CMTC / CED) is also significant (at the 1% threshold). These results may reflect vertical segregation that hampers the career promotion of women in the accounting profession (Roberts and Coutts 1992, Hull and Umansky 1997, Dambrin and Lambert 2006). Fictitious female candidates have a higher likelihood of integrating lower-skilled positions in the accounting profession (accounting assistant and accounting secretary), although vocational training opens direct access to an accountant position.

[1] There are only two constants because explanatory variables have been normalized such as their mean is equal to 0. Thus, by calculating adjusted discrimination at the mean point, only remains the effect of the constant.

Two of the CV / CL combinations also seem to positively influence the probability of invitation for females to a job interview that is significant (at the 5% threshold), as well as for the manufacturing sector that proves significant (at the 5% threshold) upon the gap in success between the two fictitious applications. The remaining variables are not significant.

Table 4. Adjusted discrimination: an ordered Probit estimation

Explanatory variables	**Coefficient**	**Std. Error**	**z**	**P>z**	**[95% Confidence Interval]**	
Variables of *testing*						
Female application first	-0.312***	0.019	-16.380	0.000	-0.350	-0.275
Type CV/CL (ref. Combination 1)						
CV/CL Combination 2	0.104**	0.047	2.200	0.028	0.011	0.197
CV/CL Combination 3	0.095**	0.048	1.990	0.047	0.001	0.188
CV/CL Combination 4	0.007	0.056	0.120	0.907	-0.103	0.116
Variables related to the firm						
Public legal status (ref. Private sector)	-0.076	0.076	-1.000	0.319	-0.225	0.073
Industry						
Extractive industry	-0.543***	0.137	-3.970	0.000	-0.811	-0.275
Manufacturing industry	0.193**	0.087	2.230	0.026	0.023	0.364
Building &Construction	-0.132	0.083	-1.590	0.111	-0.296	0.031
Trade	-0.013	0.111	-0.120	0.907	-0.230	0.204
Transportation/communication	0.099	0.099	1.000	0.317	-0.095	0.292
Other services	-0.084***	0.006	-15.240	0.000	-0.095	-0.073
Non market services	-0.091*	0.048	-1.910	0.055	-0.185	0.002
Variables related to job offers						
Job position (ref. Accountant)						
Accounting assistant	0.322***	0.101	3.180	0.001	0.124	0.521
Accounting secretary	0.300***	0.057	5.270	0.000	0.188	0.411
Required degree(ref. Accounting)						
CMTC/CED	0.191***	0.028	6.780	0.000	0.136	0.246
Bachelor (3 years higher learning)	0.197	0.237	0.830	0.407	-0.268	0.662
Bachelor (4 years higher learning))	-0.207	0.205	-1.010	0.311	-0.609	0.194
Master	-0.017	0.117	-0.140	0.887	-0.246	0.213
Higher learning	0.080	0.063	1.280	0.202	-0.043	0.203
Unspecified	-0.169	0.149	-1.140	0.256	-0.462	0.123
Required work experience (ref. First job)						
1 - 2 years	-1.716***	0.072	-23.800	0.000	-1.857	-1.575
3 - 5 years	-1.825***	0.199	-9.190	0.000	-2.214	-1.435
Over 5 years	-2.267***	0.193	-11.750	0.000	-2.646	-1.889
Unspecified	-2.644***	0.266	-9.950	0.000	-3.165	-2.123
Constant1	-2.554	0.118			-2.785	-2.324
Constant2	1.534	0.210			1.123	1.946
Adjusted discrimination	**0.057*** **	**0.022**	**2.650**	**0.008**	**0.015**	**0.099**
Log likelihood= -54.63 LR chi2(21)=47.21 R^2=0.3017 Prob > chi2=0.0013 Observations = 150						

Dependent variable: female-male gap (-1) if man preferred; (0) if both invited or rejected; (1) if woman preferred). Ref: reference modality. * p<0.1; ** p<0.5; *** p<0.01. Field: 300 fictitious applications, responses from 36 employers.
Source: experimentation conducted by authors.

An alternative explanation for gender inequalities

According to the outcomes of our and in light of the small number of responding firms, opportunities to access employment remain limited, not only because of the deficit in high quality employment, but also because of the use of unofficial job search channels. A recent study highlights the prominent use of social networks in getting a job. Using a Logit model applied to employment survey data from the ONS, Lassassi and Muller (2013) show that women have less recourse to personal or family relationships in the job search process and when they eventually find a job this way, it is mostly less skilled. In addition, the size of the network affects job search strategies and therefore access to the labour market. The assumption that women's social

networks are less developed than those of men implies that women have fewer opportunities to access employment in a context where access to information is limited (Stigler, 1962). In addition, some women choose not to participate in the labour market due to family and / or socio-cultural constraints. Taking these mechanisms into account is an essential issue both for research and for the design of public policies, which is beyond the scope of our paper.

Conclusion

We applied the testing method to the Algerian labour market in order to capture discrimination based on direct observation of the actual behaviour of employers and not on the basis of inequalities observed prior to recruitment. It appears from this correspondence test that the chances of accessing a job interview in the accounting profession are higher for a young woman than for her male counterpart, all other things being equal. This difference in treatment can be explained by gender stereotypes whereupon some employers base their hiring decisions, although they are not good predictors of the personality traits of individuals (Weichselbaumer, 2004). It seems that women can be favoured relative to men on the basis of their presumed acceptance for lower wages that is expected by recruiters, which in turn entrench women into least qualified positions. Wage discrimination against women is also a potential explanation of recruiter preferences for female candidates.
It should be noted that these results do not mean that there is no discrimination in the Algerian labour market, but that any inequality of treatment linked to individual characteristics is not necessarily discrimination. This leads to a reflection on alternative explanations of the situation of women, especially the younger ones, in the labour market. Their personal and professional networks can limit their chances of accessing employment, regardless any exogenous discrimination.

At last, we cannot state the existence of discrimination in hiring women on the basis of our experiment alone. Our experiment is an exploratory test upon the accounting profession, whose results are thus not representative of the Algerian labour market and should not be generalised. The acceptance of tests requires the multiplication of studies to detect discrimination towards vulnerable people (young people and women) and the widening of the field of experiments regarding the variables and professions to be tested. Large-scale tests with longer time span upon several professions should provide more relevant outcomes. Detection of the various sources of inequalities opens up avenues for designing the appropriate measures to combat them. We will enhance this paper by testing the cross-effect of age, gender and employment status, including the order of responses from the employer as an additional parameter in the model.

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