HIRING DISCRIMINATION BASED ON NATIONAL ORIGIN AND THE COMPETITION BETWEEN EMPLOYED AND UNEMPLOYED JOB SEEKERS

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2017

Abstract:

This study uses the findings of a correspondence testing in order to assess separately the hiring effects of foreign origin and employment status in the French construction sector. We build a model combining taste and statistical discrimination which highlights that employed applicants are in a better position than unemployed and that foreign-origin applicants benefit more from being employed than native-origin ones. To empirically test these features, we construct four applications, each representing a particular profile with respect to national origin and employment status. We sent 1204 résumés in reply to 301 job vacancies advertised from mid-April to mid-September 2011 in Paris and its suburbs. While being employed increases the hiring rate for applicants of foreign origin, this is not the case for applicants of native origin and the overall employment is not a significant factor. Conversely, the total effect of national origin is negative and significant, despite the fact that response rates for employed applicants are not fundamentally different. Hence, our study does not allow to affirm that employed applicants of foreign origin are less penalized than unemployed ones.

Keywords: hiring discrimination, correspondence testing, national origin, unemployment

Classification JEL C81, C93, J15, J7

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1. Introduction

Economic analyses of hiring rates in the French labor market have highlighted significant differences between individuals of certain national origins. French citizens of North African origin have an employment rate that is 20 percentage points lower than that of native French citizens (Aeberhardt *et al.*, 2010). This gap can be explained not only by differences in productivity and job search intensity, but also by discrimination in the hiring process (Duguet *et al*., 2007, 2009). The latter could be due either to employer distaste (Becker, 1957) or differences in the value assigned to productivity in the screening process (Phelps, 1972, Arrow, 1973). Whatever the reason, origin-based discrimination has the potential not only to unfairly increase the length and frequency of periods of unemployment, but also to modify labor market behavior and rewards for individual characteristics. In particular, origin-based hiring discrimination and its relationship with unemployment may modify the usefulness of information about the applicant's employment status.

A substantial body of literature has investigated the effects of employment status on individual employability. According to screening models, recruiters see unemployment as a negative indicator of unobserved productivity, especially in tight labor markets (Vishwanath, 1989, Lockwood, 1991, Decreuse and Kazbakova, 2008). In these models, a long period of unemployment suggests that the former employer considered the worker in question to be unproductive and the longer the period of unemployment, the stronger this message. As a consequence, exit rates are lower for the long-term unemployed than for the newly unemployed. Furthermore, human capital models (Becker, 1964, Pissarides, 1992, Ljungqvist and Sargent, 1998) highlight skills depreciation as an inherent factor in periods of unemployment. Conversely, employment is seen as a positive indicator of unobserved productivity. It is also considered as a stepping stone for access to more employment opportunities (Calvo-Armengol and Jackson, 2004), the best jobs (Pissarides, 1994), and greater bargaining power.

Empirical results back up these theoretical predictions. Blau and Robbins (1990) find a greater per-contact offer rate for employed than for unemployed jobseekers. Andrews *et al*. (2001) find that the probability of hiring is positively influenced by the fact of being employed. Longhi and Taylor (2013) compare employed and unemployed jobseekers based on their

individual characteristics, work preferences, search strategy and employment history. They find systematic differences that favor employed jobseekers and conclude that this category of applicant is unlikely to compete with the unemployed for jobs of the same quality. Other studies, such as Arulampalam (2001), Skans (2011) or Cockx and Picchio (2011) highlight the negative effect of unemployment on the labor market outcomes of individuals. Despite these empirical confirmations, the individual contributions of human capital depreciation, search intensity and network diversity are difficult to identify due unobservable to heterogeneity (Blau and Robbins, 1990).

Recent work by Kroft *et al.* (2013) addresses this issue using correspondence testing. This study uses fictitious written applications indicating either current employment or unemployment for periods ranging from one month to three years. These applications were sent in response to the same job offer in order to measure the effects of both employment and unemployment and the duration of the latter. The results show that the likelihood of receiving a callback for an interview significantly decreases with the length of the period of unemployment, with the most significant decrease occurring during the first eight months. Moreover, the negative effect of the duration of unemployment appears to be more apparent when the labor market is tighter. The findings of Kroft *et al.* (2013) are, however, not entirely consistent with the theoretical literature as they indicate that an employed applicant has a lower callback rate than a newly-unemployed one. According to the authors, two explanations can be given for this counterintuitive result. On the one hand, the higher bargaining power of employed applicants with respect to newly-unemployed ones could diminish the positive effect of employment. On the other hand, unemployed applicants have a clear advantage in terms of availability, especially when the job requires an immediate start.

How does origin-based hiring discrimination modify these findings? Apart from differences in the rate of human capital depreciation, several hypotheses can be put forward. First, employer distaste might be the reason for observing no differences in the hiring of employed and unemployed applicants. Secondly, the benefits of employment for applicants of non-French origin could be less than for those of native origin. In a comparison of access to various occupations, Bertrand and Mullainathan (2004) show that Afro-American applicants have lower returns on their credentials than white Americans. In other words, national origin appears to undermine the weight given to characteristics assumed to increase employability. This challenges the hypothesis put forward in the literature, which claims that employed

applicants have higher levels of performance. As a consequence, this could reduce differences that favor employed applicants or, in case of results like Kroft *et al.* (2013), larger differences that favor newly-unemployed applicants may be identified. Thirdly, it could be argued that insofar as foreign-origin applicants are reputed to find it more difficult to find employment than those of native origin, the impact of being employed should be greater for them. Put differently, current employment would appear to be a more relevant indicator of quality for foreign-origin applicants than for those of native origin. As a result, differences that favor employed applicants may be higher or, alternatively, differences that favor newly unemployed applicants could be lower.

Regardless of the hypothesis, differences in the weight given to employment status information as a function of national origin may have the result that origin-based hiring discrimination varies with applicant type. If employer distaste is high, the hiring level of foreign-origin applicants is the same regardless of employment status. Hence, variation is only determined by the effects of employment status for native-origin applicants. If employed, native-origin applicants perform better than newly-unemployed ones, then the difference in hiring rates due to national origin should be higher for employed applicants. Conversely, if newly-unemployed, native-origin applicants perform better than employed ones, then the difference in hiring rates due to national origin should be higher for unemployed applicants. Assuming that foreign origin has a negative impact on employment status, it could be argued that the difference in hiring rate will be higher for employed applicants. Finally, if foreign origin has a positive impact on employment status, the difference due to origin will be higher for newly-unemployed applicants. The latter hypothesis is consistent with classical theory and requires the fewest additional assumptions. Therefore, our study is focused on its analysis.

Understanding how origin-based hiring discrimination is modified by status in the labor market is crucial because of the growing importance of both employment mobility (Nagypal, 2006) and the increasing proportion of foreign-origin individuals in modern labor markets. In this study we use correspondence testing to estimate the effect of employment status *ceteris paribus* and the distortion created by national origin. To the best of our knowledge, this is the first time correspondence testing has been used to obtain an unbiased estimate of the influence of national origin on employability, conditional on employment status. Our work is closely related to that of Bertrand and Mullainathan (2004), and can also be seen as an extension to Kroft *et al*. (2013). In addition to an examination of the effect of national origin, we focus on

employed and newly-unemployed applicants in order to avoid the effect of human capital depreciation.

The article is organized as follows: in the next section, we present the formal theoretical model. This simple framework argues that employed applicants are in a better position than unemployed applicants and that foreign-origin applicants benefit more from being employed than native-origin applicants. Next, we give a detailed description of the data collection methods and the experimental protocol. Our analysis is focused on North Africans who form the majority of migrants to France and who are known to be discriminated against in hiring decisions (Duguet *et al*., 2007, 2009). The selected domain is the construction sector, which, although it has never been tested, is reputed to treat native and foreign-origin applicants more equally than other domains. Moreover, turnover is high. Hence our assessment can be seen as a lower bound of hiring discrimination based on national origin and distortion created by employment status. The final section presents the results, together with their interpretation and the potential limits of this study.

2. The model

The model presented here is an extension of the model described in Aigner and Cain (1977). An employer j evaluates the skill level of "newborn" applicants. Following Spence (1974), skill levels are assumed to be exogenous, *i.e.* insensitive to training or inactivity. The employer knows the distribution of the true score $r \sim N(\bar{r}\,;\,\sigma_r^2)$ and its zero mean equivalent $q \equiv (r - \bar{r}) \sim N(0\,;\,\sigma_q^2)$, where $\sigma_q^2 = \sigma_r^2$. However, the employer cannot perfectly observe the individual score of applicants. Instead, they observe their demographic group $i = \{w, b\}$ and a noisy signal Y (the curriculum vitae), composed of the true score equivalent and an error term.

$$Y = q + u \tag{1}$$

True score distribution is considered to be exactly the same in both demographic groups. Error is group specific: $u \sim N(0\,;\,\sigma_{ui}^2)$ with $\sigma_{ub}^2 > \sigma_{uw}^2$ and uncorrelated with the true score: $\rho_{qu} = 0$. Thus, $Cov(q,u) = 0$. A higher variance in the error term for group b

represents the fact that indicators are reputed to be less reliable for foreign-origin applicants (Linn, 1973).

The employer utility function is a classic constant absolute risk aversion (CARA) function, which only depends on the level of *q:*

$$U(q) = a - ve^{-cq} \qquad v, c > 0 \qquad (2)$$

Where a,v and c are parameters of the utility function and e is the base of the natural logarithm. The employer j will hire an applicant only if the expected utility exceeds an exogenous threshold $T_{ij} = S_j + D_{ij}$, where S_j is the level of qualification he requires and

$$D_{ij} \in \begin{cases} [0; D_{max}] & \text{for } i = b \\ \{0\} & \text{otherwise} \end{cases}$$

is employer j distaste for members of group i. It is assumed to be positive and below $D_{max} = \max\{D_{bj}, \forall j\}$ only for members of group b. Nevertheless, it is possible for the employer to be equally unwilling to hire members of both groups. Moreover it is also possible for employers to hire applicants in group b when $D_{bj} > 0$. Thus, using the Arrow-Pratt approximation, we can write the decision rule used by the employer as:

$$E[U(q|Y)] = a - ve^{-cE(q|Y)+\frac{c^2}{2}Var(q|Y)} > T_{ij} \qquad (3)$$

Where $E(q|Y) = \frac{\sigma_q^2}{\sigma_Y^2}Y = \frac{\sigma_q^2}{\sigma_q^2+\sigma_{ui}^2}Y = \gamma Y$ is the expectation of the true score q conditional on the signal Y. The zero mean of the estimation error implies $Var(q|Y) = E(E(q|Y) - q)^2 = \frac{\sigma_q^2\sigma_{ui}^2}{\sigma_q^2+\sigma_{ui}^2}$ which can be interpreted as a risk aversion measure.

In such a setting, differential hiring rates according to group membership could be due to three factors. First, $\sigma_{ub}^2 > \sigma_{uw}^2$ implies that the so-called signal-to-noise ratio $\gamma = \frac{\sigma_q^2}{\sigma_q^2+\sigma_{ui}^2}$ is lower in group b than in group w. Therefore, group w (*resp.* group b) members with Y above (*resp.* below) the mean of the true score will have a higher conditional expectation than group b

(resp. group *w)* members with the same signal. Secondly, conditional variance increases with the dispersion of the error term: $\frac{\partial \frac{\sigma_q^2 \sigma_{ui}^2}{\sigma_q^2+\sigma_{ui}^2}}{\partial \sigma_{ui}^2} = \frac{\sigma_q^4}{(\sigma_q^2+\sigma_{ui}^2)^2} > 0$. Hence, group *b* applicants are faced with a higher degree of risk aversion because of the lower precision of their signal. Thirdly, group *b* members may have to overcome a higher threshold than group *w* applicants, due to the presence of employer distaste. For all these reasons, it is less likely that group *b* applicants will satisfy the employer's decision rule than their group *w* counterparts.

When the threshold rule is satisfied, the applicant is hired. It is only then that the employer is able to learn more about the applicant's true productivity and the outcome of their hiring choice. . The learning process is common to employers and is defined as follows: at the end of each learning period *k*, the employer has a probability $p = \frac{k}{k+1}$ of detecting a hiring error. . If this happens, the contract ends immediately. As time goes by, the probability converges to 1 and it becomes increasingly unlikely that the worker will be retained. Note however that there is always a chance that a "free rider" will remain employed. Moreover, hiring is subject to idiosyncratic shocks $\tilde{\delta}_j \in [0; \tilde{\delta}_{max}]$, where $\tilde{\delta}_{max} = \max \{\hat{\delta}_j, \forall j\}$. These shocks impact the level of qualification required S_j, leading to a higher threshold $\tilde{T}_{ij} = T_{ij} + \tilde{\delta}_j$, which must be exceeded in order to remain employed. Thus, even an applicant who is hired with respect to T_{ij}, can end up losing his job as a result of the shock $\tilde{\delta}_j$ on the threshold. According to the literature, employed workers do not quit their jobs spontaneously. Hence, the departure of an employee indicates that the employer has made a hiring mistake or that a shock has changed the threshold.

We now consider the problem of an employer who has two types of applicants: those who are employed and those who have recently become unemployed. The information conveyed by the applicants' employment status will depend on their knowledge of other employers' thresholds. However, this knowledge is limited. First, the level of qualification required by other employers S_{-j} cannot be precisely evaluated. Instead, recruiters know that being employed by employer *j'* guarantees a minimal productivity level $M_{j'} \leq S_{j'}$. This level is positively correlated to $S_{j'}$. However, as unemployment could be the result of a recruitment mistake, it is not possible to associate a corresponding $M_{j'}$ with unemployed workers. Secondly, although the employer-specific level of distaste is clearly private information,

employers do know the average level of distaste $\overline{D_b}$ in the economy. Thirdly, although the specific value of an idiosyncratic shock is not known by employers, its average level $\overline{\tilde{\delta}}$ is. As this shock might be sufficient to bring an end to a job, and as signals do not tell anything about the reason for the rupture, unemployed applicants' conditional expectations and conditional variances should be calculated on the basis of the true score distribution of "newborn" applicants. In addition, the decision rule should be the same as (3). Conversely, the decision rule, conditional expectations and conditional variance are modified by information about minimum productivity levels and reliability, which is itself driven by the learning process. Thus we can write the decision rule for employed applicants as:

$$\frac{k}{k+1}\ \left[\ E\left[U\left(q\middle|q > M_{j'}\ + \bar{D}_i\ , Y\right)\right]\ \right] + \frac{1}{k+1}\ \left[\ E[U(q|Y)]\ \right] >\ T_{ij} \tag{4}$$

$$\text{where}\ \begin{cases} E\left[U\left(q\middle|q > M_{j'}\ + \bar{D}_i\ ,\ Y\right)\right] =\ \ a - ve^{-cE\left(q\middle|q > M_{j'} + \bar{D}_i\ , Y\right) + \frac{c^2}{2} Var\left(q\middle|q > M_{j'} + \bar{D}_i\ , Y\right)} \\ E\left(q\middle|q > M_{j'} + \bar{D}_i\ , Y\right) =\ \gamma Y +\ \sigma_q \frac{\phi\left(\frac{M_{j'} + \overline{D_i} - \gamma Y}{\sigma_q}\right)}{1 - \Phi\left(\frac{M_{j'} + \overline{D_i} - \gamma Y}{\sigma_q}\right)} =\ \gamma Y +\ \sigma_q \lambda\left(\frac{M_{j'} + \overline{D_i} - \gamma Y}{\sigma_q}\right) \\ Var\left(q\middle|q > M_{j'} + \bar{D}_i\ , Y\right) < Var(q|Y) \end{cases}$$

$E\left(q\middle|q > M_{j'} + \overline{D_i}\ , Y\right)$ represents the conditional expectation of the applicant's true score, drawn from a left truncated normal distribution. ϕ and Φ are the *pdf* and *cdf* function of q. $\lambda\left(\frac{M_{j'} + \overline{D_i} - \gamma Y}{\sigma_q}\right)$, the so-called inverse Mill ratio reflects the impact of the truncation. It is positive and increasing in $M_{j'}$ and $\overline{D_i}$. A well-known property of truncated distributions is that the more truncated, the lower the variance. Thus, as the truncated and non-truncated predictor are unbiased, $\left(q\middle|q > M_{j'} + \overline{D_i}\ , Y\right) < Var(q|Y)$. This means that employed applicants will be considered as less risky investments than unemployed ones.

Interpretation is straightforward: employed applicants will provide a higher expected utility than their unemployed counterparts when facing a same threshold. An interesting feature of the model is that group *b* members should benefit more from being employed than group *w* ones. Indeed, as employers are aware of the presence of distaste against *b* applicants, they should infer that their minimal threshold level of productivity ($M_{j'}\ + \overline{D_i}$) is on average higher

for them. This is reflected by a higher truncation. For this reason, employers who attempt to screen workers on the basis of their labor market status should consider current employment signal as more informative for *b* members than for *w* ones. As a consequence, differential hiring rates according to group membership should be greater for unemployed applicants than it is for the corresponding employed. Correspondence testing allows us to measure the performances of each type of applicant *ceteris paribus* and to examine the relevance of the two main features of our model. On the one hand the higher hiring rates of employed applicants with respect to the unemployed. On the other hand, the greater benefit from being employed for foreign-origin applicants with respect to native-origin ones.

3. Data collection and experimental protocol

The experiment consists in sending a large number of dummy résumés in reply to a sample of job vacancies listed between April and September 2011. We first present the data collection method, then the reasons for using this experimental protocol.

3.1 Applicant characteristics

This experiment tests the effect of national origin and employment status on the probability of obtaining a job interview. Four fictitious applications were created. The first two applicants are employed, while the others are recently unemployed. For each of these two categories, the name of one applicant suggests that they are of North African origin, while the other indicates French origin.

Applicants are given either a typically French, or typically North African first and last name. The French first names are the two most-frequent names given in the year of birth. These are randomly matched with two randomly selected last names from the ten most common last names during the year of the experiment. For the North African applicants, we randomly select two North African-sounding first names from the ten most frequently given during the year of birth. These are randomly matched with North African-sounding last names inspired by the names of small North African cities. To ensure that there is no confusion, we count the number

and content of the results of a search for these names on the Internet[1] It should be noted that typical North African last names gives no indication of social or cultural background and first names are equally distributed among different social classes. However, the names may indicate that the holders are followers of the Muslim religion (Pierné, 2013).

3.1.2 Employment status

It is more difficult to indicate employment status as it is unusual for applicants to explicitly indicate how long they have been unemployed for. Therefore, we rely on a classic habit found in résumés. Unemployment is indicated by including the exact duration of the applicant's last job. For example, unemployed applicants specify that their last job began in September 2010 and ended in February 2011 (the experiment began in April 2011). In the case of employed applicants only the starting date is included, with the addition of the word "Since" or "Currently". In addition, there is a clear statement that the applicant is "Currently searching for a job" on the résumés of unemployed applicants. Finally, their covering letter underlines that they are looking for work. As employed applicants also do this, the additional clarification is not a signal of unemployment in itself but rather reinforces the unemployment proxy. A key factor to control is human capital depreciation. Thus, the duration of unemployment is long enough to be visible but short enough to avoid depreciation. Specifically, unemployed applicants indicate that they have been unemployed during the previous one to four months, with a mode of three months. Table 1 summarizes the characteristics of applicants.

Table 1 Identity of applicants

Last name	First name	Signal	Employment status
BERNARD	Julien	French	Employed
DURAND	Jonathan	French	Unemployed
ATTA	Ahmed	North African	Employed
LARBI	Samir	North African	Unemployed

[1] The selected North African first names are Samir (in position 207 of the most-frequently given first names in France in 1990) and Ahmed (position 333). These names were given 236 (for Ahmed) and 494 (for Samir) times. The selected North African last names are Atta (in position 139,721 of the most-common last names in 2011), and Larbi (position 7,183). These names have been used 32 (for Atta) and 846 (for Larbi) times since 1966 (INSEE). The number of search results for these names is 2,700 and 50,000.

The credibility of our employment status information could be questioned. In particular, it could be argued that applicants appear to have simply forgotten to update their résumé. On the one hand, employed applicants may be perceived as unemployed but to have neglected to specify the end-date of their last job. On the other hand, unemployed applicants may be understood to be employed, but to have omitted the duration of their current job. However, we argue that real job seekers are conscientious in updating their résumés and that there is no reason for employers not to trust and understand current employment status any less than other information provided in the application. This view is supported by Kroft *et al.* (2013) who used a web-based survey to show that respondents are able to recall information about applicant's employment status and the length of any periods of unemployment. Finally, unemployment is conditioned by the type of contract governing the applicant's last job. Unemployment resulting from the end of a fixed-term contract is viewed differently to that following a permanent contract. To avoid any potential bias, we provide no information about the type of contracts. While this is consistent with practice in the construction sector, it does raise questions about the reason for the applicant's unemployment.

3.1.3 Productivity and other characteristics

Applications are exactly equivalent with respect to productivity and other characteristics. However, in order to avoid detection certain points differ. All of these differences are equivalent and randomly distributed. Thus, we can state with confidence that they do not influence the quality of résumés.

The four applicants are 20 or 21[2] years old, male, single, without children and live in similar socio-economic neighborhoods in Paris (the 10th, 11th 12th and 13th *arrondissements*). To comply with French practice, the nationality of applicants of French origin does not appear. However, applicants of North African origin explicitly mention that they have French nationality. This avoids effects due to nationality (Duguet *et al*., 2007), specifically differences in administrative requirements relative to citizenship and language fluency[3]. We assign different leisure activities to applicants (one sport and one hobby with no cultural meaning) in order to diversify applications without influencing productivity information. Finally, all applicants provide a mobile phone number and an email address.

[2] This characteristic is rotated between applicants with the same employment status.

[3] According to the *Trajectoires et Origines* Survey (2008), more than 97% of French citizens of North African origin are fluent in French.

All four fictitious applicants hold a youth training degree recognized in France (*certificat d'aptitude professionnelle*), and graduated in 2008 from apprentice training centers (*centres de formation d'apprentis* [CFA]) in various French provincial towns. It is possible that the reputation of the CFA could impact the results. However, as all establishments are located outside Paris and its suburbs, and there are about 1,000 CFA, we do not anticipate any effects arising from this source of heterogeneity. Applicants have held a two-year apprenticeship, followed by three years of work experience in three different positions in small firms. This low level of employability is deliberate, as the less-qualified the applicant, the less human capital they can lose. Thus the profile of our applicants is an additional guarantee against human capital depreciation. In the same vein, unemployment is more acceptable for young applicants. None of the applicants had experienced periods of unemployment or career breaks other than the short one indicated by 'unemployed' workers. Employed workers claim to be in jobs similar to those they are applying for.

Again with the objective of increasing heterogeneity, all applicants begin their careers in the area they graduated, and move to Paris at different times. Positions in Paris are held in fictitious firms with names similar to those of real firms, while the names of their previous employers are those of real firms. We choose to include fictitious firms in order minimize the probability of detection. If recruiters try to obtain information about applicants from their previous employers it is likely that they will call one of them. In such cases, it might be better that recruiters cannot find the firm, rather than discovering that the applicant never worked there and that the application is fake. Using fictitious companies also obviates any reputational effects from firms that might be known by recruiters. The real firms where candidates claim to have worked are small companies located in the area where the applicant graduated and are randomly selected. In this way, we increase the credibility of the application without introducing undesirable differences.

For several reasons, we do not provide details of the skills of applicants. First, it is difficult to identify a general skill set that is credible and equivalent between applicants and professions. Secondly, we want to focus on the effects of national origin and unemployment and wish to avoid the influence of a specific skill set. Thirdly, the approach is consistent with practice in the construction sector and makes it possible to apply for a greater number of jobs. On the other hand, the success rate is likely to be lower than if we create applications that give detailed skills and focus on job offers that are consistent with these skills.

Finally, other differences between the templates of the four applications are as follows: font face, font size, and the layout of résumés and covering letters are different while the content remains standard. Résumés are checked by an expert in construction recruitment to control for similarity and credibility. This impartial assessment by a professional helps to guarantee that applications are representative of the profile we aim to create. Furthermore, to ensure that characteristics other than origin and employment status do not influence the quality of applications, we rotate templates between applicants with the same employment status[4]. Applicants of French origin use the first templates for the first ten job offers, then templates are swapped with their corresponding applicant of North African origin who uses it for the ten following job offers, etc. Therefore, our applicants only retain their first and last names, employment status, mailing address, email address and mobile phone number for the whole experiment.

3.2 Sector characteristics

Our study is focused on the construction sector, in particular masons, electricians and plumbers. Studies that measure hiring discrimination generally focus on bottleneck jobs with high turnover. Bottleneck jobs maximize the probability of receiving a positive response, and avoid the situation where no differences are observable due to market saturation. Furthermore, the focus on professions with high turnover minimizes the chance of detection by employers. A quick review of the job market for these professions in the Paris area shows that the job-to-applicant ratio was respectively 0.26 (masons), 0.23 (electricians) and 0.33 (plumbers) with a jobseeker stock of about 4,000 for each profession in March 2010[5]. Furthermore, the forecast percentage of posts considered to be difficult to fill ranges from 58.9% for masons to 65.6% for plumbers. This bottleneck is important. For example, Baert *et al.* (2013) find that employers discriminate less against applicants of foreign origin when jobs are difficult to fill. Furthermore, screening theory suggests that employment status is taken into greater account when the labor market is tight. Therefore, the construction sector is particularly favorable for the identification of differences in hiring rates based on employment status. At the same time, it is likely that it leads to an underestimate of the effects of national origin on hiring probability and on employment status informativeness.

[4] For simplicity, we do not rotate templates between applicants with different employment status.

[5] Source: *Fichier Historique Statistique* prepared by the *Pôle Emploi* for the first quarter 2010.

The construction sector is generally believed to be more informal and origin-blind than other sectors. Appendices 1 and 2 present the main characteristics of the active population in each job tested. Globally, the proportion of employed workers whose parents are born in North Africa is equivalent in the three professions. They tend to be less educated than their peers whose parents are born in France, notably in masonry. Their level of seniority is lower, except for electricians and unskilled workers, and they more often hold temporary contracts. Unemployed workers of North African origin are older, less educated and have been unemployed for longer periods than French origin ones. Overall, workers of North African origin make up a significant part of the total active population in the construction sector. In addition, job-to-job and unemployment-to-job mobility seem to be reasonably high.

It must be noted that most employed workers have used their social network, unsolicited applications and direct contact to obtain their job. While the *Pôle Emploi*[6] and responding to advertised jobs are used more by employees of North African origin, they are clearly not the primary channels. This statistic confirms the reputation of the construction sector as an informal employer. It could also explain partly the lack of job offers found in the channels investigated by correspondence studies. These conditions led us to test more than one profession in order to obtain a larger sample.

3.3 Protocol

3.3.1 Applications

We decided not to send applicants for interview in cases where they were invited. In this sense, our measure is crude, as we do not really observe job access. Nevertheless, this methodological restriction has several advantages (Riach and Rich, 1991). First, we are able to control the process. In particular, there is no bias due to physical appearance (no photographs are sent with applications) and more generally, any bias related to observable characteristics. Thus, our study excludes experimenter effects (Heckman, 1998, Neumark, 2012). Secondly, the data collection procedure is simplified and we are able to collect a larger sample. Overall, 1,204 applications were sent in response to 301 job[7] offers over a five-month period.

[6] *Pôle Emploi* is the French public employment agency.

[7] Of the 301 job offers included in the sample 150 were for masons, 83 for electricians, and 68 for plumbers.

Although access to interviews provides an imperfect assessment of discrimination, it should be noted that organizing interviews is costly, which encourages recruiters to only interview those applicants who actually have a real chance of obtaining the vacancy. Moreover, studies show that hiring discrimination flows directly from access to interviews (Neumark, 1996, Kenney and Wissoker, 1994). Consequently, access to the interview can be considered as a relevant measure of access to employment.

3.3.2 Job offers

Ideally, the analysis would include all job offers in the Paris area. However, in practice, this requirement is impossible to meet. Therefore, we focus exclusively on job offers posted on the Internet, with the majority coming from the website of the *Pôle Emploi*. However, this may introduce a bias as we cannot be sure that recruiters using the *Pôle Emploi* website behave in the same way as recruiters who use other job search channels[8]. More broadly, the fact that we only test one job search channel may bias the results. Other channels, such as networks, unsolicited applications, and direct contact remain notably unexplored, while they appear to be widely used in practice. In addition job advertisement is far from the most successful channel. Recruiters are in a better position to evaluate applicant's productivity when they receive a direct contact and therefore the use of written applications may be detrimental to all applicants. From this point of view, our results might underestimate the effects of employment and national origin.

Construction is not the only sector in which networks are widely used (Holtzer, 1988) but cannot be tested. Direct contact can be tested but would involve the use of actors, which could introduce various biases. On the other hand, the *Pôle Emploi* website is widely used and has the advantage of providing very detailed information about job offers (wage, work experience required, etc.), which is generally not the case with other websites[9] or channels. We therefore select job offers where applicant requirements are clear (in particular with respect to work experience) rather than others where we cannot be sure that at least one of the applicants would be contacted. For the same reason, we test existing job offers rather than sending spontaneous applications.

[8] Using the *Pôle Emploi* website can be perceived as risky in terms of detection by discriminating recruiters.

[9] For technical reasons, we excluded websites requiring registration.

3.3.3 Application process

Applications were sent between mid-April and mid-September 2011 to job offers posted on the Internet. Applications took the form of a short message sent by email explaining that the applicant is interested in the offer together with a résumé and covering letter. As four applications were made for each job offer, special precautions were taken. To avoid detection, applications were sent on two different days (two applications the first day and two others the second day). As this procedure runs the risk of favoring the first applications the order was rotated.

We replied to all job offers that matched the qualifications and experience of applicants and that satisfied the following criteria:

- Fixed term or permanent contract (i.e. temporary jobs were excluded).
- In the Paris area.

3.3.4 Responses from recruiters

A response is considered to be positive when the recruiter asks the applicant to attend an interview or when they ask for further information about the applicant's current situation or qualifications. Conversely, a response is considered to be negative if the recruiter formally rejects the application or if they do not respond to it.

4. Results and discussion

Table 2 Average call back rates

Global call back rate: % of job offers having provided at least one positive call back

Sample	Call back rates				
	French applicants		***North African applicants***		**Global call back rate**
	Employed	Unemployed	Employed	Unemployed	
Total (301 job offers)	12.96%	11.63%	10.63%	7.31%	14.29%
Masons (150 job offers)	10.67%	10.00%	9.33%	6.67%	12.00%
Electricians (83 job offers)	14.46%	13.25%	12.05%	7.23%	15.67%
Plumbers (68 job offers)	16.18%	13.24%	11.76%	8.82%	17.65%

Table 2 presents average response rates. Employed applicant of French origin has the highest rates, ranging from 10% (for a mason) to 16% (for a plumber). Rates are similar for unemployed applicant of French origin (except for plumber). The response rate for employed applicant of North African origin is slightly lower than that of French applicants. Nevertheless, the difference is considerably less than observations in other experiments, which could indicate origin-blindness in the construction sector. Unemployed applicant of North African origin is the least fortunate and he is clearly more penalized by his employment status than his counterpart of French origin.

Globally, the success rate of applicants is low. This reflects the difficulty that young and inexperienced individuals have in finding a new or better job. Success rates are slightly higher for electricians and plumbers than masons. This could be due to more favorable hiring conditions. This is confirmed by data that indicates a tighter labor market and poor recruitment forecasts, notably for plumbers. Nevertheless, all applicants did not benefit equally from these favorable hiring conditions and rankings were the same in all three professions. Difference in sample sizes may also be an explanation. Masonry is the most egalitarian sector. It could be noted that the global success rate and the one of employed applicant of French origin are nearly the same. This indicates that situations in which he is not called back but other types of

applicant are, do not frequently happen. As the differences between the three professions are small, rankings are the same, and other effects can be controlled, the following discussion is based on the global sample.

While response rates provide an initial indication of differential treatment, a more detailed analysis is illuminating. Therefore, we examine the differences in response rates using a pair-wise comparison of applicants. Table 3 presents the main effects.

Table 3 Main detectable effects

Comparison by pairs on the same job offers	**Potential effects**
French origin employed/French origin unemployed	Employment status for a French origin applicant
North African origin employed/ North African origin unemployed	Employment status for a North African origin applicant
French origin employed/North African origin employed	Origin for an employed applicant
French origin unemployed/North African origin unemployed	Origin for an unemployed applicant

A pair-wise comparison makes it possible to isolate and assess the effects of North African origin and employment status. In this analysis, if the effect of origin remains the same regardless of employment status, we can conclude that it is independent of the latter.

Table 4 Effects of North African origin, employment status and difference in difference estimation
(Global sample)

The Student statistics have been computed by the bootstrap method on 10000 repetitions. *. Significant at 10% **. Significant at 5% ***. Significant at 1%

Comparison by pair on the same job offers	Difference between the callback rates (in % points)	T-statistic
Effect of employment status		
French origin employed/French origin unemployed	1.33	1.41
North African origin employed/ North African origin unemployed	3.32**	2.51
Effect of North African origin		
French origin employed/North African origin employed	2.33*	1.94
French origin unemployed/North African origin unemployed	4.32***	2.86
Comparison of differences between the pairs of applicants	**Difference in difference between the pairs of applicants (in % points)**	**T-statistic**
Unemployed applicants/Employed applicants	1.99	1.22

Our results show that the difference in response rates for unemployed applicants is about 4.3 percentage points in favor of applicants of French origin and is statistically significant at the 1% level. For employed applicants it reaches 2.3 percentage points and is not statistically significant at the 5% level. The benefit of being employed is only statistically significant for applicants of North African origin. Hence, at first glance, it seems that applicants of North African origin are less affected when employed. A difference in differences analysis tested the robustness of this finding more formally. This shows that being employed does not significantly modify the negative effect of being of North African origin. In other words, the benefit of being employed for an applicant of North African origin does not fully overcome the penalty created by their demographic group. However, for both groups, being employed is a benefit, although for applicants of French origin, it is non-significant.

A logistic regression analysis was used to observe the interaction between origin and employment status. We specify the following relation:

$$C_{ij} = \alpha_0 + \alpha_1 x_i + \alpha_2 y_j + \mu_{ij}$$

Where C_{ij} indicates whether an applicant i received a response to their application j. x_i is a vector expressing applicant i's properties and y_j is a vector representing j's properties given in the detailed job description. As the sample is small the only interaction term relates to origin and employment status. As the estimate of this interaction is important, we choose to use effect coding rather than dummy coding. This method consists in giving a binary code (−1; 1) rather than the classic (0; 1) dummy code and is particularly relevant when an interaction is present. The benefit is that we obtain reasonable estimates of both the main effects and the interaction. With dummy coding the estimate of the interaction remains relevant but the main effects are rather simple, *i.e.*, the effect of one variable at one level on the other variable. Using estimated coefficients we can directly check the relevancy of origin, employment status and their interactions. Results are presented in Table 5.

Table 5 Binary logistic regression used to estimate the impact of North African origin, employment status and job properties on the probability of being positively called back (Global sample)

Explained variable: Positive call back. The following effect coded variables had been introduced into the regression: origin, employment status, interaction between origin and employment status, profession, résumé template used, method of application, type of contract, wage offered, negotiable wage, experience requirement, degree requirement, maximal duration for filling the vacancy, presence of intermediary, number of hour of work. *.Significant at 10% **.Significant at 5% ***Significant at 1%.

Variables	Coeff.	Pr > Khi-2	Variables	Coeff.	Pr > Khi-2
1st intercept	-2.52	< 0.001	North African	-0.19**	0.049
Unemployed	-0.20*	0.092	Unemployed*North African	-0.08	0.421
Profession : electrician	0.1	0.449	Profession : plumber	0.31**	0.018
Résumé template : 2	-0.05	0.57	Application by postal service	-0.22*	0.075
Contract : Indefinite term	-0.35***	< 0.001	Wage ≥ 2000	-0.27*	0.061
Presence of intermediary	-0,24*	0.1	Degree : required	-0.49***	< 0.001

For greater clarity, we only show coefficients related to applicant properties and significant coefficients relative to job properties. The logistic regression results emphasize the penalty due to North African origin and minimize the penalty due to unemployment. While the overall impact of national origin on the probability of receiving a response is statistically significant at the 5% level, the effect of unemployment is only significant at the 10% level. As

previously suggested by the difference in differences estimate, the interaction between national origin and employment status is not significant. On the other hand, the probability of receiving a response is clearly lower when the job requires a degree or when the contract is permanent. This indicates that the positive answers our applicants obtained are essentially related to low-quality jobs. Although not significant at the 5% level, this was confirmed by a slight negative relation between applications for high-wage jobs and response rate. Other factors, such as the presence of an intermediary between the applicant and the employer, or the application being sent by post also seem to decrease the response rate and their significance is close to the 5% level. Finally, Table 2 shows that applications for plumbing jobs are more likely to be successful.

As it is clear that that the applicants had less chance of success when they applied for high-quality (i.e. high salary) jobs, it is possible that the characteristics of the jobs themselves had an impact on observed differences. In order to control for these effects, we regress the differences between response rates on the set of variables[10] used to predict response. Appendices 3 and 4 present the results, which indicate that some characteristics do seem to modify response rates. When a degree is required, differences in hiring rates due to employment status increase for applicants of French origin, while the difference due to national origin decreases for unemployed applicants. The latter, combined with the finding that the requirement to hold a degree has a negative effect on response rates indicates that employment is given particular importance by employers. The effect of national origin is significantly greater for employed applicants when they apply for jobs with longer working hours. Once the impact of these effects had been corrected for, we are able to recalculate discrimination coefficients. Appendix 5 gives details of these corrected coefficients, which appear to be in line with previous results and interpretations.

4.1. Discussion

This analysis has two main outcomes. First, recruiters in the construction sector penalize applicants of North African origin. Secondly, they only seem to find employment status information relevant for this category of applicants, and it reduces the difference in hiring rates

[10] We obviously exclude variables related to applicants' origin and employment status.

compared to their counterparts of French origin to a non-significant level. Nevertheless, it is not possible to state that employment status modifies the effect of national origin. Overall, the penalty created by unemployment remains weaker than that of national origin. While these findings are consistent with our theoretical model, they contrast with those of Kroft *et al.* (2013). It should be noted that the lower bound strategy used in the selection of professions and applicants' profiles is likely to reduce any effects related to national origin below the level it would otherwise be in an investigation of other professions or skill levels.

Although the difference in response rates between North African applicants appears to be related to employment status informativeness during screening, it could also be argued that employer's taste differs not just by national origin but also by national origin and employment status. This would mean that employers have greater prejudice against unemployed applicants of North African origin than employed one. This is, however, a very strong assumption that has never been explored in the literature, although the method proposed by Neumark (2012) may be useful in this respect. However, the method requires the introduction of variation in applicant characteristics that affects perceived productivity but is homogeneous across national origins. As this was not the case in our study, the method was not appropriate.

4.2 Limitations

The experimental design, and more precisely the fact that applicants had worked at a fictitious workplace, raises the question of whether the applications were identified as fictitious by recruiters. However, our results suggest that this was not the case. The detection of fake applications can take two forms. In the first, all applicants are detected. In this case recruiters either notify researchers that the experiment has been detected, or they respond to all or none of the applicants. In the second case, only some applications are considered to be fake. However, it is unlikely that only one category of applicant is detected. Finally, it should be noted that the use of fictitious information is common in the correspondence testing literature[11].

In the same vein, the fact that we did not systematically rotate application templates may have introduced a bias. Although productivity characteristics were designed to be

[11] This is for instance the case in the study of Riach and Rich (2010), as the use of real signals is prohibited in England

equivalent and were distributed randomly, this may represent a flaw in the experimental protocol. The reasons for not doing so relate to simplicity and convenience. Indirect evidence leads us to think that a bias was not introduced; for example, the fact that applicants of French origin had similar or better results than applicants of North African origin, and the non-significance of the variable representing template type. Nevertheless, our results have to be interpreted with additional care.

5. Conclusion

Correspondence testing was used to assess the effect of being of North African origin and employment status on hiring decisions. The selected domain was construction jobs in region around Paris, France. Four, equivalent applications were created and sent in response to 301 job offers between mid-April and mid-September 2011.

A first conclusion regards employment status. While being employed increases the hiring rate for applicants of North African origin, this is not the case for applicants of French origin. In addition, overall (for both groups) employment is not a significant factor. A second conclusion concerns the impact of national origin. Overall, this effect is negative and significant (despite the fact that response rates for employed applicants are not significantly different). Finally, our study does not allow to affirm that employed applicants of North African origin are less penalized than unemployed ones.

It would be interesting to extend the experiment in several ways. First, it could be replicated in sectors where applicants must be more skilled and more prone to human capital depreciation. Secondly, the fact that worker turnover in Europe is much lower than in the United States, while job turnover is roughly the same (Pries and Rogerson, 2005), together with affirmative action policies suggest that a transnational comparison would be relevant. Such a comparison would show whether, unlike the situation in France, being employed is valued less highly for applicants of foreign origin in the United States. Finally, as our results suggest that employment increases hiring rates for applicants of foreign origin, it is clear that it is important to determine the specific effect of contract type (fixed term, permanent, subsidized). This could help to determine a possible positive externality for public intervention.

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Appendix 1: Characteristics of the working population in the building sector according to the birthplace of parents and the occupation

Source : Enquête Emploi en continu 2010. Weighted average of individuals in first wave. Author's calculation. Values are in percent.

Job		Unskilled workers		Masons		Electricians		Plumbers	
Birthplace of parents		French	N. Af.	French	N. Af.	French	N. Af.	French	N. Af.
Share		55.05	11.23	54.07	9.12	74.36	7.26	79.18	7.78
Age	16-25	49.91	26.16	26.04	16.99	14.58	0	32.52	41.08
	25-40	34.29	30.11	40.38	35.37	43.11	42.08	35.92	36.08
	40-55	13.61	32.3	26.56	21.26	38.48	50.15	30.12	15.18
Contract	Temporary	4.92	22.42	4.64	16.95	4.68	23.86	8.02	15.21
	Apprentice	22.14	11.79	1.24	0	2.01	0	4.78	0
	Fixed term	18.46	13.91	7.05	3.35	5.06	8.38	2.64	2.57
	Indefinite term	54.48	51.88	87.08	79.7	88.25	67.76	84.56	82.22
Degree	CAP	33.79	26.06	57.99	18.41	47.57	40.57	62.63	41.81
	Bac pro	8.85	0.00	4.30	4.39	20.07	0	10.21	22.63
	None	35.51	55.58	19.47	69.30	12.57	7.12	3.94	14.03
Firm seniority	< 1 year	30.48	20.92	16.00	14.67	8.38	11.27	6.37	28.40
	1 to 5 years	48.08	42.39	35.32	52.17	27.31	23.58	44.66	46.08
	5 to 10 years	9.63	22.17	26.89	22.99	18.74	18.55	24.74	11.89
	> 10 years	11.81	14.52	21.79	10.17	45.56	46.60	24.24	13.63
Job search method used to be employed	Unsolicited/ direct contacts	45.04	24.41	44.04	36.49	36.30	23.99	36.48	19.74
	Network	36.99	45.40	30.99	39.64	31.17	20.82	44.25	53
	Job ads	0	4.48	3.99	0	3.60	0	1.04	0
	Pôle Emploi	7.53	7.80	4.48	8.09	4.72	11.47	0.58	0
Unemployed	1 month before	1.36	13.32	0.56	6.97	0.00	7.60	1.83	0
	3 months before	1.68	15.04	3.46	16.31	1.40	19.14	0	0
	6 months before	8.61	14.44	4.92	23.37	1.40	9.58	0	0
	11 months before	7.54	14.90	3.47	17.73	1.40	0	1.49	0

Appendix 2: Characteristics of the unemployed population in the building sector according to the birthplace of parents

Source : Enquête Emploi en continu 2010. Weighted average of individuals in first wave. Author's calculation. Values are in percent.

Birthplace of parents		French			North African		
Share		69.78			10.27		
Age	20-30	29.52			21.72		
	30-40	30.66			41.24		
	40-50	27.49			28.98		
Unemployment duration	< 1 month	17.99			13.37		
	< 4 months	45.48			34.32		
	< 6 months	53.98			38.16		
	< 1 year	76.80			66.49		
Degree	CAP	60.49			36.61		
	Bac pro	6.15			2.35		
	None	15.73			41.62		
Job search methods used	Position	1st	2nd	3rd	1st	2nd	3rd
	Pôle emploi	63.96	0	0	100	0	0
	Employment agency	22.07	0	0	0	0	0
	Unsolicited/ direct contacts	5.45	32.66	0	0	0	0
	Job ads	8.51	58.76	79.89	0	100	0
	Network	0	8.57	20.11	0	0	0

Appendix 3: Ordered probit regressions used to compute the corrected discrimination coefficients (effect of the employment status according to the national origin)

Explained variable: -1: unemployed applicant preferred 0: equal treatment, 1: employed applicant preferred. Result of a backward elimination procedure at 10%. The following dummy variables have been introduced into the regression: Résumé template used, application by postal service, professions (electrician, plumber), source of the job offer, type of contract, number of hours of work, experience requirement, degree requirement, wage negotiable, wage offered, others extras offered, duration of vacancy filling, presence of intermediary. For more clarity in the following table, only the coefficients significant at 10% level are presented.

*.Significant at 10% **.Significant at 5% ***Significant at 1%.

	Effect of the employment status			
	French origin applicants		North African origin applicants	
Variables	Coeff.	T-statistic	Coeff.	T-statistic
1st intercept	-2.77	8.4	-2.42	10.01
2nd intercept	2.30	10.2	1.75	13.17
Resumé template : 2				
Application by postal service				
Profession : electrician				
Profession : plumber				
Source of the job offer : other				
Contract : indefinite term				
Hours of work ≥ 39				
Experience : required	-0.58*	1.71		
Degree : required	0.88**	2.37		
Wage : negotiable				
1650< wage offered < 1800	-0.81*	1.7	-0.64*	1.9
1800 ≤ wage offered < 2000				
Wage offered ≥ 2000				
Other extras				
Vacancy has to be filled within : 2 months				
Presence of intermediary				

Appendix 4 : Ordered probit regressions used to compute the corrected discrimination coefficients (effect of the national origin according to the employment status)

Explained variable: -1: unemployed applicant preferred 0: equal treatment, 1: employed applicant preferred. Result of a backward elimination procedure at 10%. The following dummy variables have been introduced into the regression: Résumé template used, application by postal service, professions (electrician, plumber), source of the job offer, type of contract, number of hours of work, experience requirement, degree requirement, wage negotiable, wage offered, others extras offered, duration of vacancy filling, presence of intermediary. For more clarity in the following table, only the coefficients significant at 10% level are presented.

*.Significant at 10% **.Significant at 5% ***Significant at 1%.

	Effect of the national origin			
	Employed applicants		Unemployed applicants	
Variables	Coeff.	T-statistic	Coeff.	T-statistic
1st intercept	-2.40	10.72	-2.42	10.27
2nd intercept	1.93	12.04	1.71	12.46
Resumé template : 2				
Application by postal service				
Profession : electrician				
Profession : plumber				
Source of the job offer : other				
Contract : indefinite term				
Hours of work ≥ 39	0.64**	2.36		
Experience : required				
Degree : required			-0.98***	2.74
Wage : negotiable			-0.38*	1.66
1650< wage offered < 1800				
1800 ≤ wage offered < 2000				
Wage offered ≥ 2000				
Other extras				
Vacancy has to be filled within : 2 months				
Presence of intermediary				

Appendix 5 : Corrected discrimination coefficient (Global sample)

Corrected discrimination coefficients computed from the ordered probit regression presented in the appendices 4 and 5

*.Significant at 10% **.Significant at 5% ***Significant at 1%.

Comparison by pair on the same job offers	Corrected difference (in % points)	T-statistic
Effect of employment status		
French origin applicants	0.78	1.26
North African origin applicants	3.21	2.64***
Effect of North African origin		
Employed applicants	1.85	1.73*
Unemployed applicants	3.58	2.83***

Appendix 6 : Binomial tests

The analysis is restricted to job offers for which applicants from compared groups obtained different responses (1st accepted and 2nd rejected or reversely). Exact binomial test

*.Significant at 10% **.Significant at 5% ***Significant at 1%.

Comparison by pair on the same job offers	**1st group prefered (N1)**	**2nd group prefered (N2)**	**P1 = N1/ (N1+N2)**	**Null hypothesis : P1= ½**		
				P-value		
Effect of North African Origin				Alternative P1<1/2	Alternative P1>1/2	Alternative P1≠1/2
Employed applicants	French	N.Af.				
Global sample	10	3	0.769	0.989	0.046**	0.092*
Masons	4	2	0.667	0.891	0.344	0.688
Electricians	2	0	1.000	1.000	0.250	0.500
Plumbers	4	1	0.800	0.969	0.187	0.375
Unemployed applicants	Français	N. Af.				
Global sample	17	4	0.809	0.999	0.004**	0.007**
Masons	7	2	0.778	0.980	0.090**	0.18
Electricians	6	1	0.857	0.992	0.062**	0.125
Plumbers	4	1	0.800	0.969	0.187	0.375
Effect of employment status						
French origin applicants	Employed	Unemployed				
Global sample	6	2	0.750	0.965	0.144	0.289
Masons	2	1	0.667	0.875	0.500	1.000
Electricians	2	1	0.667	0.875	0.500	1.000
Plumbers	2	0	1.000	1.000	0.500	1.000
North African origin applicants	Employed	Unemployed				
Global sample	13	3	0.812	0.998	0.011**	0.021**
Masons	6	2	0.750	0.965	0.144	0.289
Electricians	4	0	1.000	1.000	0.062*	0.125
Plumbers	3	1	0.750	0.937	0.312	0.625