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Hiring discriminations based on national origin and religious closeness

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HIRING DISCRIMINATIONS BASED ON NATIONAL ORIGIN AND RELIGIOUS CLOSENESS

Results from a field experiment in the Paris Area

Working paper

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Abstract

This study uses the findings of a correspondence testing in order to assess separately the potential effects of North African origin and Muslim and Catholic religions at job access level in the real estate sector. We constructed 6 jobseekers profiles, each representing a particular situation with respect to national origin and religious closeness. We sent 1800 resumes in reply to 300 job vacancies advertised between mid-April and mid-September in Paris and its suburbs. We find evidences of significant hiring discrimination against the North African origin applicants, regardless of their religious closenesses and against applicants signaling closeness with Muslim religion, regardless of their national origin.

Keywords: discrimination, correspondence testing, ethnic origin, religion

JEL Classification: C81 C93 J15 J71

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1 Introduction

For several years, the issue of discrimination against people of foreign origin recognizes a strong resurgence of interest in developed societies and, since a decade, this notion appears recurrently in public debates. However, it is not certain that it is always used in a relevant way. Detecting discrimination implies identifying a situation where individuals from different demographic groups are treated differently *ceteris paribus* (Heckman, 1998). Thus, detecting inequalities in income or in job access is not a sufficient condition to conclude about the existence of discriminations. Other factors such as differences in productive characteristics (skill level, experience…) or self-selection can be the source of inequalities. In the same way, we cannot rely neither on the feelings of individuals whose subjectivity would interfere with an impartial measure, nor on the employers' statements who cannot confess such practices. For all these reasons, discrimination is hard to be measured.

In order to assess ethnic discrimination in the labor market, economists began by using information available in Census and Population Surveys. This methodology has several limits. Firstly, these data only refer partially the productive characteristics of individuals and forces to make a strong assumption of nullity of the average effect of unobservable productive characteristics. Secondly, the use of this kind of data implies that one can perfectly identify the non-productive characteristic differentiating individuals. If, in some countries, the use of accurate ethnic repositories (like skin color) is tolerated, that is not the case in France[1]. Finally, these data provide not so much information on how recruitment is done. Only employed population is taken into account and it is therefore impossible to distinguish self-selection from hiring discrimination or to measure it. The results of the studies using this kind of methodology often show that the wage gap between ethnic groups is totally explained by productivity differences. In United States, Kanazawa (2005) shows that racial disparity in earnings disappears once cognitive ability is controlled for and confirms the intuition of Neal and Johnson (1996). In France, Aeberhardt and Pouget (2010) also connect the wage gap between workers whose parents were born in France and those born abroad (South Europe and North Africa) to productivity differences. However this last study points an uneven distribution of jobs to the detriment of workers whose parents are migrants. These puzzling

[1] For more details, see the Comité pour la mesure de la diversité et l'évaluation des discriminations (COMEDD) report (2010).

inequalities raise the question of the existence of hiring discrimination based on national origin.

To assess hiring discrimination, only a correspondence testing can be mobilized (Petit, 2003). This kind of test consists in making fictitious applications that are exactly similar except for the *a priori* non-productive single characteristic that is desired to test. The resumes are then sent in reply to the same job ads, at the same time. It is then possible to compare the access of applicants to job interviews. Study designers can also choose to complete the correspondence testing by conducting a pair audit study. Applicants are sent to the job interviews and it is then possible to compare the access of applicants to jobs. Therefore, situation testing method provides an unbiased measure of hiring discrimination.

However, several limits have to be emphasized (Heckman, 1998). First, the measure of hiring discrimination provided is a partial, punctual and localized measure. It is materially impossible to run an experiment investigating all the jobs continuously on the whole country. In the same vein, this assessment is only potential. It differs from the measure provided by the use of surveys which is an effective measure of labor market discrimination. A field experiment can detect the potential presence of discrimination while the job access rates of demographic groups seem to be the same in the data. It requires that job discriminating firms being tested but that there are enough job non discriminating firms on the labor market. The conclusions drawn are therefore limited in scope. Second, field experiments do not allow accurate identification of the cause of discrimination. There are two main categories of theoretical framework aiming to explain discrimination on the labor market. The first one includes taste-based models, in the spirit of Becker's seminal work. In these models, employers, are willing to sacrifice a part of their income to avoid being in contact with members of some demographic group. The second one gathers statistical discrimination models. A group of statistical models is based on the imperfect assessment of applicant's productivity by employers (Phelps, 1972, Aigner and Cain, 1977). In order to remedy to this lack of accuracy, employers use *a priori* non-productive characteristics easily identifiable (such as sex, skin color…) as proxies for the average productivity and the reliability of the assessment. Another group of models initiated by Arrow (1973) is based on the heterogeneity of *a priori* beliefs about the productivity of workers from different demographic groups. These beliefs are self-fulfilling and they lead discriminated people to reduce their investment in skills, creating *ex post* productivity inequalities on the labor market. Results from field experiments do not allow one to know which is the contribution of each one of these

theoretical foundations in explaining hiring discrimination[2]. Finally, in the case of pair audit studies, pretend applicants are matched in function of a set of selected characteristics but it is also possible that unobservable characteristics are taken into account by employers. In this case, study designers are forced to make a strong assumption of equality of the average and of the variance of these unobservable characteristics. However, Aeberhardt et al (2009) note that the last critic has no meaning when experiments are limited to the correspondence testing.

In the economic literature, several studies on the assessment of origin based hiring discrimination are mostly referred[3]. The first study conducted by Bertrand and Mullainathan (2004), compares the difference in access to job interviews of applicants with typical Afro-American or white American sounding names. Authors apply on a great scale in various jobs (cashier, clerk, manager…) located in Chicago and Boston. Several results are highlighted. The first is that the difference in job interview access between an Afro-American and a white American applicant is significant regardless of the job type. Bertrand and Mullainathan also observe the impact of some factors on the success rate, for example the one of sending higher quality resumes (extra professional skills, extra years of experience…). If it appears that its impact on job access for the white American applicants is always significant, this is not the case for the Afro-American applicants and the gap between high quality resumes is higher than the gap between low quality resumes. The job characteristics (earning, hierarchical position…) do not seem to have an effect on the job interview access gap. Conversely, neighborhood quality of applicants (in term of education, income) has a significant positive effect for all applicants. Finally, it appears that equal opportunity employers and federal contractors discriminate as much as other employers and that the amount of discrimination is inversely related to the number of African Americans residing in the firm locality.

The second study, conducted by Duguet et al (2007) highlights the different determinants that can affect hiring discrimination based on North African origin in the Paris area. Authors want to test the effects of the nationality, first and last name together with qualification level and postal address on hiring discrimination in catering and accounting sectors. Treatment of results leads to several conclusions. In the two sectors, it's the change of French sounding surname for North African sounding name which increases the most the likelihood of being job discriminate. Change of French sounding surname for North African

[2] In some well-designed field experiments, it is however possible to identify, under some plausible assumptions, the statistical discrimination surplus associated with the addition of a characteristic.
[3] For a detailed review of the literature, see Riach and Rich (2002).

sounding name also increases the likelihood significantly, but to a lesser extent. The effect of the change of nationality is significant in the accounting sector but not in the restaurant industry. Living in a disadvantaged locality has no impact in the accounting sector but increases the likelihood of being discriminate for high skilled and for applicants with French sounding first and last name in the restaurant industry.

One of the striking observations that can be made on these studies concerns the proxies that are used to signal the national origin of the applicants. If it is clear that first name and surname provide to the recruiter a relevant signal of the national origin, it is also possible that they provide a signal of religious closeness. This point is ignored by the literature previously cited. Many studies show however that religion influences the economy in several points. Barro and Mc Cleary (2003) highlight the link between religiosity and economic growth. The latter is positively impacted by the extent of religious beliefs but negatively to church attendance. Algan and Cahuc (2006) show that employment protection is influenced by the place of women conception in the labor market, which is itself shaped by religious values. According to them, Catholics, Muslims and Orthodox would be more likely than Protestants and atheists to adopt macho values. Such values would imply a higher degree of job safety to give insiders (men) already employed a better protection. Guiso et al (2002) study the relationship between religion and economic attitudes (toward cooperation, legal rules, the government, working women, thriftiness, and the market economy) in several countries. Their results indicate that religious beliefs are linked with attitudes conducive to higher per capita income and growth but that religious people tend to be less favorable with respect to working women. Pattachini et al (2012) compare the labor market outcomes of individuals according to their religious closeness in Europe. Their study suggests that there is a significant premium in term of employment prospects of being Catholic or Protestant, especially if male but a significant penalty of being Muslim especially if female. Since religious closeness seems to impact economic behaviors and labor market outcomes, one can legitimately ask if it impacts hiring discrimination. Besides the aversion which provides intuitively a plausible explanation to the existence of hiring discrimination based on religion, the studies just mentioned previously suggest that a statistical component could play a part. This is possible if recruiters link religious closeness and productivity and if this link differs depending on the signal of religious closeness sent.

This problem has been identified recently by economists and literature proposing to separately evaluate origin and religion based hiring discriminations is only sparse. Two

studies can be cited. Banerjee et al (2009) seek to identify the role of cast and Muslim membership on hiring discrimination in software and call center job in India. For this purpose, they send a set of fictitious applications, differing only in the name of applicants, indicating membership in the Muslim religion or in a higher or lower cast group. The authors' conclusion is that there is no proof of hiring discrimination against Muslim applicants. Their results also show that a higher cast group membership rather than a lower one increases the probability of obtaining a job interview but that this disadvantage disappears when the job being applied for requires higher skill level. It is mainly the quality of the application with respect to the job vacancy that seems important.

Adida et al (2010) are the first to note that previous research on hiring discrimination against applicants from geographical areas associated with Islam, do not know whether, and to what extent, ethnicity and religious closeness influence hiring discrimination in France. To detect it, the authors measure the difference in job access as secretary and accountant positions between a female applicant with French sounding name and two female applicants with Senegalese names, indicating by their respective first names and professional or volunteering activity, closeness with Catholic and Muslim religion. The difference between the French and the Senegalese Catholic applicants is much lower than the difference between the French and the Senegalese Muslim applicants. Several observations can be made here. To minimize the risk of detection by employers, the authors do not send the Senegalese resumes on the same job offers. Their comparison of results is made under the assumption of transitivity without being able to prove it. Thus, these results can induce a strong presumption of hiring discrimination against Muslims but, overall, they show the existence of hiring discrimination linked to a combined effect of Senegalese origin and Muslim religion. Another point, noted by the authors, is that the use of Senegalese applicants is perhaps not the most appropriate to detect hiring discrimination against Muslim.

Our study follows the intuition of Adida et al considering the previous observations. To assess hiring discrimination based on national origin and religious closeness, we built six similar applications differing only in the *a priori* nonproductive characteristic we wanted to test. Three CVs signal, through the first and the last name, a North African origin. Three others CVs signal a French origin. In both cases, three situations are represented: the one of an applicant indicating no closeness with religion, the one of an applicant signaling closeness with Catholics and the one of an applicant signaling closeness with Muslims. The six applicants applied on 300 job offers (1800 applications) of real estate agent in the Paris area.

We are thus able to assess the single effects of North African origin and closeness with Catholic and Muslim religions *ceteris paribus*. The study is made up of two sections. The first section describes the protocol for application construction and for data collection. The second section presents the results.

2 Data collection and protocol description

The test consisted in sending a large number of dummy resumes in reply to a sample of job vacancies available between April and September 2011. We present the data collection protocol and reasons for the choices that led us to design the test in the way that was ours.

Nature of the experiment

Creation of fictitious applications

Individual characteristics of applicants

We tested the effect of the signaling of two individual variables on the probability of obtaining a job interview: the signal of a North African origin and the signal of closeness with the most represented religions in France, namely Catholic and Muslim religions. The choice of North African origin can be explained by several reasons. First, North Africa (Algeria, Morocco and Tunisia) is the first source of immigrants and immigrant descent. Second, studies show that it is immigrants and immigrant descent from these countries who encounter the most difficulties in accessing jobs (Richard, 2006, Duguet et al, 2007). Finally, North Africa area is strongly associated with Islam. In order to give our results better representativeness and to maximize the chances of getting positive responses, we favored the construction of male candidates.

To isolate the effects of North African origin and religious closenesses, we build 6 separate applications. The first type of application is the type of reference, signaling no particular religious closeness other than first and last name. The second type of application signals closeness with Catholic religion. The third type signals closeness with Muslim religion. For each type of application, two applicants are represented. An applicant indicates a North African origin and another applicant signals a French origin. Comparisons within origin and within religion are used to obtain the single effects of religious closeness and North African origin *ceteris paribus*.

Table 1 Fictitious applications

Application	Origin signaled	Nationality signaled	Religious closeness signaled
1	French	French	None/Secular
2	French	French	Catholic
3	French	French	Muslim
4	North African	French	None/Secular
5	North African	French	Catholic
6	North African	French	Muslim

To indicate the origins of applicants we give them typical French and North African sounding first and last name. First and last names of applicants signaling a French origin have been selected among first and last names most frequently given during their year of birth. For the applicants signaling a North African origin, an association of North African sounding first and last names has been made. We ensure us subsequently that these associations do not allow misidentification of applicants (by observing the number of results obtained after typing the name of the applicant in a search engine).

Indicate the religious closeness of applicants is more complex. Indeed, declaring religious closeness on a CV is not usual. Like Adida and *al*, we attribute to our applicants extra professional activities directly linked to religion. However, as we make all our applicants apply on the same job offers, we cannot send signals as symmetrical as those used by Adida and *al*[4]. Thus, our applicants report having worked (it is not mentioned on the CV's if it was volunteering) for various secular, Catholic and Muslim organizations. With the aim of avoiding to capture the effect of reputation of an existing structure, organizations are fictitious. In order to minimize the probability of detections by recruiters, we introduce some heterogeneity in the tasks performed within organizations. Secular organizations deal with the organizing of sport and cultural events. Catholic organizations oversee local (vigil) and foreign (travel to World Youth Day, pilgrimage) events. Muslim organizations organize various activities (trip, draw…) and local events (preparing meal and entertaining during Ramadan's nights). It is possible that the type of activity of the association had an influence

[4] In their study, Adida and al signal religious closeness by the first names and by professional and extra professional activities for Secours Catholique and scouts et guides de France for Catholics and Secours Islamique and scouts Musulmans de France for Muslims.

on the chances of an applicant to obtain a job interview. To neutralize this potential effect, we operate a rotation of this characteristic between applicants of same religious closeness. Moreover, extra professional activities of our applicants have in common to reveal a skill in organization and management of events. This point helps to justify that the extra professional experience appears in the CV's

Table 2 Identity of applicants

* Translated from French

Last name	First name	Signal sent	Organization*	Signal sent
MARTIN	Julien	French	Smile	None/Secular
PETIT	Nicolas	French	Chaplaincy of St Joseph Parish	Catholic
MOREAU	Sébastien	French	Ramadan together	Muslim
HASSANI	Rachid	North African	Saturday Youth	None/Secular
BOURAS	Farid	North African	Paths of Compostela	Catholic
ABDELKRIM	Mohamed	North Africa	Association of the Muslim Youths of Reims	Muslim

The signal of religious closeness must be interpreted with caution. Indeed, this signal reflects greater involvement than mere religious closeness. From this point of view we tend to overestimate religion job based discrimination. To solve this problem, we avoid the use of some terms (Islamic…) who can be perceived as "too much strong" by recruiters and we make appear the extra professional experience as finished since more than six years for all the applicants.

Some critic can be made about the credibility of religious closeness signal and applicants representativeness. Applicants signaling no religious closeness and applicants signaling religious closeness with their usual religion (French origin applicant close to the Catholic religion and North African origin applicant close to the Muslim religion) are not a problem from this point of view. French origin applicant close to the Muslim religion represents the potential situations of French convert to Islam[5]. North African origin applicant close to Catholic religion is the more distinguishing. Indeed, the signal of religious closeness send by his first and last names is contrary to the signal of religious closeness send by his extra professional experience. This is unlikely but no impossible. It is estimated that less than

[5] According to Trajectoires et Origines Survey (2010) among French population aged 18-50 in 2008 nearly 100000 people was converted to Islam on a total of 2 million of Muslims.

1% of North African population is close to Christian's religions (0,5% of Catholics). North African applicant can be seen as representative of this population or as representative of North African people converted to Catholicism[6]. Comparison of results allows us to examine whether this signal was interpreted in a way different from others religious closeness signals.

Other characteristics of applicants are similar. They are 27 or 28[7] years old, single without children and live in socio economically similar neighborhood located in Paris (10th, 11th[8] and 12th municipal arrondissements). To comply with the use, we do not make appear the nationality of French origin applicants. However, the French nationality of North African origin applicants is explicitly mentioned. In doing so, we protect ourselves from the effects induced by North African nationality (Duguet and al, 2007) in order to retain only the effect of North African origin. We assign different leisure to the applicants (one sport and one hobby without cultural meaning) in order to diversify their applications without influencing their productivity signals. Finally we assign to the applicants mobile phone numbers and email addresses.

Tight job choice

We assess discriminatory hiring practices in real estate jobs (real estate agents, consultants, etc.). Studies which aim to measure hiring discrimination generally focus on tight jobs with high labor flow. Choose a tight job maximizes the chances of the applicants of getting positive responses and allow us avoiding to capture a labor market saturation effect. Choose a job with high labor flow allow us to minimize the chances of detection by employers. A quick review of the market for real estate agent situation in the Paris area shows that tightness was 0,65 with a job seeker stock about 4000 people in March 2010[9]. Furthermore, the part of forecast recruitments seen as difficult was 60%. Thus, real estate jobs fulfill ideal conditions for assessing hiring discrimination.

Moreover, real estate jobs involve contact with customers. So *ceteris paribus* we should observe a higher level of hiring discrimination than the one we would observe by testing job involving no contact with the customers. We retrieve here Becker's assumption on the discriminatory preferences of customers.

[6] According to the sociologist of religions Loïc Lepape (EHESS) about 150 North African people ask baptism each year in France.
[7] We operate a rotation of this characteristic between applicants with the same religious closeness.
[8] Note that applicants close of the Muslim religion never state living in the 11th municipal arrondissement.
[9] Source : Fichier Historique Statistique of Pôle Emploi 1st trimester 2010

It should be noted that real estate job have some important characteristics which can differ, especially the worker's status (salaried/unsalaried). These differences of characteristics in the jobs proposed may influence the results. For example, we can imagine that recruiters discriminate less applicants of foreign origin when the job proposed is unsalaried. We control for this effect on hiring discrimination in our regressions. A comparison of applicant's performances remains still possible. Recruiters choose indeed an applicant who will represent the firm image, salaried or unsalaried.

Productive characteristics of applicants

Applications we created are exactly similar productively speaking. However to avoid detection, some points differ.

Our six applicants hold a baccalauréat in economic and social science and a two year technical degree (BTS) in estate transactions. All the applicants graduated in 2002 and 2004. To diversify paths, we indicate that our applicants graduated in different provincial towns (Nantes, Clermont Ferrand, Le Mans, Dijon, Limoges and Reims). They have about seven years[10] of work experience shared between five positions in different type of real estate agencies (individual agencies, group agencies). Thus their employability can be considered as strong. They did not have any periods of unemployment or career breaks and they are currently working in similar jobs to the ones they are applying for. Staying with the objective to introduce some heterogeneity in our applications, we make the applicant's career starts in the town where they stated to have been graduated at and we make them move in the Paris area at different times. To avoid introducing a bias related to the difference of experience specific to the Paris area (signaling a better knowledge of the housing market can influence the expected productivity), the removal occurs in half 2009 at the latest which guarantees a minimum experience specific to the Paris area of two years.

Skills signaled by applicants are equivalent too. To ensure us the signal of skills valued by real estate agencies, we observe the prerequisites asked repeatedly in the job offers posted before the beginning of our experiment. Then, we assign these skills to our applicants modifying the order and the way we name it. We indicate the knowledge of English, Spanish, traditional computer tools and real estate softwares. Finally, our applicants have the same mobility (driving license and vehicle available).

[10] A company internship is required in BTS and doesn't appear on CV's. Applicants have sufficient work experience to make it the case

The other differences appearing between the six applications are as follows. The type font, the font size and the layout of the CV's and of the covering letters are distinct while remaining standard. To control the similarity and the credibility of our resumes, we made them check by an expert of real estate jobs. To avoid that others characteristics than origin and religious closeness influence the quality of the applications, we implement a resume rotation system between applicants with the same religious closeness[11]. Therefore, our applicants keep only their first and last name, religious closeness signal, mail address, email address and mobile phone number for the entire test.

Unfolding of the experiment

Restriction to a job interviews access test

We limited our experiment to job interviews access, choosing not to send applicants to the interviews in the case they would be asked to attend. In this sense, our measure of hiring discrimination is crude since we do not really observe job access. This methodological restriction offers however several advantages (Riach and Rich, 1991). The first advantage is that we are able to control perfectly the unfolding of the experiment. In particular, we ensure us the absence of physical appearance bias (our applications don't contain any photographs) and more generally, any unobservable characteristic's related bias. Thus, Heckman's critics concerning the equality of the average and of the variance of unobservable characteristics are not necessary. The second advantage comes from the simplification of data collection procedure. We are able to produce a bigger sample by restricting ourselves to job interviews access. On the whole, we sent 1800 applications in response to 300 job offers over a five months period.

If job interview access provides an imperfect assessment of hiring discrimination, it should be noted that organizing interviews is costly, which encourages recruiters only to interview the applicants who actually have a real chance of obtaining the vacancy. Moreover, studies carried out show that hiring discrimination occurs right from job interviews access (Neumark et al 1996, Kenney and Wissoker, 1994). For all these reasons, job interview access appears as a relevant measure of job access.

[11] For simplicity , we do not implement rotation system between applicants of different religious closeness

Source of the job offers

Ideally, all the real estate agent's job offers available in the Paris should have the same probability of being tested. However, it is physically impossible to meet this requirement. In this study we focus only on job offers available on the Pole Emploi website. This website centralizes the most of the real estate agent's job offers. By taking such action, we introduce a bias in our results. Indeed, we are not sure that recruiters using Pole Emploi website behave the same way as recruiters prospecting on others website do[12]. More broadly, our results are biased considering that we test only one channel for job search. From this perspective, our study probably tends to underestimate hiring discrimination. However, Pole Emploi website is still one of the most used for job search and has the advantage to provide job offers whose characteristics are very detailed (wage offered, work experience required, etc.) which is not the case of the others websites[13]. Thus, we privileged the test of job offers whose characteristics are identified (in particular the work experience requirement) rather than the test of job offers whose characteristics are unknown and where we are not sure that at least one of our applicants has the opportunity of being called back.

Sending the applications

Applications have been sent between mid-April and mid-September 2011 to the job offers available on the Pole Emploi website. We replied to the job offers by sending an email with the CV and the covering letter attached and a short message explaining that the applicant is interested in the job offer. As we send our six applicants on the same job offers, we take special precautions in the sending of the applications. To avoid detection by recruiters, we apply on two days (three applications are sent the first day and the three others the second day). This way of proceeding can promote the first application sent. In order to avoid this, we operate a perfect rotation in the order of application so that the effect is zero on average.

We replied to all the job offers consistent that matched the qualification and experience of the applications and that also satisfied the following criteria:

[12] If prospecting in Pole Emploi website is perceived as more risky in term of detection by discriminating recruiters, then it is likely that there is less job discrimination from Pole Emploi job offers.
[13] For technical reasons, we have excluded websites requiring pre-registration

- Full time job.
- Fixed term or indefinite term contract (this excludes temporary jobs).
- Positions located throughout the Paris Area.

Processing the responses by the recruiters

A response is considered to be positive when the recruiter asks the applicant to attend an interview or when he asks for more information on the applicant's current situation or qualifications. Conversely, a response is considered to be negative if the recruiter formally rejects the applications or if he does not respond to it.

3 Results

Average differentials in the call back rates over all the vacancies

Table 3 presents the call back rates of our applicants.

Table 3 Average call back rates

Global call back rate: % of job offers having provided at least one positive call back
*** : significant at 1%

Applicant	Number of observations	Call back rate
French secular	300	32,00%***
French Catholic	300	31,67%***
French Muslim	300	20,33%***
North African secular	300	16,67%***
North African Catholic	300	17,67%***
North African Muslim	300	11,33%***
Global call back rate	45,33%	

Our reference, the French secular has been called back nearly one times out of three. This result traduces the lack of workers (or the high turnover) in real estate jobs but also the good adequacy between our applicant's productive characteristics and the job offers tested. We note that the applicants did not face the same success in term of job interviews' access. French secular applicant and French applicant close to the Catholic religion receive on average one positive call back for three applications sent. French applicant close to the Muslim religion receives one positive call back for five applications. The North African secular applicant and the North African applicant close to the Catholic religion receive one

positive call back for six applications. The North African applicant close to the Muslim religion receives one positive call back for 10 applications sent. These results seem to indicate the presence of both significant hiring discriminations based on North African origin and Muslim. If we assign a success index of 100 for the French secular applicant, we obtain 99 for the French Catholic applicant, 63 for the French Muslim applicant, 55 for the North African Catholic applicant, 52 for the North African secular applicant and 35 for the North African Muslim applicant.

Estimation of discrimination

If these results provide first presumptive elements of hiring discrimination, they should be deepened by carrying out further comparisons between applicant's performances. For this purpose, we examine the significance of callback's gap by pair of applicants. Table 4 presents the main effects potentially observable.

Table 4 Main detectable effects

Comparison by pair on the same job offers	Potential effect
French secular/North African secular	Usual result of a field experiment
French Catholic/North African Catholic	Origin for Catholics
French Muslim/North African Muslim	Origin for Muslims
French secular/French Catholic	Signaling of closeness with Catholic religion for a French origin applicant
French secular/French Muslim	Signaling of closeness with Muslim religion for a French origin applicant
North African secular/North African Catholic	Signaling of closeness with Catholic religion for a North African origin applicant
North African secular/ North African Muslim	Signaling of closeness with Muslim religion for a North African origin applicant
French Catholic/French Muslim	Religious closeness for the French origin applicants
North African Catholic/ North African Muslim	Religious closeness for the North African origin applicants

Comparisons by pair of applicants allow us to assess the single effect of North African origin on hiring discrimination. In order to achieve this, we observe the first three pairs of the table 4. If the effect of North African origin remains significant regardless of the religious closeness, then we can conclude that the effect of North African origin on hiring discrimination seems independent of the religious closeness.

Table 5 Effect of North African origin according to the religious closeness signaled

The student test statistics have been computed by the Bootstrap method on 10000 repetitions.
*** : Significant at 1%.

Comparison by pair on the same job offers	Difference between the callback rates (in % points	Student
Secular French/North African	15,33***	5,998
Catholic French/North African	14,00***	5.531
Muslim French/North African	9,00***	4,59

According to our results, the effect of North African origin is strongly significant regardless of the religious closeness signaled by the applicants. The difference between the callback rate of applicants signaling only French and North African origins is about 15 percentage points. It is similar for applicants signaling closeness with Catholic religion and it reaches nine percentage points for the applicants signaling closeness with Muslim religion. *Ceteris paribus,* recruiters seems to always prefer an applicant signaling a French origin rather than applicants signaling a North African origin. It is interesting to note that the difference in the callback rates decreases when the applicants signal a religious closeness, in particular with the Muslim religion. This result suggests that closeness with Muslim religion has a stronger impact on the French origin applicants than on the North African origin applicants.

To assess the impact of the signaling of religious closeness according to the origin of the applicants, we use the pairs four, five, six and seven

Table 6 Effect of the signaling of religious closeness according to the origin

The student test statistics have been computed by the Bootstrap method on 10000 repetitions. *** : Significant at 1%.

Comparison by pair on the same job offers	Difference between the callback rates (in % points	Student
French		
Secular/Catholic	0,33	0,128
Secular/Muslim	11,67***	4,49
North African		
Secular/Catholic	- 1	0,52
Secular/Muslim	5,33***	3,064

Signaling closeness with Catholic religion has not the same impact on the probability of accessing to a job interview that signaling closeness with Muslim religion. In the case of the French applicants, closeness with Catholic religion has no impact on the chances of getting a job interview whereas closeness with Muslim religion decreases significantly these chances. The same statement can be reached for the North African applicants. As table 5 results suggested, the penalty generated by the religious closeness with Muslim religion seems stronger for French applicants. Overall, table 6 indicates the existence of a differentiated treatment between workers close to the Catholic religion and workers close to the Muslim religion.

We have yet to assess the single effect of religious closeness on the probability of being called back. For this, we have to make the assumption that the signals of religious closeness of Catholic and Muslim applicants (see above) have been perceived in the same way (in term of religious involvement) by the recruiters. If, for instance, the applicant signaling closeness with Muslim religion has been perceived more religious than the applicant signaling closeness with Catholic religion, then our estimation is biased. However, the particular precautions we have taken during the design of the experiment allow us to think that this assumption is plausible.

Table 7 Effect of the religious closeness according to the origin

The student test statistics have been computed by the Bootstrap method on 10000 repetitions. *** : Significant at 1%.

Comparison by pair on the same job offers	Difference between the callback rates (in % points)	Student
French		
Catholic/Muslim	11,33***	4,397
North African		
Catholic/Muslim	6,33***	3,47

Table 7 confirms the previous intuition. *Ceteris paribus*, recruiters prefer applicants close to the Catholic religion rather than those close to the Muslim religion regardless with their origin. In the case of the French applicants, the difference between the call back rates of Catholic and Muslim is 11,33 percentage points in favor of the Catholic. In the case of the North African applicants, the gap is 6,33 points in favor of the Catholic and in both cases the difference is strongly significant

Conditional discriminations

It is possible that the characteristics of the job offers we tested (type of contract, requirements…) had an impact on the level of hiring discrimination observed. In order to control for these effects, we regress the differences between the callback rates of the applicants by a set of variables detailed in the job offers descriptions. Results are presented in annex.

Hiring discrimination based on North African origin observed in our sample is captured through three pairs of applicants (Table 2A1). Thus some coefficients are difficult to interpret. We remark that recruiters valuing professional experience seem more reluctant to discriminate according to the origin. In the same way, recruiters proposing some extras (computer, profit sharing…) tend to treat more equally applicants close to the Muslim

religion. Conversely, when a degree is wished or when the recruiter is a woman[14], hiring discrimination increases.

The impact of the characteristics of the job offers on the level of hiring discrimination based on religious closeness (and it's signaling) is presented throughout the results of tables 3A2 and 4A2. Hiring discrimination based on closeness with Islam is impacted by the type of contract offered. Counter intuitively, the less the contract links the agency and the worker (unsalaried) the higher hiring discrimination based on closeness with Islam is. Women recruiters also penalize more strongly the French applicants close to the Muslim religion. This could be put in relation with Algan and Cahuc and Guiso and al findings. If women recruiters think that Muslim applicants are more likely to adopt a macho behavior, they may tend to treat them differently. Finally, recruiters proposing some extras discriminate more the French applicants signaling closeness with a religion.

Once composition effects have been assessed, we can correct our hiring discrimination coefficients (tables 2A1, 3A1 and 4A1). These new coefficients represent the coefficients at the mean point sample and can be interpreted like the coefficients presented above. The correction does not change the previous results.

Interpretation of the results

This field experiment teaches us two things. First, it seems that there is presence of hiring discrimination based on North African origin in real estate jobs located in the Paris area regardless of the religious closeness. This result confirms the findings of previous studies. One of the reasons why North African origin population experiences hiring performances lower than those of French origin population is the existence of origin based hiring discrimination. Religious closeness does not modify this finding even if it introduces some disparities. The effect of ethnicity seems so independent of the religious closeness and, on a wider basis, cultural closeness.

[14] It has to be remembered that the set of variable come from the job offers. If some are plausibly true (degree, experience required…) others may be not representative. In the case of the sex of the recruiter, we took the sex of the person to contact in the job offer. Thus we can't be sure that this person is really the recruiter

Secondly, it would exist hiring discrimination based on closeness with the Muslim religion and its signaling regardless with the origin of the applicants. Thus we reach similar findings as Adida and al (2010) with a different design. People close to the Muslim religion would constitute a demographic group with specific hiring performances.

It would therefore be interesting to know what basis allow to explain these results differences. Unfortunately, our experiment provides only little answer to this question. Hiring discrimination based on origin can be explained by the expression of discriminatory preferences from recruiters. However the results suggest that there is no "pure" (or total) aversion towards North African applicants. If it would have been the case, we should have observed similar results for this type of applicants regardless with their religious closeness. Thus, the use of lexicographic search suggested in Bertrand and Mullainathan does not fit with our case. Discrimination against North African applicants can also be explained by a phenomenon of statistical discrimination. Recruiters would assess less precisely their expected productivities of North Africa and they would use the signal of origin in order to increase their assessment accuracy. We should however note that to the extent our CV are strictly equal from a productive point of view and we implement a rotation system of the productive characteristics between applicants with the same religious closeness, this difference in accuracy cannot come from a lack (or less understood) of information's. In the same way, we cannot determine whether if hiring discrimination based on Muslim religion can be explained by statistical or preferential process. Indeed, to the extent we modify an *a priori* non productive characteristic of the applicants (their religious closeness), we cannot know if the callback gap is due to different beliefs about the productivity of individuals from each demographic group (Catholic and Muslim) or to differences in the degree of aversion toward each demographic group.

Conclusion

In order to assess the extent of hiring discriminations based on North African origin and on closeness with the Catholic and the Muslim religion in the Paris area real estate jobs, we have built a correspondence testing. This testing consists in the creation of six applications strictly productively similar sent in response to 300 same job offers between mid-April and mid-September 2011.

A first conclusion is about the extent of hiring discrimination based on North African origin. This discrimination is always significant, regardless with the fact that applicants signal or not religious closeness. A second conclusion concerns hiring discrimination based on religious closeness. Only closeness and signaling closeness with the Muslim religion appear to be penalizing, regardless with the origin of the applicants. However our experiment do not allow to determine if it is taste based discrimination or statistical discrimination which give the better explanation of these two potentially effects. Nevertheless, it seems that it does not exist pure aversion of the recruiters towards North African applicant.

Given that our measures of hiring discrimination are only partial punctual and localized, it makes sense to remain cautious with the generalization of the results. To the extent that they confirm intuitions already found in other field experiment, we might think that they do not represent a specific feature of our field. However it would be interesting to transfer this experiment to others job sectors and to other localities in order to checking for its robustness.

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ANNEX: BINOMIAL TESTS, CONDITIONAL DISCRIMINATION AND CORRECTED DISCRIMINATION COEFFICIENTS

Table 1A: Binomial tests

The analysis is restricted to the job offers for which applicants from compared groups obtained different responses (1st accepted and 2nd rejected, or reversely). Exact binomial test. ** : Significant at 5%.

Comparison by pair on the same job offers	**1st group prefered**	**2nd groupe prefered**	**P1 = N1/ (N1+N2)**	**Null hypothesis P1 = ½**		
				P Values		
	French	**North African**		**Alternative P1 < ½**	**Alternative P1 > 1/2**	**Alternative P1 ≠ 1/2**
Effect of origin according to the religious closeness						
Secular	56	10	0,848	1,000	3,451E-09**	6,901E-09**
Catholic	53	11	0,828	1,000	5,029E-08**	1,006E-07**
Muslim	32	5	0,865	1,000	3,714E-06**	7,428E-06**
Effect of signaling religious closeness according to the origin						
French	**Secular**	**Religious**				
Catholic	27	26	0,509	0,608	0,500	1,000
Muslim	50	15	0,769	1,000	7.859E-06**	1.572E-05**
North African	**Secular**	**Religious**				
Catholic	15	18	0,454	0,364	0,3642	0,7283
Muslim	22	6	0,786	0,999	0,0019**	0,0037**
Effect of religious closeness according to the origin	**Catholic**	**Muslim**				
French	49	15	0,766	1,000	1.218E-05	2.436E-05
North African	25	6	0,806	1,000	4.390E-04	8.779E-04

Table 2A1: Corrected discrimination coefficients (Effect of origin according to the religious closeness)

Discrimination coefficients are computed from the ordered probit regressions presented in the annex 2A2. They represent the discrimination coefficient at the mean point sample.
*** : Significant at 1%

Comparison by pair on the same job offers	Difference between the callback rates (in % points)	Student
Secular French/North African	14,97***	6,08
Catholic French/North African	13,9***	5.56
Muslim French/North African	8,58***	4,56

Table 2A2: Ordered Probit regressions used to compute the corrected discrimination coefficients (effect of origin according to the religious closeness)

Explained variable: -1: North African applicant preferred, 0: Identical treatment, 1: French applicant preferred. Result of a backward elimination procedure at 10%. The following variables had been introduced into the regression: resume template used, type of contract (unsalaried, fixed term, indefinite term), experience requirement (beginner, experience "wished", experience "required"), degree requirement (none, minimal degree "wished", minimal degree "required"), wage offered, others extras, sex of the recruiter, wage offered. Additional variables are introduced in order to take into account missing information's.

	Origin effect					
	Secular		Catholic		Muslim	
Variables	Coeff.	Student	Coeff.	Student	Coeff.	Student
1st intercept	-1,92	12,89	-1,82	13,14	-2,2	11,71
2nd intercept	0,93	10,72	0,94	10,97	1,28	12,73
Resume template : 2						
Contract : fixed term						
Contract : unsalaried						
Experience : wished	-0,4	2,15	-0,35	2,21		
Experience : required						
Degree : wished	0,33	2,04				
Degree required						
Degree : baccalauréat						
Degree : bachelor						
Degree : unknown						
Other extra					-0,41	2,24
Recruiter : woman	0,4	2,51				
Recruiter: unknown						
Wage <= 1400					0,45	2,01
1600 <= Wage <= 2200						
Wage > 2200						
Wage : unknown						

Table 3A1: Corrected discrimination coefficients (Effect of signaling religious closeness according to the origin)

Discrimination coefficients are computed from the ordered Probit regressions presented in the annex 3A2. They represent the discrimination coefficient at the mean point sample.
*** : Significant at 1%

Comparison by pair on the same job offers	Difference between the callback rates (in % points)	Student
French		
Secular/Catholic	0,02	0,11
Secular/Muslim	11,47***	4,61
North African		
Secular/Catholic	- 1	0,56
Secular/Muslim	4,99***	3,05

Table 3A2: Ordered probit regressions used to compute the corrected discrimination coefficients (effect of signaling religious closeness according to the origin)

Explained variable: -1: Religious applicant prefered, 0: Identical treatment, 1 : Secular applicant preferred. Result of a backward elimination procedure at 10%. The following variables had been introduced into the regression: resume template used, type of contract (unsalaried, fixed term, indefinite term), experience requirement (beginner, experience "wished", experience "required"), degree requirement (none, minimal degree "wished", minimal degree "required"), wage offered, others extras, sex of the recruiter, wage offered. Additional variables are introduced in order to take into account missing information's.

	Effect of signaling religious closeness							
	French				North African			
	Catholic		Muslim		Catholic		Muslim	
Variables	Coeff.	Student	Coeff.	Student	Coeff.	Student	Coeff.	Student
1st intercept	-1,37	13,24	-1,72	13,28	-1,57	13,47	-2,12	12,12
2nd intercept	1,36	13,13	1	11,33	1,67	13,34	1,49	13,17
Resume template : 2								
Contract : fixed term								
Contract : unsalaried			0,44	2,23			0,53	2,41
Experience : wished								
Experience : required					0,35	1,85		
Degree : wished								
Degree required								
Degree : baccalauréat								
Degree : bachelor								
Degree : unknown								
Other extra	0,26	1,69	0,48	2,82				
Recruiter : woman			0,32	2,05				
Recruiter: unknown								
Wage <= 1400								
1600 <= Wage <= 2200								
Wage > 2200								
Wage : unknown								

Table 4A1 : Corrected discrimination coefficients (Effect of religious closeness according to the origin)

Discrimination coefficients are computed from the ordered probit regressions presented in the annex 4A2. They represent the discrimination coefficient at the mean point sample.
*** : Significant at 1%

Comparison by pair on the same job offers	Difference between the callback rates (in % points)	Student
French		
Catholic/Muslim	11,19**	4,44
North African		
Catholic/Muslim	6,33**	3,48

Table 4A2 : Ordered probit regressions used to compute the corrected discrimination coefficients (effect of the religious closeness according to the origin)

Explained variable: -1: Muslim applicant preferred, 0: Identical treatment, 1 : Catholic applicant preferred. Result of a backward elimination procedure at 10%. The following variables had been introduced into the regression: resume template used, type of contract (unsalaried, fixed term, indefinite term), experience requirement (beginner, experience "wished", experience "required"), degree requirement (none, minimal degree "wished", minimal degree "required"), wage offered, others extras, sex of the recruiter, wage offered. Additional variables are introduced in order to take into account missing information's.

	Effect of religious closeness			
	French		North African	
Variables	Coeff.	Student	Coeff.	Student
1st intercept	-1,68	13,39	-2,05	12,3
2nd intercept	1	11,37	1,38	13,29
Resume template : 2				
Contract : fixed term				
Contract : unsalaried				
Experience : wished				
Experience : required				
Degree : wished				
Degree required				
Degree : baccalauréat				
Degree : bachelor				
Degree : unknown				
Other extra				
Recruiter : woman	0,33	2,11		
Recruiter: unknown				
Wage <= 1400	-0,36	1,81		
1600 <= Wage <= 2200				
Wage > 2200				
Wage : unknown				

Econometric and statistical methods

1. Descriptive statistics and *bootstrap*

The data we use are experimental. Thus descriptive statistics provide a good measure of the recruiter's preferences *ceteris paribus*. We compare the success rates, on the same job offers, of applications which differ only in the national origin signaled throughout the first and last names of the applicants and in the religious closeness signaled throughout some extra professional activity. In order to determine if the gaps between the success rates are significant, the bootstrap method is employed. This method gives the possibility to avoid making strong assumptions on the distribution followed by the data. We proceed as follow: we draw ten thousand new samples with replacement from our initial sample. Then we compute the desired statistic on each one of the ten thousand samples. The ten thousand points obtained give us an estimate distribution of the statistic. We can compute the *t* stat by dividing the statistic to its standard deviation.

2. Ordered Probit estimation

Descriptive statistics allow for the overall measuring of recruiters preferences. However, it is possible that some characteristics of the experiment (resume template) or of the vacancy could affect the intensity of these preferences. We speak about conditional preferences (and conditional discrimination) when the recruiter's preferences happen only when some explanatory variable takes a precised value. In a field experiment, the searcher only controls for the characteristics of the application, not for (or in a small extent) the characteristics of the firms. The aim of probit regressions is to verify if the characteristics of the vacancies or of the experiment influence significantly the recruiters' preferences; in a second step we can provide a corrected measure of the preferences.

For each job offer, we compare two applications. Three solutions are possible: only the first applicant is chosen, only the second applicant is chosen, or both applicants receive the same treatment. It goes back to study the difference between the answers they obtain. By coding 1 for a positive answer (0 for a negative), we obtain 0-1=-1 when the second applicant is chosen, 0-0=0 or 1-1=0 when both applicant receive the same treatment and 1-0=1 when the

first applicant is chosen. Thus, the difference in answers obtained offers a measure of the preference for the first applicant (-1 : disadvantaged, 0 : equal treatment; 1 : preferred). It's a ordered qualitative variable, which we explain as a function of the explanatory variables available in our study. To estimate this kind of relation, we use a probit model, which is based on normal distribution assumption.

In a dichotomous Probit model, we assume that answers received by an applicant are generated by a comparison between the subjective utilities of the recruiter. Let U_i (1) be the utility related to the first applicant recruitment and $U_i(2)$ to the second applicant recruitment. The utility difference between the two recruitments is :

$$y^*_i = U_i(1) - U_i(2)$$

Ordered Probit model make the following additional assumptions:

$$y^*_i = b_0 + X_i b_1 + u_i$$

With X an explanatory variable vector and u a standard error which represents the unobservable factors affecting the recruitments' utilities (uncorrelated X). Observable variable y is defined by:

$$-1 \text{ if } y^*_i < a_0 \text{ (Applicant 2 preferred)}$$
$$0 \text{ if } a_0 \geq y^*_i < a_1 \text{ (Equal treatment)}$$
$$1 \text{ if } y^*i \geq a_1 \text{ (Applicant 1 preferred)}$$

Where (a_0 ,a_1) are two unknown threshold. If the utility difference is strong between the two recruitments, only one of the two applicants will be recruited. The probability that the first applicant is chosen is

$$Pr[y_i = 1] = Pr[y^*_i \geq a_1] = 1 - \phi(a_1 - b_0 - X_i b_1) = 1 - \phi(\alpha_1 - X_i b_1)$$

Where ϕ is the standard normal distribution cdf and $\alpha_1 = a_1 - b_0$ is the first intercept of ordered Probit model.

The probability that the second applicant is chosen is

$$Pr[y_i = -1] = Pr[y^*_i < a_0] = \phi(a_0 - b_0 - X_i b_1) = \phi(\alpha_0 - X_i b_1)$$

Where $\alpha_0 = a_0 - b_0$ is the second intercept of the ordered Probit model.

Thus, the mean point sample preference coefficient is :

$$D = Pr[y_i = 1 \mid \overline{X}] - Pr[y_i = -1 \mid \overline{X}] = 1 - (\phi(\alpha_1 - \overline{X}_i b_1) - \phi(\alpha_0 - \overline{X}_i b_1)$$

We use centered explanatory variable for all our regressions ($\overline{X} = 0$) so the mean point sample preference coefficient can be written:

$$D = 1 - \phi(\alpha_1) - \phi(\alpha_0)$$

What we estimate by :

$$\widehat{D} = 1 - \phi(\hat{\alpha}_1) - \phi(\hat{\alpha}_0)$$

Where $(\hat{\alpha}_0, \hat{\alpha}_1)$ are the maximum likelihood estimators of ordered Probit intercepts. The computation of the asymptotic variance of $\widehat{D}$ comes immediately :

$$\hat{V}as(\widehat{D}) = \frac{\partial g}{\partial \alpha}(\hat{\alpha}) Vas(\hat{\alpha}) \frac{\partial g}{\partial \alpha'}(\hat{\alpha})$$

With $\alpha = (\alpha_0, \alpha_1)$ and $g(\alpha) = 1 - \phi(\alpha_1) - \phi(\alpha_0)$