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EMMANUEL DUGUET, YANNICK L'HORTY, PASCALE PETIT

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Residential Discrimination and Ethnic Origin : An experimental assessment in the Paris suburbs

Emmanuel Duguet*, Yannick L'Horty*, Pascale Petit*

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Abstract

We performed a correspondence testing in order to assess the potential discrimination at job access level against young people of ethnic origin from the underprivileged suburbs of the Paris area (Ile-de-France). We measure simultaneously the effects of place of residence (privileged or underprivileged city), of nationality (French or Moroccan), and of sound of surname and of forename (French or Arab), on the chances of obtaining a job interview when answering a job ad. We base our assessment on a controlled experiment conducted on the profession of waiter. We constructed 16 jobseeker profiles and sent 938 resumes in reply to 118 job vacancies advertised at the end of 2006. We obtain two results. First, there is evidence of a significant effect against the candidates with an Arab origin; second, there is evidence of residential discrimination against the candidates that are either the most qualified or of French origin. Overall, discrimination would tend to level down the employment opportunities of the candidates in underprivileged suburbs by putting at a disadvantage the candidates that are usually the most favored.

Keywords : discrimination, correspondence testing, neighbourhood effect
JEL classification : C81, C93, J15, J71

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Emmanuel DUGUET, Université Paris-Est, ERUDITE et TEPP (FR CNRS n°3126), 61 avenue du Général de Gaulle, 94010 Créteil cedex, emmanuel.duguet@u-pec.fr

Yannick L'HORTY, Université Paris-Est, ERUDITE et TEPP (FR CNRS n°3126), 5 boulevard Descartes, Champs sur Marne 77454 Marne la Vallée cedex 2, Yannick.lhorty@univ-mlv.fr

Pascale PETIT, Université d'Evry Val d'Essonne, EPEE et TEPP (FR CNRS n°3126), 4 boulevard François Mitterrand 91025 Evry cedex, pascale.petit@univ-evry.fr

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1. Introduction

One of the key messages in urban economics literature is that the place of residence can have a *ceteris paribus* effect on many variables, including health, poverty and welfare, especially *via* the behavior of job search and the chances of leaving unemployment. Several mechanisms are at work to generate this neighbourhood effect. Following Manski (2000) classification of social interactions, it is useful to group them into three different categories[1]. First, there is the endogenous channel, wherin the propensity of an individual to behave in some way varies with the behaviour of the inhabitants group in his area of life. Social norms, peer influences, social networks belongs to this endogenous type of neighbourhood interaction. Second, the place of residence effects can pass through contextual interactions, wherin the propensity of a person to behave in some way varies with exogenous neighbourhood characteristics. These characteristics do not depend of individual choice, like for instance, age, ethnicity or origin, but have an impact on individual behaviour in the neighbourhood, mainly through composition effects. The third type of mechanisms, which is a nonsocial phenomenon, consists in correlated effects, wherin inhabitants of the same area tend to behave similarly because they have similar individual characteristics or face similar environments. We can group into this category neighbourhood effects due to the presence of local amenities as well as the distance from firms and spatial mismatch, in line with John Kain hypothesis. It seems important to distinguish between endogenous interactions, contextual effects and correlated effects because these channels imply different public policies.

According to all these theoretical neighbourhood effects, the place where you live can determine your chances to get a job. But even if the evidence theory are numerous, it is not easy empirically to identify rigorously a causal impact of neighbourhood on individual job search behavior. The well known problem is that place of residence is not exogenously given. It depends on a set of personal characteristics that will affect the chances of access to employment. In order to avoid this endogeneity bias, several empirical strategies have been implemented using i) instrumental variables, following the pathway opened by Cutler and Gleaser (1997) ; ii) small selected sample of residents who do not choose their place of residence, more often teenagers like in the seminal paper of O'Regan and Quigley (1996) ; iii) panel data regression that do account for neighbourhood selection on the basis of time-invariant and time-varying unobserved individual characteristics, like in Weinberg and *alii* (2004) ; iv) panel of brothers or of sisters like in Plotnick and Hoffman (1999). All these empirical strategies attempt to replicate datasets as they would be produced from a randomized experiment. A

[1] Gaslter (2010) groups these effects into four broad rubrics: social interactive; environmental; geographical; and institutional. Leventhal and Brooks-Gunn (2000) group them into three rubrics : institutional resources,

better proof for neighbourhood effect would be to carry out directly a controlled experiment in which people would be randomly distributed in space. This is the path followed by studies that have used the results of the two majors programs conducted in the U.S. to fight against urban segregation, the Gautreaux program, conducted at the end of the seventies, and the Moving to Opportunity program, launched in 1992. For instance, Kling, Liebman and Katz (2007) are exploiting the offer of housing vouchers by lottery within the Moving to Opportunity program to evaluate four to seven years after random assignment the neighbourhood effects on poverty of female-headed minority households with children, living in high-poverty public housing projects in five U.S. cities. In Europe, another good example of this type of approach is the paper by Åslund, Östh and Zenou (2010), which exploit a Swedish refugee dispersal policy to get exogenous variation in individual locations, and find that having been placed in a location with poor job access at the beginning of the 1990's adversely affected employment at the end of the decade.

The aim our paper is to present a controlled experiment conducted in Paris area which allow us to measure and to identify very carefully one specific neighbourhood effect. This effect is the employment discrimination against inhabitant of a certain urban area, which belongs to correlated effects within the previous Manski categorization. Residential discrimination is a particularly interesting neighbourhood effect because access to job discrimination is an employer behaviour and it corresponds to a decision by someone who does not reside in the area discriminated.

The measurement guards against any endogeneity bias while monitoring the full effects of socio-demographic composition of the urban area. It demonstrates a neighbourhood effect without any influence of skill mismatch or spatial mismatch, which are often mentioned in the literature. It also helps to guard against any reflection problem due to social externality and interdependency between individual and collective behaviours.

The method consists in making up two totally fictitious applications that are similar except for a single characteristic that is, *a priori*, not productive (such as place of residence). The two applications are then sent in reply to the same job ads, in the same firms. This data collection technique tests access to job interviews (correspondence testing); it consists in comparing the access of the two applicants to job interviews. In a second stage, if the applications are selected by the employers, the people in charge of the study can choose to send pretend applicants to the interviews (face-to-face testing). In which case they conduct a pair audit study so as to compare the job access of the two applicants. Situation testing methods thus give a measure of labor market discrimination because they

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relationships, and norms/collective efficacy. Ellen and Turner (1997) use five categories: concentration, location, socialization, physical, and services.

make it possible to compare the success rates of applicants belonging to two demographic groups, *all other things remaining equal*.

This paper presents the results of a test of access to job interviews for young people from the Ile-de-France Region according to their place of residence. In the testing literature, there are numerous works since the first study, conducted by Riach and Rich (1991) in Australia, which compares access to employment for Greek and Vietnamese minorities with access to employment for a reference group made up of Australians of Anglo-Celtic origin, over the period from 1983 to 1988, for three types of job: white-collar employees, salespeople, and secretaries. But none of these studies has analysed the impact of living place on employment access. The only counter-example is the study conducted by Bertrand and Mullainathan (2004), which compares access to job interviews for young white and young black applicants for administrative and sales jobs. Their results highlight major discrimination against black applicants, of a scale that is comparable for both types of job, but they show also that living in a privileged neighborhood increases the probabilities of success of both black and white applicants in comparable proportions.

Place of residence is a non productive individual characteristic that can provide support for discrimination in the sense of Heckman (1998), for which labor market discrimination appears when a firm does not reserve the same attributes (wages, access to employment, to training, to promotion, etc.) for two employees who have *entirely* identical productive characteristics and different non-productive characteristics. However, in the case of France, the residence is not on the legal list of 18 prohibited grounds of discrimination (which includes gender, age, origin, political opinions, religious beliefs, etc..). If an employer refuses you a job because of your home, it can not be prosecuted by the courts for discrimination, even if you live near his business.

Discrimination based on origin can be triggered by various aspects, such as nationality, sound of forename and of surname, that should be isolated from place of residence,. It is possible, in particular, as suggested by Heckman (1998) that the employment access gap that works against young people of ethnic immigrant origin might result from a negative signal that they convey as regards the environment in which they live. In order to take account of these aspects, four types of application were constructed: a first applicant was of Moroccan nationality and had an Arab-sounding forename and an Arab-sounding surname; a second applicant was of French nationality and had an Arab-sounding forename and an Arab-sounding surname; a third applicant was of French nationality and had a French-sounding forename and an Arab-sounding surname; and a fourth applicant was of French nationality and had a French-sounding forename and a French-sounding surname. The other characteristics of the applicants were similar. Each of the four applicants was assigned a place of residence in a “privileged” city or in an “underprivileged” city of Ile-de-France. The two types of location were chosen at equal distance from the center of Paris, in order to neutralize the potential effects of distance to employment (spatial mismatch and redlining). In all, eight types of application were thus constructed for sending in reply to the same job ads in the same firms. Within this framework, the situation testing was thus conducted both on low-skill jobs or skilled jobs of waiter.

Three particularities of this study can thus be highlighted. The first lies in the field that is explored: discrimination in hiring first-time employees in the Paris area. The second particularity lies in the fact that several discrimination factors are analyzed simultaneously: place of residence, nationality, surname and forename. The methodology that we use makes it possible to assess finely to what extent these various discrimination factors actually combine and are cumulative. The third particularity lies in the facts that a rigorous protocol for collecting observations was followed, and that econometric techniques were used that enabled the reliability of our findings to be tested.

The paper is made up of two others sections. The second section describes the protocol for application construction and for data collection. The presentation of the protocol followed is particularly important because it conditions the results obtained. The third section presents these results.

2. Data collection

The correspondence test consisted in sending a large number of dummy resumes in reply to a sample of job vacancies available at the end of 2006 for one profession, waiters. The aim is to test simultaneously the effects of place of residence (privileged or underprivileged), of nationality, and of origin of surname and of forename (French or Arab). The outlines of protocole are the same than in Duguet et *alii* (2010), which is a companion paper dealing with an another testing campaign, for the profession of accountant. In this section, we describe how the data was compiled.

Nature of the experiment

Eight fictitious applicants per job vacancy

We tested three types of individual variable indicating French or foreign origin: the applicant's French or Moroccan nationality, the French-sound or Arab-sound of the applicant's surname, and the French-sound or Arab-sound of the applicant's forename (Table 1). These three characteristics were the only elements by which the applications differed, together with type of city (privileged or underprivileged). They made it possible to construct four reference profiles (Table 1) located in a suburb reputed to be underprivileged or in a suburb reputed to be privileged. In all, we thus formed 8 types of application. The choice of Moroccan as the foreign nationality was guided by the fact that several studies show that it is the immigrants and children of immigrants of North African origin who suffer the most difficulties in accessing jobs.

Table 1: four types of application

Application	Nationality	Surname	Forename
MMM	Moroccan	Arab-sounding	Arab-sounding
FMM	French	Arab-sounding	Arab-sounding
FMF	French	Arab-sounding	French-sounding
FFF	French	French-sounding	French-sounding

These four types of application enabled us to form three pairs of applicant. Within each of the pairs, the two applicants were similar (same sex, same age, same experience, same qualifications, living in towns that were socio-economically comparable, etc.). Only one characteristic set them apart, and that characteristic had, *a priori*, no effect on productivity.

The first pair differed by nationality (MMM and FMM). One was Moroccan, and the other was French. Both had forenames and surnames that were Arab-sounding. Since otherwise the two applicants had the same characteristics, any gap in access to job interviews between them can be interpreted as being discrimination based on nationality. A second pair differed by sound of forename (FMM and FMF). Both applicants were French and had Arab-sounding surnames. The only difference between the two applicants lay in one of them having a Arab-sounding forename while the other had a French-sounding forename. Any gap in access to job interviews between the two applicants would be indicative of the influence of a foreign forename on discrimination. A third pair differed by sound of surname (FMF and FFF). Both applicants were French and had French-sounding forenames. However, one had a Arab-sounding surname while the other had a French-sounding surname. Any gap in access to job interviews between the two applicants can be interpreted as being discrimination based on a foreign-sounding surname.

The professional profiles

We assessed discriminatory hiring practices on low-qualification positions and qualified positions in waiter jobs. This job offered the advantage of having a large quantity of vacancies proposed every month so as to reach a sufficient representative sample. The low-skill jobs corresponded to waiter in a standard restaurant. The level of qualification required for this type of job is a vocational training certificate in catering (BEP). The skilled jobs required a professional Baccalauréat in catering. This level of qualification makes it possible to apply for a job of waiter in gourmet restaurants or a job of head waiter. For each of the two skill levels, eight applications were constructed. They were entirely similar without being identical so as to limit the risk of detection by the recruiters. This was because all eight applications were to be sent simultaneously to the same employers in response to the same job ads.

All eight applicants were male and of the same age (18 years for a BEP and 20 years for the Baccalaureate). All eight resumes were identical in terms of qualifications and experience. All eight applicants had the same diplomas obtained in June 2005. The applicants had knowledge of English.[2] All of them were mobile (with vehicles) and driving license holders. Their experience was of comparable length (about one year). They did not have any periods of unemployment: they were currently in work in jobs similar to the one they were applying for. They had occupied the same types of job during internships while they were studying, and since they started working in their current jobs in the second half of 2006. The tasks they were performing in their current jobs were similar and described in detail in the resumes.

The differences appearing between the eight applications were as follows. The type font, the font size, and the layout of the resumes and of the covering letters were distinct, while remaining standard. The applicants had worked in different firms, located in different *arrondissements* (districts) inside Paris. They had worked in different industrial and service sectors. The leisure activities of the applicants were also different, while remaining very standard and impersonal (sport, cinema, reading, music, etc.). Mobile phone (cell phone) numbers and email addresses were also assigned to the eight applicants.

The Moroccan nationality of the MMM-type applicants appeared explicitly on their resumes. However, as is common practice, the French applicants (of the FMM, FMF, and FFF types) did not indicate any nationality; their nationality was thus suggested. It is possible that the FMM-type applicants sent the signal of having Moroccan nationality. Comparison of the results obtained by the applications of the MMM and FMM types makes it possible to examine whether the Moroccan nationality stated explicitly or merely suggested elicited different rates of access to job interviews.

All eight applicants had different forenames and surnames that were unambiguously French-sounding or Arab-sounding. They are given in Table 2.

[2] The Baccalaureate holders have the obligation to do six weeks of training in a foreign country during their cursus.

Table 2: Identity of the applicants

	MMM and FMM	FMF	FFF
Low-skilled jobs	KAIDI Abdallah BELKACEM Youssuf AAZOUZ Soufiane BRAHIMI Karim	EL HADJ François JLASSI Christophe	MARTIN Bruno PAGE Frédéric
Skilled jobs	HADDAD Nordine CHETTOUH Mohamed ZALEGH Mounir BEN CHARGUI Medhi	MEKHLOUFI Nicolas AIT OURAB Olivier	LECOMTE Thomas DUBOIS Julien

All eight applicants for each skill level lived in the Ile de France Region. Their place of residence appeared in their resume. Four of them, of the MMM, FMF and FFF types were located in towns reputed to be "privileged" while the other four, also of the MMM, FMF, and FFF types, were located in towns reputed to be "underprivileged".

The places of residence of the applicants are given in Table 3. They were chosen on the basis of two set of criteria. First, these cities are located at equal distances from the center of Paris (about 30 minutes by public transport), which neutralizes the possible effect of spatial mismatch. Second, we have checked with many statistical indicators that cities actually disadvantaged showed less positive characteristics that favored cities (poverty rate, per capita income, per capita wealth). Moreover, at least one *"Zone Urbaine Sensible" (ZUS)* – or "Sensitive Urban Area" - is located in each of them.

Table 3: Place of residence of the applicants

"Underprivileged" cities	"Privileged" cities
Bobigny (93) Bondy (93) Epinay sur Seine (93) Stains (93)	Champigny sur Marne (94) La Varenne Saint-Hilaire (94) Nogent sur Marne (94)

NB: More than one applicant can be located in the same town.

"93" is the number indicating the administrative area or "département" of Seine-Saint-Denis; "94" is the number indicating the "département" of Val de Marne

Course of the experiment

Access to job interviews

We chose not to send any applicants to the job interviews, even when the applicants were selected by the recruiters. We can thus only compare the applicants' access to the job interviews. This methodological restriction offers two advantages (Riach and Rich (1991)). Firstly, we were able to control the proceedings of the study fully. Thus, we could be sure that all of the characteristics of the applicants other their nationalities, how their forenames and surnames sounded, and the locations of their places of residence remained similar. More precisely, our results are free from distortions related to the physical appearances and personalities of the applicants since not only did the applications not contain any photographs but also the recruiters did not meet the applicants. Secondly, the data collection procedure was simplified so that, at any given time, we were able to constitute a more substantially sized sample. In all, 938 applications were sent over a period of two months.

Access to job interviews, in the first analysis, gives only an approximation of access to employment, but organizing interviews is costly for firms, which encourages them to interview only those applicants who actually have a real chance of obtaining the post. What is more, a decision to refuse to interview an applicant indicates that the potential employer is not even entertaining the possibility of recruiting that applicant.

Sending the applications

In France, the *"ANPE" (Agence Nationale pour l'Emploi)*, which is the government-run employment agency, centralizes most of the vacancies relating to office employee positions in the service sector. We thus regularly consulted the job ads posted and updated daily by the *ANPE*[3]. In order to obtain a representative sample of other sources of job vacancies, we also used databases of Internet sites specialized in job ads (monster.fr; jobtel.com, joob.fr) and the specialist press ("*L'Hôtellerie Restauration"*). No unsolicited application was sent. The applications reached the recruiters a few days after their ads appeared.

The applications were sent between the beginning of October and the end of November 2006, in response to ads corresponding to one of the four profiles. The eight applications for each job were mailed simultaneously, in order to ensure that they arrived the same day. Furthermore, they were sent from different post offices in Paris in order to limit the risk of the study being detected. For the

[3] Since the first January of 2009, ANPE became *Pôle Emploi*.

applications that were sent by electronic mail, the emails were sent the same day with a few minutes between each transmission in order to limit the risk of detection.

We replied to all of the job ads that matched the qualifications and experience of the applications and that also satisfied the following criteria: Full-time job; Fixed-term or indefinite-term contract (which excluded temporary employment) ; Positions located throughout Ile de France.

In addition, in order to avoid that the style or the contents of a particular application systematically influences the firms so that they choose a particular applicant (in spite of the precautions taken when constructing the applications), we implemented a resume rotation system. The types of paper used were alternated between the applicants of each type living in privileged or underprivileged suburbs. Finally, various types of envelopes and of stamps were used in order to prevent the survey from being detected.

Processing the responses from the recruiters

A response was considered to be positive when the recruiter asked the applicant to attend an interview or when the recruiter asked for more information on the applicant's current situation or qualifications[4]. Conversely, a response was considered to be negative if the recruiter formally rejected the application or did not respond to it.

3. Methodology and Results

Mean differences in the success rates over all of the vacancies: discrimination presumed

Overall 31% of the posts got at least one positive answer. The inequalities between the candidates are reported in Table 4. The ethnic origin seems to strongly impact the probability of getting a job. First, we find that the origin of the candidates strongly influences the possibility to get an interview. The candidates with Arab first and last names face the lowest probability to get an interview (5-6%); this probability strongly increases when the candidates has a French first name (10.7%) and reaches its maximum for the candidates with French first and last names (16.7%). This confirms the conclusion of our companion study on the profession of accountant (Duguet et *alii*, 2010). We also find that a higher level of qualification (Baccalauréat against BEP) almost double the success rate (6.4% vs 12.7%). But what is especially of interest for this paper is the difference of treatment between

[4] When a recruiter contacted an applicant to offer an interview or to ask for more details on skills or situation, we replied that the applicant had just found a job.

underprivileged and privileged cities. We find that the place of residence matter as much as the degree of qualification: the candidates from underprivileged cities have 7.3% chances to get an interview, while the chances of the candidates from privileged cities reach 11.8%. However, this global result may hide composition effects, so that we have examined the difference between privileged and underprivileged cities for each type of candidate.

Table 4 - Success rates

Sample	Number of applications sent	Success rate	90% confidence interval	Average number of applications for one interview
Low qualification (BEP)	472	6.4%	4.7%-8.3%	16
High qualification (BAC)	464	12.7%	10.1%-15.3%	8
Underprivileged city	468	7.3%	5.3%-9.2%	14
Privileged city	468	11.8%	9.4%-14.3%	8
Seemingly origin:				
MMM	234	4.7%	2.6%-7.3%	21
FMM	234	6.0%	3.4%-8.5%	17
FMF	234	10.7%	7.3%-14.1%	9
FFF	234	16.7%	12.8%-20.5%	6
Percentage of applications with at least one positive answer	30,8%			

The confidence intervals are computed by the bootstrap with 100,000 repetitions; they can be asymmetric. Seemingly origin: MMM: Moroccan nationality, name and forename. FMM: French nationality, Arab name and forename. FMF: French nationality, Arab name and French forename. FFF: French nationality, name and forename.

Table 5 reports the effect of the city on matched job applications. The global effect that we have already found (11.8%-7.3%=4.5%) can be decomposed in the following manner. First, the low qualified jobs face a smaller discrimination (2.5 points) that the highly qualified jobs (6.4%). This may well provide incentives for qualified candidates to move to other places. We also find that the city effect does not play for all the origins. A very interesting result is that there is not significant effect for the Arab origin candidates while there is a strong negative effect for the French origin candidates: their chances to get an interview rises from 12% to 21.4% (+9.4%) when they move from an underprivileged city to a privileged one. This may provide incentives for French origin candidates to move to privileged cities. In order to investigate that result further, we have computed the success rate down to the finest level of disaggregation (origin and qualification)

Table 5 - Effects of the city of residence on matched job applications

Sample	Success rate: privileged cities (1)	Success rate: underprivileged cities (2)	Difference (1)-(2)	90% confidence interval	Student
All observations	11.8%	7.3%	**4.5%**	2.4%-6.6%	3.40
Low qualification (BEP)	7.6%	5.1%	**2.5%**	0.0%-5.1%	1.75
High qualification (BAC)	15.9%	9.5%	**6.4%**	0.3%-9.9%	2.95
Seemingly origin:					
MMM	6.0%	3.4%	2.6%	0.0%-6.0%	1.36
FMM	6.8%	5.1%	1.7%	-1.7%-5.1%	0.83
FMF	12.8%	9.5%	4.3%	0.0%-8.5%	1.52
FFF	21.4%	12.0%	**9.4%**	4.3%-15.4%	2.73

Comparisons are made on the same job offers. The confidence intervals are computed by the bootstrap with 100,000 repetitions; they can be asymmetric. Seemingly origin: MMM: Moroccan nationality, name and forename. FMM: French nationality, Arab name and forename. FMF: French nationality, Arab name and French forename. FFF: French nationality, name and forename.

Table 6 reports the most detailed effect of the city on matched job application. Here we compare candidates that have the same origin and qualification. We find that there is only one type of candidate that suffers a significant discrimination: the highly qualified candidates with French origin. Their chances to get an interview rise from 15.5% up to 34.5% (+19%) when they move from an underprivileged city to a privileged city. Since their chances to get an interview more than double when they move, they must be the ones with the strongest incentives to leave the underprivileged cities.

Table 6 - Effects of the city of residence on matched job applications, by level of qualification

Sample	Qualification	Success rate: privileged cities (1)	Success rate: underprivileged cities (2)	Difference (1)-(2)	Student
Seemingly origin:					
MMM	Low (BEP)	5.1%	3.4%	1.7%	0.46
	High (BAC)	6.9%	3.4%	3.5%	0.84
FMM	Low (BEP)	5.1%	1.7%	3.4%	1.03
	High (BAC)	8.6%	8.6%	0	0
FMF	Low (BEP)	11.9%	6.8%	5.1%	0.95
	High (BAC)	13.8%	10.3%	3.5%	0.57
FFF	Low (BEP)	8.5%	8.5%	0	0
	High (BAC)	34.5%	15.5%	**19.0%**	**2.42**

Comparisons are made on the same job offers. Student statistics are computed by the bootstrap with 100,000 repetitions. Seemingly origin: MMM: Moroccan nationality, name and forename. FMM: French nationality, Arab name and forename. FMF: French nationality, Arab name and French forename. FFF: French nationality, name and forename.

Regression analysis : discrimination confirmed

In order to perform a regression analysis, we will consider an overall discrimination measurement on all the answers to each of the job vacancies. The reference group will be the privileged city, compared with the underprivileged city.

Analysis at the vacancy level

For each vacancy, we have a certain number of responses for every of the study groups (FFF and the others). It is thus possible to compute, within each vacancy, success rates for every groups. For each comparison, we have N vacancies and, for each vacancy, there are C applicants belonging to two different groups. In practice, following rejection of certain applications by the French employment public agency (ANPE), the number of applicants can vary for each vacancy. For vacancy number *i*, we have C_i applicants (i=1,…,N) whose index j varies from 1 to C_i. By convention, the reference group is identified with an index k=0, and the comparison group is identified by an index k=1. For each vacancy, we have two success rates:

$$\bar{y}_{k,i} = \frac{1}{C_i}\sum_{j=1}^{C_i} y_{k,j,i} \quad , \quad k \in \{0,1\}, \;\; i = 1,\ldots,N$$

The measurement of net discrimination is thus equal to:

$$\Delta = \frac{1}{N}\sum_{i=1}^{N}\left(\bar{y}_{1,i} - \bar{y}_{0,i}\right),$$

In the case of regressions, this measurement is explained by a set of explanatory variables. Here, two cases can arise: either the characteristic whose effect is being studied is exactly the same for both of the individuals, and it must be put in level in the model, or else it is different and it must be put both in level and in difference in the model. For both types of variable, only the variables in levels indicate conditional discrimination.

Linear regression and decomposition

With experimental data it is possible to define a variant of the Blinder-Oaxaca decomposition (1973) that makes it possible to improve the estimation of discrimination compared with mere comparison of means. The main difference with the Blinder-Oaxaca method lies in the fact that two separate regressions (depending on group) are not necessary because we do observe the two potential results of the recruitment process. On the experimental data, we observe both the response from the employer when the person belongs to the potentially privileged group and what the employer would have responded if the person had belonged to another group. We thus do not need to make any prediction in the latter case. This implies that a single, overall regression is necessary instead of two with the Blinder-Oaxaca method.

The set of explanatory variables of the model can be decomposed into two parts: the variables referenced z which take different values for the FFF applicants and for the others, and the variables referenced x which always take the same value in both of the groups. For the x variables, the difference in the mean values of the two groups is always zero.

We assume that the probability of obtaining a job interview is of the following form:[5]

$$E(p_k) = z\,b_k + x\,c_k,\ \ k \in \{0,1\},$$

This implies that the difference in the success rates between the privileged city (referenced 1) and the underprivileged city (referenced 0) can be written, using $x_1 = x_0$:

[5] We have checked that this linear form gives admissible predictions. See Appendix A.

$$
\begin{aligned}
E(p_1 - p_0) &= z_1 b_1 + x_0 c_1 - (z_0 b_0 + x_0 c_0) \\
&= z_1 b_1 - z_0 b_0 + x_0 (c_1 - c_0) \\
&= (z_1 - z_0) b_1 + z_0 b_1 - z_0 b_0 + x_0 (c_1 - c_0) \\
&= (z_1 - z_0) b_1 + (z_0, x_0) \begin{pmatrix} b_1 - b_0 \\ c_1 - c_0 \end{pmatrix}
\end{aligned}
$$

Thus we need to regress the difference in the proportions of success of the two groups on the *difference* in the mean characteristics of the variables z and on the *levels* of all of the variables z and x. This explains the shape of the model presented in Table 7 to 10. The coefficients of the differences do not, by definition, represent a measurement of discrimination; however, the coefficients of the variables in levels measure conditional discrimination.

Since we have 116 job vacancies, our regressions are conducted on a small number of observations. Therefore we take some care in computing the standard errors. We have computed the bootstrapped standard errors.

The regression analyses confirmed our previous results. Tables 7 in the appendix performs a backward elimination regression of the difference of treatment between privileged and underprivileged cities for the French origin candidates. The only significant variable is the degree of qualification. The discrimination coefficient at the mean point of the sample is equal to 9.4% of the low qualified candidates and 0.094+0.19×(1–0.49)=19%, which corresponds to the sample statistics on matched applications.[6] Therefore no characteristic of the experiment or of the firms is behind our results. Tables 8 to 10 report the results of the same regression for the FMF, FMM and MMM candidates and find no significant discrimination and no significant effect of the characteristic of the experiment or the firms. Therefore, the matched statistics are robust to the experimental design and can be commented directly.

[6] This was expected since no other variable is significant in the regression. The formula comes from the fact that the dummy variables are centred, and 0.49 is the mean of the high qualification dummy (i.e. the share of highly qualified candidates in the sample).

4. Conclusion

In order to measure the scale of discriminatory hiring practices suffered by young people of foreign origin in the suburbs of Ile-de-France, we have, in this paper, presented the results of a controlled experiment conducted on waiters. For the purposes of conducting this experiment we constructed 16 jobseeker profiles and sent 938 replies to 116 job vacancies advertised from October to November 2006. The aim of the experiment was to test simultaneously the effects of place of residence (privileged or underprivileged), of nationality, and of origin of surname and forename (French or Arab) on the chances of being asked to a job interview. The idea was to analyze the joint effects of various discrimination factors, such as place of residence and the elements indicating nationality of origin by using reliable measurement that is based on a rigorous protocol for collecting observations and that uses statistical and econometric techniques making it possible to verify the significance and the robustness of the results.

A first conclusion emerges from this study. It concerns the scale of the discrimination against young people of ethnic origin in the suburbs of Paris. When seeking a job as a waiter, the chances of obtaining a job interview are much higher for applicants who signal that they are of French origin by the sounds of their surnames or of their forenames than for applicants who signal that they are of Moroccan nationality or of Arab origin. Applicants of Moroccan nationality and Arab origin must, on average, send over four times as many resumes in order to obtain the same number of invitations to job interviews as applicants whose surnames and forenames are of French origin. These considerable differences, present in the raw data, were confirmed by the statistical tests leading to a robust conclusion of a diagnostic of major discriminatory hiring practices against young people of foreign origin.

The second main conclusion of this study is about the existence of residential discrimination by the employers. We find a huge difference in the rate of success of all our candidates: the candidates from underprivileged cities have 7.3% chances to get an interview, while the chances of the candidates from privileged cities reach 11.8%. However, this global result may hide composition effects, so that we have examined the difference between privileged and underprivileged cities for each type of candidate. When we compare candidates that have the same origin and qualification, to avoid composition effects, we find that there is only the highly qualified candidates with French origin that suffers a significant discrimination. Their chances to get an interview rise from 15.5% up to 34.5% (+19%) when they move from an underprivileged city to a privileged city. Since their chances to get an interview more than double when they move, they must be the ones with the strongest incentives to leave the underprivileged cities. This last result give support for a strong neighbourhood effect as well as for a segregative mechanism coming entirely from the employers decision without the need to refer to the inhabitants choices and behaviour.

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Table 7: Conditional discrimination based on Residence – FFF candidates

Backward selection based on bootstrapped standard errors

The Student statistics are computed by the bootstrap with 100,000 repetitions.

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.094	0.415	0.215	0.244	-0.019	-0.039	0.064	-0.013	-0.034	-0.226	0.182	0.139	0.429	0.092	-0.385	0.122	0.080	-0.065
Student	2.76	1.64	1.88	0.67	0.02	0.92	0.39	0.07	0.48	0.87	0.69	1.27	1.37	0.96	2.32	1.80	0.24	1.07
Coefficient	0.094	0.414	0.215	0.242		-0.039	0.064	-0.013	-0.034	-0.227	0.182	0.139	0.428	0.092	-0.386	0.122	0.074	-0.065
Student	2.75	1.66	1.97	0.67		0.93	0.41	0.08	0.47	0.91	0.71	1.28	1.37	0.95	2.43	1.82	1.38	1.07
Coefficient	0.094	0.414	0.215	0.242		-0.039	0.073		-0.035	-0.227	0.184	0.139	0.425	0.090	-0.387	0.121	0.075	-0.066
Student	2.76	1.65	1.97	0.67		0.95	0.88		0.49	0.92	0.73	1.27	1.39	0.92	2.41	1.87	1.41	1.08
Coefficient	0.094	0.409	0.215	0.219		-0.041	0.066			-0.228	0.176	0.141	0.414	0.088	-0.390	0.115	0.074	-0.061
Student	2.76	1.64	2.00	0.62		0.99	0.87			0.92	0.70	1.30	1.36	0.90	2.51	1.73	1.40	1.04
Coefficient	0.094	0.403	0.196			-0.037	0.063			-0.247	0.196	0.144	0.417	0.081	-0.361	0.115	0.065	-0.052
Student	2.76	1.60	1.85			0.95	0.84			1.11	0.87	1.33	1.34	0.82	2.42	1.76	1.37	0.87
Coefficient	0.094	0.394	0.149			-0.038	0.055			-0.250	0.199	0.163	0.423		-0.345	0.116	0.070	-0.051
Student	2.76	1.59	1.78			0.98	0.76			1.18	0.93	1.48	1.39		2.39	1.79	1.54	0.85
Coefficient	0.094	0.395	0.149			-0.041				-0.248	0.203	0.159	0.417		-0.347	0.117	0.074	-0.041
Student	2.75	1.59	1.79			1.04				1.14	0.92	1.43	1.37		2.45	1.83	1.64	0.69
Coefficient	0.094	0.409	0.156			-0.041				-0.249	0.208	0.163	0.420		-0.367	0.112	0.075	
Student	2.77	1.64	1.88			1.05				1.15	0.94	1.46	1.37		2.62	1.81	1.71	
Coefficient	0.094	0.410	0.157			-0.039				-0.060		0.156	0.433		-0.360	0.127	0.071	
Student	2.76	1.66	1.88			1.02				0.96		1.39	1.43		2.59	2.04	1.65	

(to be followed)

(followed from Table 7)

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.094	0.402	0.147			-0.039						0.156	0.399		-0.356	0.135	0.070	
Student	2.76	1.61	1.83			1.00						1.40	1.30		2.57	2.17	1.63	
Coefficient	0.094	0.414	0.138									0.111	0.425		-0.352	0.131	0.028	
Student	2.75	1.83	1.86									1.07	1.48		2.60	2.08	1.27	
Coefficient	0.094	0.457	0.149										0.458		-0.352	0.159	0.030	
Student	2.76	1.96	1.89										1.52		2.58	2.76	1.38	
Coefficient	0.094	0.442	0.124										0.461		-0.304	0.174		
Student	2.76	1.96	1.90										1.58		2.58	2.71		
Coefficient	0.094	0.194	0.104												-0.284	0.175		
Student	2.76	1.29	1.44												2.38	2.68		
Coefficient	0.094		-0.023												-0.143	0.178		
Student	2.75		0.21												1.05	2.72		
Coefficient	0.094														-0.165	0.179		
Student	2.75														1.94	2.78		
Coefficient	0.094															0.190		
Student	2.75															2.84		

Table 8: Conditional discrimination based on Residence – FMF candidates
Backward selection based on bootstrapped standard errors

The Student statistics are computed by the bootstrap with 100,000 repetitions.

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.043	0.029	0.236	0.014	0.232	0.036	0.015	-0.056	0.028	0.365	-0.258	-0.068	0.069	0.146	-0.136	0.022	-0.148	0.002
Student	1.52	0.27	2.00	0.07	0.20	1.09	0.20	0.66	0.44	1.47	1.07	0.98	0.33	1.49	0.77	0.36	0.40	0.03
Coefficient	0.043	0.029	0.236	0.015	0.231	0.036	0.016	-0.056	0.027	0.365	-0.258	-0.069	0.070	0.146	-0.136	0.023	-0.148	
Student	1.53	0.27	2.03	0.08	0.20	1.10	0.25	0.71	0.45	1.49	1.08	0.97	0.33	1.51	0.78	0.36	0.40	
Coefficient	0.043	0.028	0.235		0.287	0.036	0.014	-0.057	0.029	0.363	-0.257	-0.069	0.071	0.146	-0.135	0.022	-0.166	
Student	1.52	0.26	2.02		0.32	1.11	0.25	0.72	0.47	1.54	1.10	0.98	0.35	1.52	0.77	0.36	0.62	
Coefficient	0.043	0.028	0.237		0.292	0.036		-0.069	0.031	0.364	-0.259	-0.069	0.070	0.148	-0.135	0.024	-0.168	
Student	1.52	0.26	2.08		0.33	1.11		0.87	0.51	1.55	1.12	0.99	0.34	1.59	0.78	0.39	0.63	
Coefficient	0.043		0.228		0.287	0.036		-0.071	0.032	0.365	-0.259	-0.069	0.052	0.150	-0.125	0.023	-0.167	
Student	1.52		2.36		0.33	1.12		0.92	0.53	1.55	1.11	0.99	0.26	1.61	0.80	0.38	0.63	
Coefficient	0.043		0.240		0.311	0.037		-0.063	0.031	0.367	-0.259	-0.070		0.152	-0.143	0.025	-0.176	
Student	1.52		2.48		0.38	1.11		0.92	0.53	1.57	1.12	1.02		1.64	0.96	0.42	0.70	
Coefficient	0.043		0.243			0.040		-0.065	0.038	0.365	-0.258	-0.068		0.151	-0.146	0.026	-0.075	
Student	1.52		2.47			1.29		0.99	0.65	1.56	1.11	0.99		1.66	0.96	0.44	2.01	
Coefficient	0.043		0.239			0.039		-0.061	0.045	0.351	-0.248	-0.059		0.143	-0.135		-0.073	
Student	1.53		2.49			1.29		0.96	0.79	1.51	1.07	0.84		1.70	0.90		1.99	
Coefficient	0.043		0.239			0.042		-0.065		0.345	-0.229	-0.059		0.147	-0.130		-0.074	
Student	1.52		2.50			1.41		1.04		1.48	1.01	0.85		1.78	0.88		2.02	

(to be followed)

(followed from Table 8)

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.043		0.231			0.032		-0.070		0.342	-0.224			0.129	-0.123		-0.063	
Student	1.53		2.46			1.16		1.07		1.44	0.97			1.56	0.84		1.81	
Coefficient	0.043		0.186			0.031		-0.064		0.340	-0.225			0.111			-0.061	
Student	1.52		2.48			1.10		0.97		1.42	0.96			1.42			1.76	
Coefficient	0.043		0.184			0.029		-0.060		0.136				0.107			-0.055	
Student	1.53		2.47			1.03		0.91		1.96				1.35			1.62	
Coefficient	0.043		0.168			0.024				0.141				0.093			-0.048	
Student	1.51		2.24			0.91				1.98				1.20			1.50	
Coefficient	0.043		0.164							0.135				0.088			-0.020	
Student	1.53		2.20							1.91				1.15			1.10	
Coefficient	0.043		0.157							0.137				0.071				
Student	1.53		2.13							1.93				0.94				
Coefficient	0.043		0.118							0.139								
Student	1.52		2.12							1.94								
Coefficient	0.043		0.108															
Student	1.52		1.96															

Table 9: Conditional discrimination based on Residence – FMM candidates
Backward selection based on bootstrapped standard errors

The Student statistics are computed by the bootstrap with 100,000 repetitions.

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.017	-0.006	0.021	-0.020	0.067	0.019	0.033	0.027	-0.068	-0.076	0.021	0.066	-0.071	-0.005	0.010	-0.058	-0.036	0.010
Student	0.82	0.08	0.35	0.11	0.19	0.81	0.45	0.41	1.07	1.11	0.33	0.61	0.71	0.10	0.09	1.06	0.29	0.20
Coefficient	0.017		0.023	-0.020	0.064	0.019	0.033	0.027	-0.068	-0.076	0.021	0.067	-0.066	-0.005	0.007	-0.058	-0.035	0.010
Student	0.82		0.54	0.11	0.19	0.86	0.44	0.41	1.06	1.11	0.33	0.69	0.62	0.09	0.08	1.07	0.31	0.20
Coefficient	0.017		0.028	-0.019	0.060	0.018	0.034	0.028	-0.068	-0.077	0.021	0.067	-0.069	-0.003		-0.059	-0.033	0.009
Student	0.82		0.55	0.11	0.18	0.85	0.50	0.50	1.05	1.20	0.35	0.72	0.80	0.05		1.09	0.30	0.22
Coefficient	0.017		0.029	-0.019	0.059	0.018	0.034	0.027	-0.068	-0.077	0.021	0.067	-0.069			-0.059	-0.033	0.009
Student	0.82		0.87	0.11	0.18	0.86	0.51	0.54	1.09	1.26	0.37	0.73	0.81			1.11	0.30	0.18
Coefficient	0.017		0.029		0.031	0.018	0.035	0.028	-0.070	-0.074	0.019	0.067	-0.069			-0.058	-0.024	0.008
Student	0.82		0.88		0.10	0.88	0.57	0.56	1.19	1.32	0.38	0.72	0.84			1.11	0.23	0.17
Coefficient	0.017		0.030			0.018	0.036	0.029	-0.070	-0.073	0.019	0.067	-0.069			-0.058	-0.014	0.008
Student	0.82		0.95			0.88	0.59	0.57	1.22	1.38	0.38	0.72	0.85			1.11	0.66	0.18
Coefficient	0.017		0.029			0.018	0.039	0.031	-0.071	-0.073	0.019	0.066	-0.069			-0.058	-0.014	
Student	0.82		0.98			0.91	0.74	0.63	1.25	1.50	0.41	0.72	0.84			1.12	0.69	
Coefficient	0.017		0.029			0.018	0.038	0.030	-0.070	-0.056		0.066	-0.069			-0.057	-0.015	
Student	0.82		0.98			0.91	0.74	0.63	1.26	1.33		0.72	0.85			1.14	0.70	
Coefficient	0.017		0.030			0.019	0.017		-0.067	-0.058		0.068	-0.070			-0.054	-0.016	
Student	0.82		1.01			0.93	0.36		1.23	1.40		0.75	0.87			1.14	0.73	

(to be followed)

(followed from Table 9)

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.017		0.031			0.018			-0.062	-0.059		0.066	-0.066			-0.055	-0.015	
Student	0.82		1.03			0.85			1.36	1.45		0.75	0.87			1.16	0.66	
Coefficient	0.017		0.033			0.009			-0.062	-0.060		0.076	-0.068			-0.055		
Student	0.82		1.12			0.78			1.39	1.50		0.92	0.92			1.16		
Coefficient	0.017		0.030						-0.052	-0.063		0.088	-0.065			-0.053		
Student	0.82		1.07						0.99	1.50		1.09	0.92			1.09		
Coefficient	0.017		0.026						-0.051	-0.063		0.081				-0.055		
Student	0.82		1.01						0.99	1.50		1.09				1.12		
Coefficient	0.017		0.031							-0.078		0.080				-0.066		
Student	0.81		1.09							1.81		1.07				1.24		
Coefficient	0.017		0.033							-0.080						-0.045		
Student	0.82		1.09							1.78						1.08		
Coefficient	0.017		0.034							-0.071								
Student	0.82		1.10							1.63								
Coefficient	0.017									-0.069								
Student	0.82									1.61								

Table 10: Conditional discrimination based on Residence – MMM candidates

Backward selection based on bootstrapped standard errors

The Student statistics are computed by the bootstrap with 100,000 drawings.

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.026	-0.271	-0.194	0.206	-1.826	0.004	0.071	0.027	-0.142	0.022	0.086	0.106	-0.133	0.014	0.205	0.033	0.590	-0.006
Student	1.36	2.24	1.88	1.49	1.91	0.18	1.13	0.44	2.20	0.28	1.13	1.55	1.51	0.38	1.85	0.78	1.90	0.16
Coefficient	0.026	-0.272	-0.194	0.203	-1.823	0.004	0.068	0.026	-0.141	0.020	0.088	0.108	-0.133	0.014	0.203	0.032	0.590	
Student	1.35	2.25	1.88	1.56	1.92	0.18	1.29	0.46	2.22	0.26	1.19	1.51	1.52	0.37	1.85	0.74	1.91	
Coefficient	0.026	-0.272	-0.194	0.205	-1.813		0.068	0.027	-0.140	0.018	0.089	0.111	-0.135	0.013	0.204	0.032	0.590	
Student	1.35	2.26	1.88	1.64	1.96		1.29	0.50	2.20	0.24	1.19	1.68	1.58	0.36	1.85	0.74	1.98	
Coefficient	0.026	-0.273	-0.194	0.201	-1.802		0.068	0.027	-0.140		0.105	0.112	-0.135	0.013	0.204	0.031	0.587	
Student	1.35	2.27	1.89	1.65	1.95		1.30	0.50	2.23		2.24	1.70	1.59	0.37	1.86	0.75	1.97	
Coefficient	0.026	-0.274	-0.201	0.202	-1.803		0.069	0.031	-0.139		0.106	0.114	-0.134		0.205	0.030	0.588	
Student	1.35	2.27	1.90	1.67	1.96		1.39	0.61	2.23		2.26	1.77	1.58		1.86	0.76	1.99	
Coefficient	0.026	-0.276	-0.205	0.198	-1.775		0.047		-0.136		0.103	0.115	-0.134		0.210	0.033	0.579	
Student	1.35	2.29	1.95	1.68	1.95		1.23		2.24		2.18	1.81	1.60		1.91	0.87	1.98	
Coefficient	0.026	-0.276	-0.204	0.190	-1.717		0.045		-0.125		0.097	0.124	-0.135		0.205		0.561	
Student	1.35	2.28	1.93	1.64	1.90		1.20		2.13		2.24	2.01	1.59		1.88		1.93	
Coefficient	0.026	-0.273	-0.208	0.159	-1.562				-0.111		0.096	0.116	-0.126		0.197		0.512	
Student	1.35	2.26	1.94	1.38	1.77				2.03		2.22	1.99	1.50		1.82		1.80	
Coefficient	0.026	-0.283	-0.214		-0.822				-0.101		0.089	0.117	-0.113		0.204		0.280	
Student	1.35	2.31	1.96		1.61				1.91		2.08	2.01	1.39		1.85		1.66	

(to be followed)

(followed from Table 10)

Statistic	Mean discrimination coefficient	Cubitus Stamp	Maranne stamp	Commuting time	Firm size : available	Firme size : level	Restaurant/Café	Hotel/Café	Job located inside Paris	Through Pole Emploi	Long term contract	The firm is a membre of a group	Cubitus stamp	Marianne stamp	Pre-stamped letter	Qualified job (baccalauréat)	Commuting time	Resume template 2
		Variables in differences			Variables in levels													
Coefficient	0.026	-0.228	-0.213		-0.795				-0.104		0.092	0.112			0.196		0.269	
Student	1.35	2.08	1.96		1.56				1.94		2.14	1.98			1.80		1.60	
Coefficient	0.026	-0.235	-0.228						-0.122		0.093	0.094			0.197		0.014	
Student	1.35	2.03	1.92						2.08		2.14	1.63			1.71		1.09	
Coefficient	0.026	-0.236	-0.231						-0.110		0.087	0.096			0.201			
Student	1.35	2.00	1.88						1.98		2.06	1.69			1.68			
Coefficient	0.026	-0.140	-0.134						-0.104		0.096	0.110						
Student	1.35	2.07	1.85						1.87		2.08	1.86						
Coefficient	0.026	-0.056							-0.111		0.100	0.129						
Student	1.35	1.61							1.87		1.92	1.96						
Coefficient	0.026								-0.110		0.097	0.113						
Student	1.36								1.86		1.90	1.95						
Coefficient	0.026										0.064	0.102						
Student	1.36										1.28	1.78						
Coefficient	0.026											0.097						
Student	1.35											1.73						

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