Accent As a Cause Of Discrimination

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Abstract

The study looks for the existence of accent-based discriminations on the labor market when employers analyze voices. It presents a correspondence study including four candidates and three expected disfavored characteristics: carrying a North-African name, living inside a deprived area and having an accent of deprived areas. They are ramdomly assigned to fictitious candidates in order to compare or cumulate last one with the two other unproductive observables which suffer employer's prejudice. In order to find accent-based discriminations, I check whether employers leave a message after they heard applicants' voice in their answering machine. I found that applicants whose voices sound from deprived areas are less favored for jobs which require direct relationships with customers. Probit estimation shows a marginal effect of -0.104 statistically significant at the 10% level.

Keywords Correspondence study; accent-based discriminations.

JEL classification C81; C93; J71.

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1 Introduction

"The deprived area accent afraid employers [...]. More and more job insertion organisms help their owner to "erase" it", Mais pourquoi les jeunes des cités ont-ils un accent ?, Le Parisien, leparisien.fr 11/17/2012.

On November 13 2015, a journalist of the information website Slate.fr published an article untitled "We do not insiste enough on accent-based discriminations".[1] It presents individuals affirming they have suffered from it and he cites researchers working on the question. In Summer 2013 in the United Kingdom, news treated on a pool from ComRes agency showing that 28% of British people think they had been mistreated because of their accent.

Studies on accent-based discrimination exist in the social science literature. The linguist Lippi-Green (1997) works on its role of in the U.S society. She thinks it can be part of the judgment of others. In France, the sociolinguist Gasquet-Cyrus (2009) shows the deprived area Marseille accent may be badly perceived. These studies are qualitative. Heblich et al (2015) provide a quantitative study on the question. They run a laboratory experiment in Germany. They show that German regional accent may be badly perceived compared to the owners the German "standard" one. From now onwards, it looks worthwhile to prove the existence of accent-based discriminations on the

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[1]http://www.slate.fr/story/109511/discrimination-accent, the title of the article is *On n'insiste pas assez sur la discrimination par l'accent.*

field. Correspondence studies appear the proper field experiment to find it (Bertrand and Mullainathan, 2004). Correspondence study consists to send fictitious job applications to true job offers. Job applicants are similar but some characteristics. I check whether employers differentiate applicants' characteristics by looking at employers' callback rates and employer's left message on answering machines conditional on a phone callback.

The present study tests accent-based discriminations by comparing deprived area accent with the French "standard" accent. Besides, It includes fictitious applicants with a North-african name or living in a deprived area. They have already been proved to cause discriminations (Edo et al, 2013, Duguet et al, 2010). Marseille hosts the study since the city is an interesting melting-pot with a high number of deprived areas and with a high number of burgher areas. I make sure employers will not find strange a jobseeker with a deprived area in the Marseille region. I take care to record a deprived area voice in the Marseille region to control for the geographical effect. Indeed, if the owner of the deprived area accent was from another French region, Marseille employers might recognize an accent from this region and not from deprived areas.

I study discriminations at two steps of the job hiring process. First, I look at name-and-address-based discriminations at the *job application analyze* step. Second, I test the relevance of accent-based discriminations hypothesis at the *voice analyze* step. Furthermore, I also test whether higher discriminations occur when fictitious jobseekers hold two or three (expected) discriminated traits. In the *job application analyze* step, fictitious job candidates may cumulate a North-African name with a deprived area address. At the *voice analyze* step, applicants might hold a deprived area accent with a North-African

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name or a deprived area address.

The economic literature on discrimination proposes three explanations to discriminations. First, Employers (or customers) could distaste deprived-area accents. Becker (1961) defines it the taste-based discrimination. Employers do not consider the productivity of job applicants to not hire. They just do not like unproductive characteristics such as the name, the living place, etc. Second, employers may think the accent is non-understandable and they must think job applicants with a particular accent undermine the firm efficiency if they hire them. Third, to carry a deprived area accent can send wrong signals on productivity for employers. Arrow (1973), Phelps (1972) and Aigner and Cain (1977) call this mechanism the statistical discrimination. It occurs when a group shows different mean (or variance) productivity compared to another group.[2] Employers use applicants' unproductive observables (or observables partially correlated with productivity) to infer unobserved productivity. Besides, Combes et al (2016) show the existence of customer discrimination. I look for it by doing the study on waiter and cook job markets. Indeed, the two occupations work with the same employers and co-workers but they have different customer relationships. Waiters do direct interactions with clients while cooks do indirect interactions with clients. Customers discrimination is detected when discrimination exist on the waiter job market but not on the cook job market.

Results show accent-based discriminations exist when the deprived area accent is cumulated with a North-African name. Fictitious applicants with a North-African name

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[2]Heckman and Siegelman (1993) frame statistical discrimination which occur when two groups have different variances on productive variables.

and a deprived area accent receive 0.884 times the number of employer left message on answering machines of applicants with a North-African name but with a French "standard" accent. This difference only holds on the waiter job market. So accent-based discrimination is caused by customers. Accent-based discrimination must be caused by either customers distaste to North-African with a deprived area accent or because to cumulate both characteristics send a wrong signal.

Name-based discrimination is also observed. Employer callback mean difference between Borth-African and French "traditional" candidates is −0.104 (with p<0.001). Furthermore, applicants who cumulate a deprived area address and a North-African name are less favored than applicants without these traits too. The employer callback mean difference is −0.126 (with p<0.001).

These results are still robust if I check whether job application qualities or the application sending order impact them. Furthermore, second-moment statistical discrimination does not exist in waiter and cook job markets.

I propose the opposition between *strong* and *weak* discriminated characteristics to distinguish name-based from address-or-accent-based discriminations. Indeed, to have a North-African name is enough to observe discriminations while a deprived area address or a deprived area accent need to be cumulated with a North-African name to cause discrimination.

Section 2 presents the job hiring process. It helps to figure oneself where employers may produce discriminations. Section 3 and 4 exhibit the experimental design. They first detail job application construction and then the voice selection. Section 5 displays

results and section 6 discusses them. It checks results robustness; it propose to interpret results; and it takes into account restaurant heterogeneity. Section 7 concludes.

2   The job hiring process

Heckman and Siegelman (1993) sketch a figure of the job hiring process. Nevertheless, for the purpose of the present study, I have to detail it more. Figure 1 is a developed representation of the job hiring process. First, employers receive applicants' applications and they treat them. It is the *job application analyze* step. They can discriminate on unproductive elements inside resume and cover leters. Then, they decide either to contact job candidates or to not contact them. They can do a contact by either sending an e-mail (or a mail) or doing a phone call. When they do a phone callback, they heard applicants' voices and they can propose an interview.[3] They analyze voices and they may discriminate by the voice itself or the content. It is the *voice analyze* step. The last step is the interview situation. Employers interpret it and they make a decision. They may still discriminate according to a vector of unproductive observables. It is the *interview interaction analyze.*
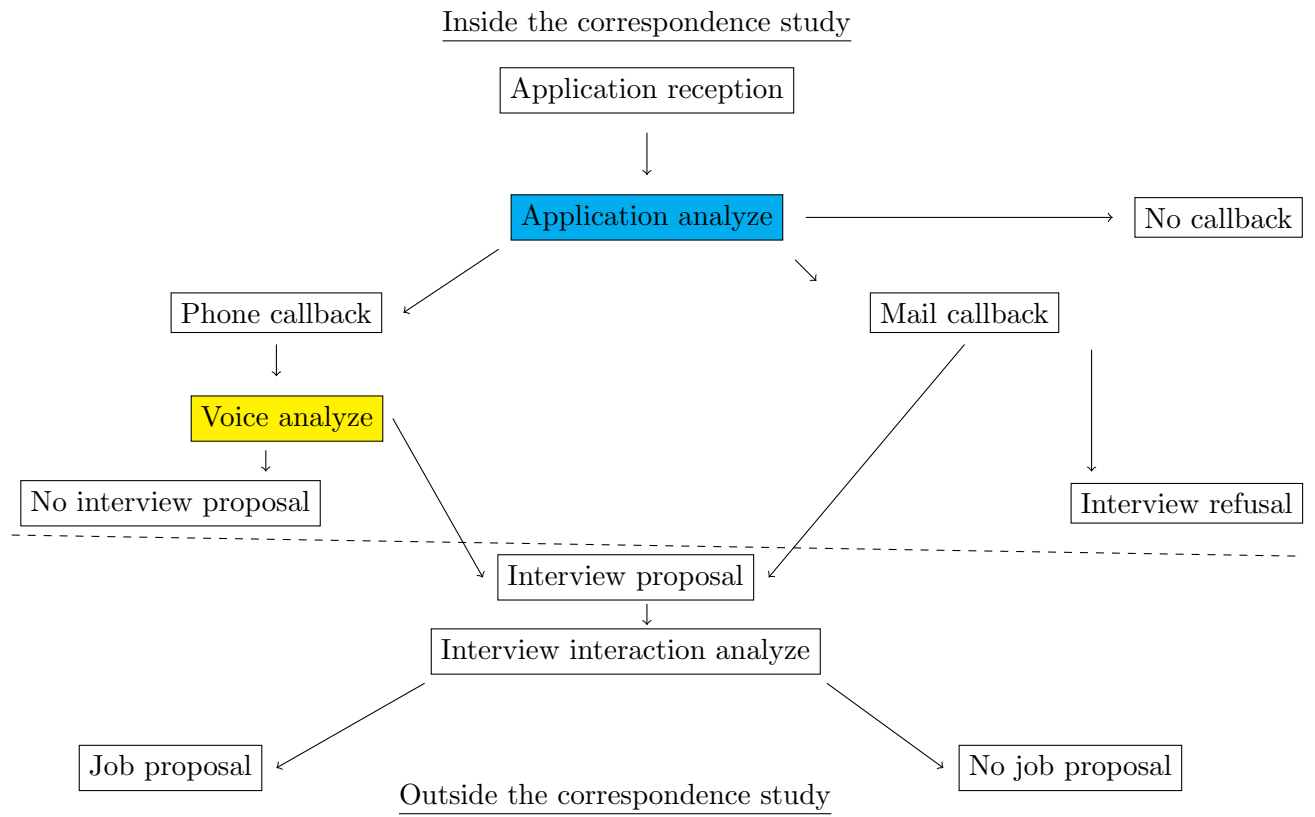
The figure highlights the *Voice analyze* step. This step may let to detect discriminations based on voice. It can be on job candidates' oral expression or accent. The present experiment will focus on accent-based discriminations.

Correspondence studies only observe employer's practices from the *job application analyze* to the interview proposal. They cannot give information on employer's hiring

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[3]Employers heard voices on the phone answering machine or by speaking with the applicant.

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Figure 1: The job hiring process

Application reception

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Application analyze → No callback

Phone callback   Mail callback

Voice analyze

No interview proposal   Interview refusal

Interview proposal

Interview interaction analyze

Job proposal   No job proposal

Outside the correspondence study

practices at the *interview interaction analyze* step. So far as I know the proper literature,

only audits let researchers to analyze further in the job hiring process.

3 Experimental Design

I consider the correspondence study at two steps of the job hiring process: the job application analyze step and the voice analyze step. At the job application analyze step employers look at resumes and cover letters. They see North-African or French "traditional" names and deprived or non-deprived area addresses. I test if they do name-based or address-based discriminations at this step. At the voice analyze step employers listen applicants' voice. They heard deprived area or French "traditional" accents. I test whether they leave more message on answering machine to applicants with a French "traditional" accent than to applicants with a deprived area accent.

3.1 Resume construction

I use four different resume templates. I find cook and waiter templates online and I slightly change them to avoid detection. An job placement counselor took care they fairly correspond to typical resume templates of job applicants. Furthermore, I investigate for second-moment statistical discrimination. I follow Neumark's response to Heckman and Siegelman criticism (2012) by using three different resume and cover letter qualities: low, medium, and high. Qualities differ with resume and cover letter contents.

Cook and waiter fictitious applicants have a cooking CAP and a catering professional baccalaureate (cook speciality for cooks and service and marketing for waiters). Following advices from the job placement counselor, I postulate that working experiences are important for employers. This point is the sharpest to compare the quality of an job

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application to others. High-level cooks and waiters worked in four restaurants. It corresponds to a total of either eighty-four, eighty-two or eighty worked months for cooks and eighty-one, eighty-two or eighty-four worked months for waiters. They have always been hired until the end of their last workplace. Medium quality applicants worked in four restaurants too. However, cooks presents a total of sixty-nine, sixty-eight, sixty-seven or sixty-five worked hours and waiters a total of seventy-four, seventy-two, seventy or sixty-eight worked months. Medium-quality jobseekers have periods without a job. Low-level applicants only show three working places spreading over either sixty-nine or sixty-eight worked months for cooks and sixty-two or sixty-one worked months for waiters. They present the longest unemployment periods.

I assign several ages to applicants because it may be seen as a signal of how "mature" is the candidate for employers. They may think, ceteris paribus, younger applicants have been more serious regarding their study and occupation than older applicants. High quality fictitious applicants are 21 and medium and low ones are 22 and 23.

Then I create identities. All of them have a first name and a family name. Three applicants have a French "traditional" name among the top 50 first and last names present in Marseille region.[4] All of them are male. I end up with Julien Lambert, Maxime Roux and Quentin Martin. One name has North-African descent backgrounds, Mourad Benhamoud. It is the expected discriminated name. Applicants live in Marseille and close to a subway station. Three of them leave in a district without deprived area.[5]

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[4]I take three names among the top 50 family names present in the Bouche-du-Rhône département.

[5]In order to determine whether a district has a deprived area, I use the state official name of a deprived area: the "ZUS".

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The fourth address is located in a ZUS, Frais Vallon.[6]

They detain a driving licence and they are single. They have a mobile phone number and an e-mail address (composed by the first name, the last name and sometimes a random number).[7] Their hobbies are composed of a sport and a cognitive activity.

I also use cover letters to each job offer. Cover letters with high-level candidates begin with the name of the person indicated as the provider of the job offer. Then, fictitious applicants tell to employers why they are interested by the job offer and reasons which may motivate them to hire. Also they explicitly indicate they are open to detail requests. They finish with a sentence of politeness and their names as a signature. Medium quality cover letters do not indicate the name of the job provider but only an undefined person. Moreover, they do not have a paragraph saying to employers they can ask questions. Low quality cover letters contain the same elements that the medium ones but the applicant does not indicate her first and family names at the end of the letter. Furthermore, the writing styles and length are positively correlated with the quality of cover letters.

Table 1 presents mean comparisons of employer's phone or e-mail callback between application templates by quality and occupation.[8][9] Since all difference are not statistically significant, I consider applications are similar by the occupation and the quality.

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[6]The place is well-known by local inhabitants since news sometimes relate the present drug traffics. Appendix A provides screenshots of the French Google webpage when I search for "Frais Vallon" and the webpage of the first link that Google proposes.

[7]A number may be randomly assigned by the e-mail carrier.

[8]They are considered without their discriminatory characteristics on resumes and cover letters.

[9]E-mail callbacks are employer's e-mail asking for more informations or proposing a job interview. Employer do phone callbacks with the intention to ask for more informations or to propose a job interview.

Table 1: Callback means tests of application templates by quality and occupation

Application means comparisons	Application quality		
	High	Medium	Low
	$\neq$	$\neq$	$\neq$
	Waiter		
Others vs Prenom Nom applications	-0.010	-0.007	-0.046
	(0.059)	(0.052)	(0.043)
Others vs P_NOM applications	0.051	0.007	0.015
	(0.059)	(0.052)	(0.043)
Others vs Nom applications	-0.051	0.007	0.000
	(0.059)	(0.052)	(0.043)
Others vs Nom Prenom applications	0.010	-0.007	0.031
	(0.059)	(0.052)	(0.043)
N	264	364	348
	Cook		
Others vs Prenom Nom applications	-0.021	-0.022	0.018
	(0.061)	(0.051)	(0.050)
Others vs P_NOM applications	0.021	0.051	-0.082
	(0.061)	(0.051)	(0.049)
Others vs Nom applications	0.000	-0.007	0.047
	(0.061)	(0.051)	(0.049)
Others vs Nom Prenom applications	0.000	-0.022	0.018
	(0.061)	(0.051)	(0.050)
N	260	364	372

Notes: The four different job applications distinguish themselves by the title of resume and cover letter files: Prenom Nom, P_NOM, Nom and Nom Prenom. Standard errors are in brackets. Means include employer's phone or e-mail callbacks. "Test." is the mean of employer's phone or e-mail callbacks for the treatment application. "Oth." is the mean of employer's phone or e-mail callbacks for control applications. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$.

Table 2 shows whether employers put upper or lower hiring threshold. On the waiter

job market, they hire with a lower hiring threshold. Mean differences between high and low quality applicants and between medium and low quality applicants are statistically significant at 1% level. However, on the cook job market, employers do not use hiring threshold. All mean differences between different qualities are statistically unsignificants. Besides, these results allow to check if job vacancy are high in the waiter and cook job markets. Hozler (1994) defines job vacancies as jobs "available for immediate occupancy". High job vacancies markets will drive employers to callback most of received job applications. None of employers' callback rates are above 23.3% (i.e less than a quarter of sent applications).So the two job markets do not present high job vacancies.

Table 2: Callback means tests of application qualities by occupations

Application qualities	Callback mean 1	Callback mean 2	$\neq$
	Waiter job offers		
High vs medium applications	0.220 (0.415)	0.236 (0.425)	-0.017 (0.034)
	$N = 264$	$N = 364$	
High vs low applications	0.220 (0.415)	0.138 (0.345)	0.082*** (0.031)
	$N = 264$	$N = 348$	
Medium vs low applications	0.236 (0.425)	0.138 (0.345)	0.098*** (0.029)
	$N = 364$	$N = 348$	
	Cook job offers		
High vs medium applications	0.231 (0.422)	0.225 (0.418)	0.005 (0.034)
	$N = 260$	$N = 364$	
High vs low applications	0.231 (0.422)	0.218 (0.413)	0.013 (0.034)
	$N = 260$	$N = 372$	
Medium vs low applications	0.225 (0.418)	0.218 (0.413)	0.008 (0.031)
	$N = 364$	$N = 372$	

Notes: Standard errors are in brackets. Means include employer's phone or e-mail callbacks. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$.

3.2 Randomisation Process

In order to randomize resumes, four elements stay orthogonal: the triptych experience-education-hobbies with templates, the address, the names and the phone number. I randomly generate a bank of 150 resumes and cover letters or I use a software which automatically generate applications. I also randomize e-mail messages and e-mail subjects.

Each name correspond to two e-mail addresses.[10] Resumes and cover letters incorporate one of the two inside each job offer application. One accent is linked with the same phone number. Following, Bertrand, M. and Mullainathan, S. (2004), I create non-nominative answering machine message.

4 Voice Selections

Employers must heard two different accents in answering machines: the French "standard" accent and the deprived area accent. First, I need to construct answering machine messages which integrate "sounds" distinguishing an accent. Then, I ask to 14 person to record their voice while they say the answering machine message. Second, I ask to a sample of individuals to give its opinion over voices in order to select accents for the correspondence study.

The first step is a sociolinguist who created an answering machine message. He took care of having particular "sounds" of each accents in the text. Then I asked to 14 individuals to record their voice while they read out the text. The message is the

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[10]Only one e-mail per applicant are used in the second campaign.

following:

Bonjour, vous êtes bien sur la messagerie du 04 91 01 01 01 ; je suis indisponible pour l'instant, mais laissez moi un message, et je vous rappellerai à un autre moment.[11]

Hello, you are on the answering machine of the 04 91 01 01 01; I am currently unavailable, but leave me a message, and I will call you back.

56 first year undergraduate economics and business students in Aix-Marseille University listened to the 14 voices and they had to fill questionnaires. I consider they match employer's opinion regarding voice perception since they may have job positions close enough to employers.

Questionnaires are composed of questions which ask to students their perception about each voice. The first question is they have to categorize voices. Three main categories are present. The first category asks participants to tell the "Sounding-region" of what they heard. The second category reveals their "Social background-sounding" feelings. The last category shows how they consider voices by their "Quality-sounding". Students indicate it from a meliorative adjectives list.[12] Categories were randomly assigned among questionnaire to avoid ranking bias. Students had to choose at most three characteristics describing voices among the three main categories. I only look at stu-

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[11]This phone number does not exist.
[12]Appendix B shows questionnaires.

dent's responses in the "Social background-sounding" category. The "Quality-sounding" and the "Sounding-region" categories were useful to trouble student's opinion on the aim of the experiment and to control that voices do not convey other signals.

Furthermore, questionnaires include a free-expression category. Students had the opportunity to express their opinion over voices. Nobody wrote down voices are non-understandable. In case of accent-based discrimination, the hypothesis that employers do not understand fictitious applicants is no longer relevant.

Figure 1 displays voices according to their "standard"-sounding and their deprived-area sounding. Voice 1 fits the deprived area accent since it is located a the top-left part of the graphical representation . Voices 4, 13 and 14 are on the opposite part of the figure. They stands as the French "standard" accents.

Then we create four different but similar answering machine messages. The sociolinguist decomposed the original message in four parts. He slightly changed the content of some of them or he switched two or three of them in order to have different but similar answering machine messages. Thus we would limit the risk of employers' detection of the experiment when they heard messages in answering machine.[13] Finally, each owners of voices 1, 4, 13 and 14 randomly receives one of the four messages and they speak out in answering machines of mobile phones.

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[13]Answering machine messages are in Appendice B.

Figure 2: Voice perceptions with respect to the "Standard" and "deprived area"-soundness of voices from a sample of 56 first year economics and business students at Aix-Marseille University.
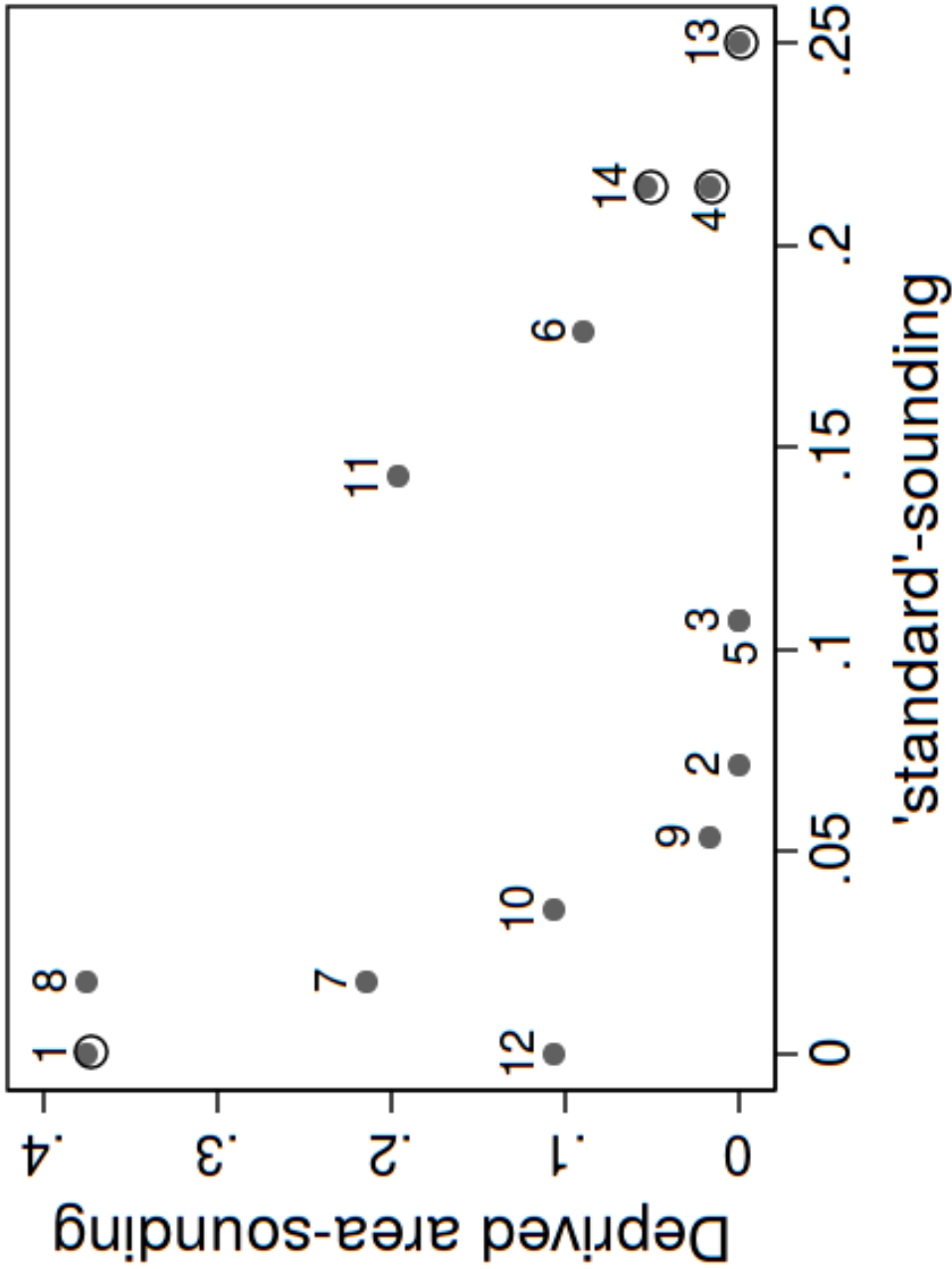
Note: circled voices are selected accents for the correspondence study.

5 The reply process and employers' responses report

I replied to cook and waiter on-line job offers located in the Bouches-du-Rhône département between April 29, 2016 and November, 22, 2016 and from May 25 2017 to 6 july 2017. I mostly use the website Pôle-emploi.fr and I only reply to job offers with a contact e-mail[14].

For each job offer, the sending order of fictitious candidates is randomly selected and two job applications are at least separated by an one-hour gap. The sending procedure last at most two days for one job offer. The correspondence study spreads over X job offers which correspond to 249 cook and X waiter job offers. Overall, I sent X job applications.

I reported every employer's callback or e-mail and job offer's characteristics (i.e type of contract, department, wage and working hours).

Table 3 shows distributions of (expected) discriminated characteristics at the two steps of the job hiring process from employers' glance. It does not present the deprived area accent distribution at the job application analyze since employers cannot detect it at this step. The North-African name and the deprived area address are equally distributed over all job applications (each characteristic is in 25% of job applications). Then the table exhibits distributions of the deprived area accent, the North-African name and the deprived area address at the voice analyze step. They are not equally distributed among job applicants who receive a phone callback because employers callback applicants

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[14]I also took into account job offers from keljob.fr, leboncoin.fr, vivastreet.fr and other punctual websites

without considering the accent. They end up to contact at the voice analyze step less than 25% of job applicants with the deprived area accent. Distributions of the North-African name and the deprived area address without the accent at the voice analyze step are not present because employers no longer consider them to decide to hire.

Table 4 exhibits descriptive statistics on job offers by where workers are located in the restaurant: in the room or in the kitchen (cooking job offers). The majority of job offers in both jobs are short-term contracts. Besides, waiter and cook jobs take the highest shares of all job offers. Together they represent 91.17% of jobs and respectively 48.68% and 42.49% of room and cooking job offers. Assistant chef job offers are the third most present job offers. They represent up to 10.64% of all job offers among cooking job offers.However, unless I specify it, I consider all cooking or room jobs as cook or waiter jobs.

Table 3: Distribution of (expected) discriminated characteristics at the job applications analyze step

(Expected) discriminated characteristic(s)	% over all job applications
At the job application analyze step	
North-African name only	19.42
Deprived area address only	19.42
North-African name × deprived area address	5.58
Number of job application sent	1972
At the voice analyze step	
Deprived area accent only	17.74
Deprived area accent × North-African name	4.89
Deprived area accent × deprived area address	2.45
Number of employers phone callback	327

Table 4: Descriptives statistics on job offer characteristics

Characteristics	Both occupations	Room job offers	Cooking job offers
Type of contract			
Long-term contract	45.23	43.85	46.59
Short-term contract	54.77	56.15	53.41
Type of job			
Waiter	48.68	98.36	0.00
Headwaiter	0.81	1.64	0.00
Cook	42.49	0.00	84.14
Chef de partie	0.81	0.00	1.61
Assistant Chef	5.38	0.00	10.64
Cook chef	1.83	0.00	3.61
N	493	244	249

Notes: values are in percentages.

6 Results

Distribution of phone callback per employer

In order to figure out the number of relevant observations at the two steps of the job hring process I present employer callbacks after the job application analyze and the number of employer left messages on answering machines I collect after the voice analyze

step.

Table 5 gives employer's callback after they perform the job application analyze. Employers who never do positive callbacks or who always send positive callbacks do not show name-or-address-based discriminations. 8.92% of e-mails callbacks and 19.67% of phone callbacks may show discriminations.

This table cannot let to determine accent-based discriminations since it does not exhibit employer left messages conditional on a phone callback.

Table 5: Distribution of e-mail positive or phone callbacks by employer

Callback distribution	0	1	2	3	4	Total
E-mail callback						
Both occupations						
Number of job offers	443	12	13	19	6	493
% among job offers	89.86	2.43	2.64	3.85	1.22	100
Waiter job offers						
Number of job offers	214	8	8	12	2	244
% among job offers	87.70	3.28	3.28	4.92	0.82	100
Cook job offers						
Number of job offers	229	4	5	7	4	249
% among job offers	91.97	1.61	2.00	2.81	1.61	100
Phone callback						
Both occupations						
Number of job offers	367	29	22	46	29	493
% among job offers	74.45	5.88	4.46	9.33	5.88	100
Waiter job offers						
Number of job offers	186	17	12	19	10	244
% among job offers	76.23	6.96	4.92	7.79	4.10	100
Cook job offers						
Number of job offers	181	12	10	27	19	249
% among job offers	72.69	4.82	4.02	10.84	7.63	100

Figures and table from 3 to 6 detail employers' left messages conditional on phone callbacks. The first three figures display employer left message-to-phone callback ratios.

A ratio equals to zero means employers never leave a message when they do phone callback. A ratio with a value equal to one means employers always leave a message when they do phone callbacks. Employers who always leave a phone message cannot show accen-based discriminations. Nevertheless, employers who never leave a phone message may do accent-based discriminations if they significantly do not leave message when they heard a deprived area accent.

Figures from 3 to 5 describes left message-to-phone callback ratio distributions by values. Figures 3 show employers are 11.32% to not have the same behavior when they heard answering machine messages. They are 10.00% in the waiter job market (figure 4) and they are 8.82% in the cook job market.

Table 6 displays the number of employers who do not leave an answering machine message when they do a phone callback by job applicant's accent and the number of called job applicants. Employers are 8 not leave an answering machine message when they do a phone call. They are 6 to only phone call a job applicant and 2 to phone call three job applicants. All of them do a phone callback to a job applicant with a deprived area accent.

The 12 employers who do not act equally towards all job applicants and the 6 ones who did not leave message when they only phone call job applicants with a deprived area accent are supposed to lead to accent-based discriminations.
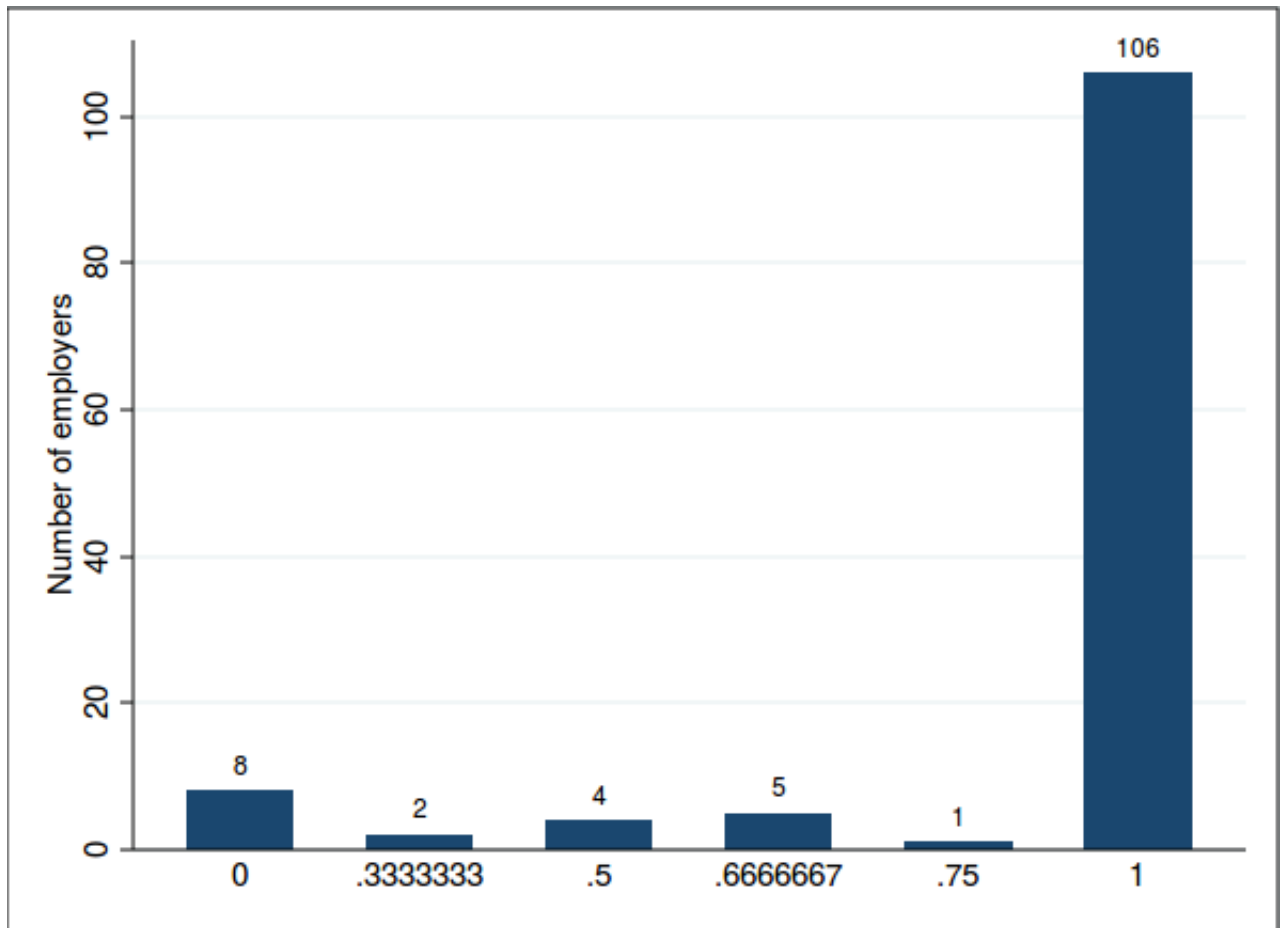
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Figure 3: Number of employers by each value of the left message-to-phone callback ratio on both job offers
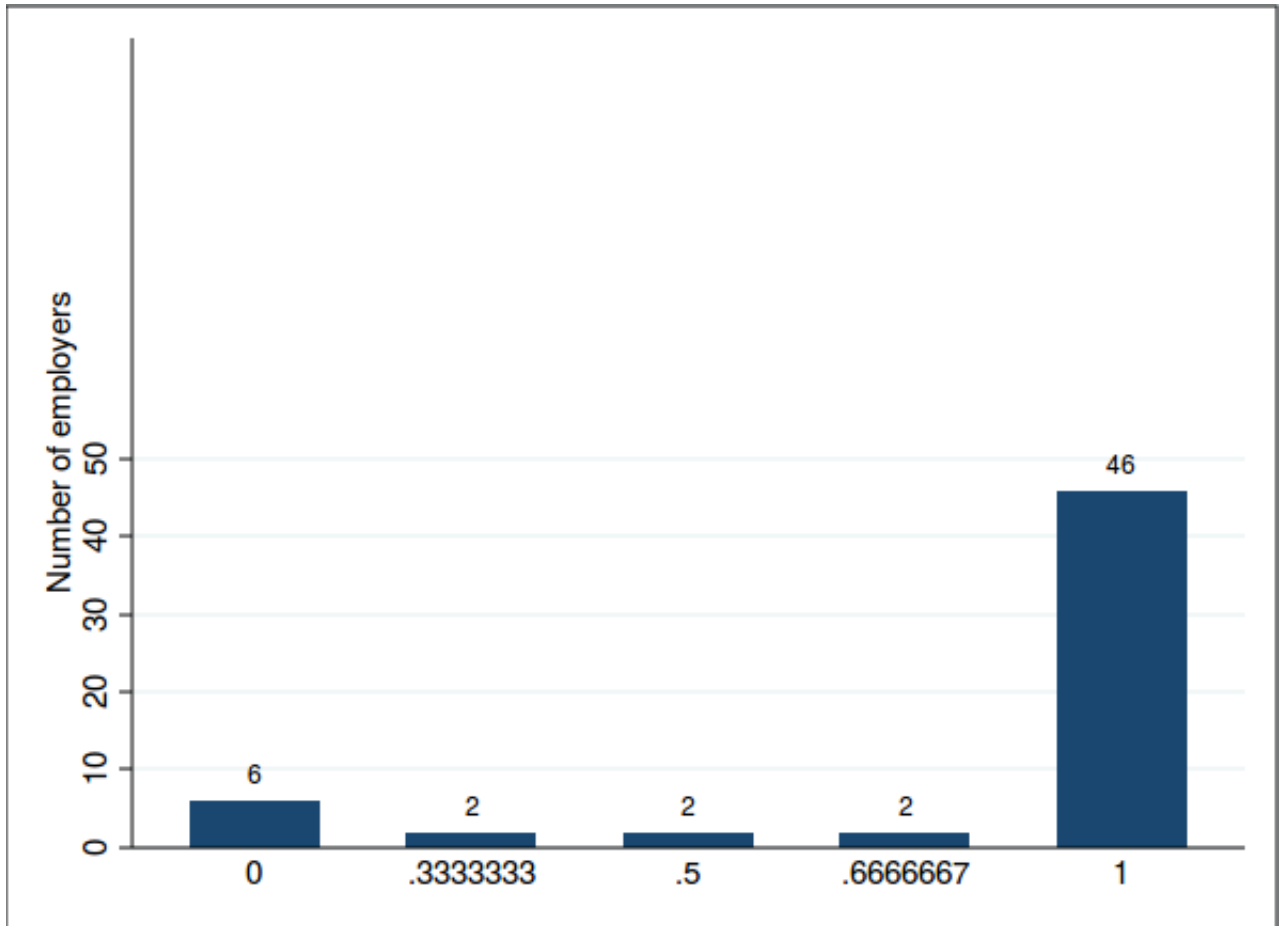
Figure 4: Number of employers by each value of the left message-to-phone callback ratio on waiter job offers

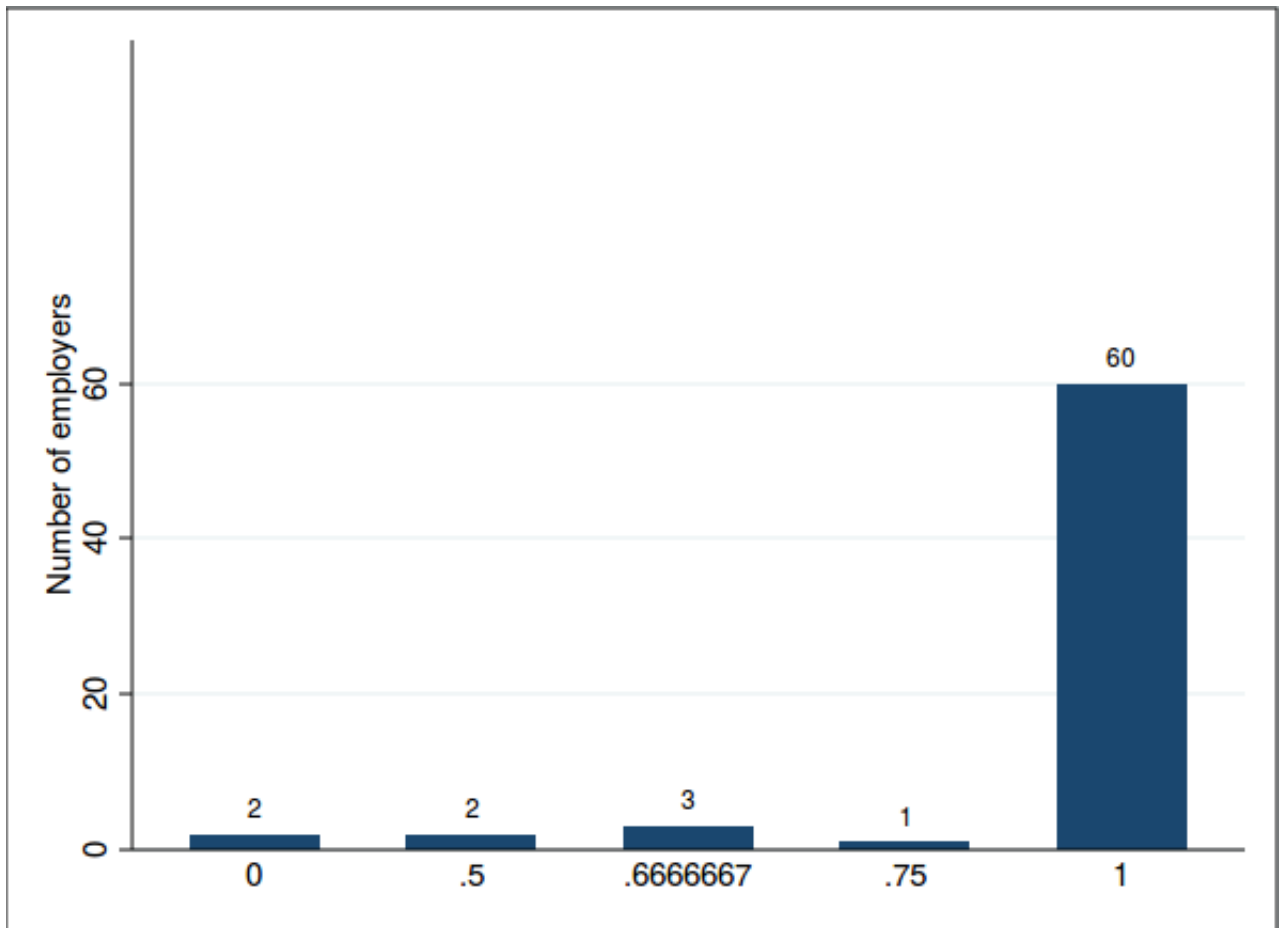Figure 5: Number of employers by each value of the left message-to-phone callback ratio on cook job offers

Table 6: Number of employers doing a phone callback without leaving an answering machine message

Type of accent	Number of phone callbacks				Total
	1	2	3	4	
Deprived area accent	6	0	2	0	8
French "standard" accent	0	0	0	0	0

Accent-based discrimination occurs under two conditions

Table 6 exhibits means of employer's message on answering machine when they do a phone call. First row shows that the effect of the deprived area accent to get an inteview is negative with the full sample. The difference appears in column three and it takes the value -0.077 significant at the 5% level. However, the sample restriction to fictitious applicants with either the deprived accent or without expected disfavored traits presents no employer's treatment difference between the two groups. In row 5 observations are restricted to not living in a deprived area. The role of having a voice from deprived areas is a handicap. The left message on answering machine differences between applicants with the two accent is -0.069 (p-value<0.05). However, fallacious candidates living in a deprived area and speaking with a deprived accent do not suffer from less employer's message on answering machine than their counterparts with the "standard" accent. When the sample is restricted to applicants with the North-African name, owners of a deprived area-sounding voice undergo less employer's message than their counterparts. The mean difference is -16.3% at the 10% significance level. The impact of this accent no longer holds when candidates have a French "traditional" name.

Table 7: Means of employer's message on answering machine conditional on a phone callback

Compared accents	Deprived area accent	"Standard" accent	Difference
Sample restriction			
All sample	0.857 (0.352)	0.934 (0.249)	-0.077^{**} (0.035)
N=327	*N=84*	*N=243*	
Without others expected discr. charact.	0.879 (0.329)	0.935 (0.246)	-0.056 (0.042)
N=213	*N=58*	*N=155*	
On the address			
Do not live in deprived area	0.865 (0.344)	0.934 (0.249)	-0.069^{*} (0.039)
N=255	*N=74*	*N=181*	
Live in deprived area	0.800 (0.422)	0.935 (0.248)	-0.135 (0.094)
N=72	*N=10*	*N=62*	
On the name			
Do not have a North-African name	0.879 (0.329)	0.933 (0.251)	-0.054 (0.038)
N=274	*N=65*	*N=209*	
Have a North-African name	0.778 (0.428)	0.941 (0.239)	-0.163^{*} (0.092)
N=52	*N=18*	*N=34*	

Notes: Without others expected discr. charact.: Without others expected discriminated. characteristics. Data with applicants living inside deprived areas or having a North-African name are not included. Means and differences are in percentages. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Standard deviations and standard errors are in brackets.

Table 7 decomposes results by occupations. Job applicants with the deprived area accent obtain less employer's message conditional on a phone callback than their coun-

Table 8: Mean of employer's message on answering machine conditional on a phone callback

Sample restriction	Deprived area accent	"Standard" accent	Difference
Only cook applicants	0.896 (0.309)	0.950 (0.218)	-0.055 (0.041)
N=189	N=48	N = 141	
Only waiter applicants	0.806 (0.401)	0.912 (0.285)	−0.106* (0.062)
N=138	N=36	N=102	

*: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Standard deviations and standard errors are in brackets.

terparts with the French "standard" accent only on the waiter job market. The mean difference is -0.106 (with $p < 0.1$). Employers do not discriminate deprived area accent. They hire less candidates with this accent because either customers discriminate the deprived area accent or employers think customers must discriminate it.

Name-based discrimination at the job application analyze step

Table 8 reports employer's behaviors at the job application analyze step. The first row proves that being called Mourad Benhamoud is a handicap to get a job. The mean gap with their counterparts carrying a French "traditional" name is -10.4% and significant at the 1% level. However, candidates living inside deprived areas seem not less advantaged than those living outside these places. There is a non-significant difference of -3.56%. Applicants who cumulate a North-African names and living in deprived areas are disfavored too. the table reveals a gap of -12.6% at the 1% in levels. The last row shows candidates do not suffer employers' differential treatment by the accent. Indeed,

employers are not supposed to know applicants' accent by reading applications.

Table 9: Mean of employer's phone or e-mail callback

Compared resumes	"Disfavored" characteristic	"Favored" chacteristic	Difference
Sample restriction			
Without expect. discr. address	0.141 (0.348)	0.245 (0.430)	−0.104*** (0.024)
N=1479	N=383	N=1096	
Without expect. discr. name	0.209 (0.407)	0.245 (0.430)	−0.036 (0.025)
N=1479	N=383	N=1096	
With expect. discr. name and address	0.118 (0.324)	0.245 (0.430)	−0.126*** (0.042)
N=1206	N=110	N=1096	
Without expect. discr. name and address	0.209 (0.407)	0.211 (0.408)	-0.002 (0.021)
N=1972	N=493	N=1479	

Notes: *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Expect. discr. means expected discriminated. Standard deviations and standard errors are in brackets.

7 Discussion

The section checks robustness of results. First, It shows that quality does not remove accent-based discriminations. Second, second-moment statistical discrimination does not seem to exist on the waiter and cook job markets. Third, the sending order does not influence the odd to get a callback.

I also propose to distinguish *strong* and *weak* discriminated traits. They differentiate themselves by whether they need to cumulate itself with another discriminated traits to

infer discrimination.

Finally, I go further in details on the characteristics of restaurants.

To control for the application quality does not undermine results

Table 10: Probit of employer's message on answering machine conditional on a phone callback

	Both		Cooks		Waiters	
	(1)	(2)	(3)	(4)	(5)	(6)
Accent	−0.077*	-0.050	-0.050	-0.038	−0.107*	-0.074
	(0.041)	(0.045)	(0.045)	(0.051)	(0.069)	(0.074)
Accent × name		-0.078		-0.060		-0.154
		(0.091)		(0.096)		(0.209)
Accent × address		-0.048		-		-0.037
		(0.103)		-		(0.144)
quality	0.001	0.003	0.046**	0.05**	−0.057*	-0.053
	(0.019)	(0.019)	(0.020)	(0.021)	(0.033)	(0.034)
LR test	4.29	5.67	6.67**	8.08**	5.64*	6.81
N	327	327	189	185	138	138

Notes: *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Standard deviations and standard errors are in brackets.

Table 11: Probit of employer's phone callback or positive e-mail

	Both		Cooks		Waiters	
	(1)	(2)	(3)	(4)	(5)	(6)
Name	−0.100***	−0.100***	−0.080***	−0.060*	−0.120***	−0.141***
	(0.019)	(0.021)	(0.028)	(0.032)	(0.025)	(0.027)
Address	-0.032	-0.031	-0.025	-0.004	-0.038	−0.058*
	(0.020)	(0.023)	(0.030)	(0.034)	(0.028)	(0.030)
Address × Name	-	-0.004	-	−0.102*	-	0.131
	-	(0.055)	-	(0.060)	-	(0.095)
Accent	0.002	0.002	0.000	-0.000	0.003	0.003
	(0.021)	(0.021)	(0.031)	(0.031)	(0.029)	(0.029)
Quality	0.025**	0.025**	0.007	0.008	0.044***	0.043***
	(0.012)	(0.012)	(0.017)	(0.017)	(0.016)	(0.016)
LR test	30.58***	30.59***	7.87*	9.97*	27.96***	30.28***
N	1972	1972	996	996	976	976

Notes: *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Standard deviations and standard errors are in brackets.

Second-moment statistical discrimination does exist with our data

Table 12: Heteroskedastic probit of employer's phone callback or positive e-mail on both occupations

	Accent		Accent × name		Accent × address	
	(1)	(2)	(1)	(2)	(1)	(2)
Hetprobit model	−0.039	0.	-	0.	-	0.
	(0.025)	(0.)	-	(0.)	-	(0.)
Effect through level	-0.007	0.	-	0.	-	0.
	(0.012)	(0.)	-	(.)	-	(.)
Effect through variance	−0.032	0.	-	0.	-	0.
	(0.028)	(0.)	-	(0.)	-	(.)
LR test of heteroskedasticity	11.44***	0.	-	0.	-	0.
N	*327*					

Notes: *: p < 0.1, **: p < 0.05, ***: p < 0.01. Standard deviations and standard errors are in brackets.

Table 13: Heteroskedastic probit of employer's phone callback or positive e-mail on both jobs

	Name		Address		Name × address	
	(1)	(2)	(1)	(2)	(1)	(2)
Hetprobit model	−0.107***	−0.072	−0.022	−0.166	-	0.148
	(0.027)	(0.149)	(0.047)	(0.537)	-	(0.632)
Effect through level	0.011	−0.052	−0.058	-0.535	-	0.495
	(0.036)	(0.208)	(0.214)	(1.490)	-	(1.650)
Effect through variance	−0.12***	-0.020	0.036	0.369	-	-0.347
	(0.038)	(0.257)	(0.174)	(0.958)	-	(1.101)
LR test of heteroskedasticity	4.55	0.630	4.55	0.630	4.55	0.630
N	1972	1972	1972	1972	1972	1972

Notes: *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$. Standard deviations and standard errors are in brackets.

The sending order does not influence employer callbacks

Table 14: Employer callback means by the sending order

Considered Sending orders	Callback mean of:		Difference
	The tested sending order	Other sending orders	
Sending order 1 vs other sending orders			
Sending order 2 vs other sending orders			
Sending order 3 vs other sending orders			

Strong and *weak* discriminated characteristics

I observe the deprived area accent is discriminated only for applicants who cumulate it with a North-African name. I also conclude that applicants with a deprived area address are discriminated when they cumulate a deprived area address with a North-African name. At the application analyze step, table 9 shows applicants with a deprived area address and a North-African name receive less employers' callback than applicants with only a deprived area address. The callback mean difference is -0.091 ($p < 0.05$).

I propose *strong* and *weak* discriminated characteristics to understand that I only observe accent-based and address-based discriminations with a discriminated name. *Strong* discriminated characteristics are enough alone to show discrimination. The name is included in this category. *Weak* discriminated characteristics have to be cumulated with a *strong* discriminated one to lead to discrimination. In this experiment, the accent and the address stand among them.[15]

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[15]The address can be a *strong* discriminated trait. Atkinson and Kintrea (2001) show it with a study

Table 15: Employer callback mean comparison between applicants with a North-African name or a deprived area address

		North-African name		
		With	Without	Difference
Deprived area address	With	0.118 (0.324) *N = 110*	0.209 (0.407) *N = 383*	−0.091** (0.042)
	Without	0.141 (0.348) *N = 383*	0.245 (0.430) *N = 1096*	−0.104*** (0.024)
	Difference	−0.023 (0.037)	−0.036 (0.025)	

*Notes: *: p < 0.1, **: p < 0.05, ***: p < 0.01. Expect. discr. means expected discriminated. Standard deviations and standard errors are in brackets.*

8 Conclusion

Observing accent-based discrimination at the voice analyze step of the job hiring process show correspondence studies lead to detect discriminations not only at the job application analyze step but at the voice analyze step too. The study shows applicants who cumulate deprived area accent and North-African name get less employer's left message on their answering machine than other applicants. However, accent-based discriminations are from customers since they are only detected on the waiter job market (and not on the cook job market). Moreover, accent-based discriminations are present at the job

on deprived areas in Edimburgh and Glasgow.

application analyze step. Nevertheless, accent-based and name-based discriminations cannot be compared since they are two discriminations which occur at two different step of the job hiring process.

Finally, accent-based discrimination may be stronger at the interview interaction analysis step. Two interpretations emerge to explain why employers might discriminate less accent at the voice analyze step than at the interview interaction analyze step. First, employers are surprised when they heard deprived area-sounding voices and they keep proposing a job interview. Second, the cost of doing callback and not leaving a message on the answering machine is higher than the one to do a callback and proposing a job interview. Hence, employers will discriminate later at the job hiring process. Audits appear as the sole method to tackle the issue in spite of its limits (see Heckman and Siegelman, 1993) unless an innovative field experiment is designed.

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9   Appendix

9.1   Appendice A

9.2   Appendice B

La voix que vous entendez vous inspire que la personne est… (trois choix maximums par voix) :

	rapide	sympathique	fiable	sérieuse	du Nord	du Sud	sans marque régionale	des « banlieues »	d'un milieu favorisé	d'un milieu défavorisé	autre(s) (précisez)
Voix 1											
Voix 2											
Voix 3											
Voix 4											
Voix 5											
Voix 6											
Voix 7											
Voix 8											
Voix 9											
Voix 10											
Voix 11											
Voix 12											
Voix 13											
Voix 14											
Voix 15											

Figure 3 : Questionnaire students had to fill to indicate their perceptions on voices 1 to 14.

9.3   Appendice C

The three messages I used for the answering machines are the following:

Bonjour, vous êtes bien sur la messagerie du X X X X X ; je suis indisponible pour l'instant, mais laissez moi un message, et je vous rappellerai à un autre moment.

Hello, you are on the answering machine of the X X X X X; I am currently unavailable, but leave me a message, and I will call you back at a other moment.

Bonjour, vous êtes bien sur la messagerie du X X X X X ; je ne suis pas disponible pour l'instant, merci de me laisser un message, je vous recontacterai à un autre moment.

Hello, you are on the answering machine of the X X X X X; I am currently not available, thanks to leave me a message, I will contact you back at a other moment..

Bonjour, vous êtes bien sur la messagerie du X X X X X ; je suis indisponible pour le moment, mais laissez moi un message, et je vous rappellerai sans faute.

Hello, you are on the answering machine of the X X X X X; I am currently unavailable, but leave me a message, and I will call you back without any doubt.

Bonjour, vous êtes bien sur la messagerie du X X X X X ; je suis momentanément indisponible, mais merci de me laisser un message, je vous recontacterai sans faute.

Hello, you are on the answering machine of the X X X X X; I am momentarily

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unavailable, but thanks to leave me a message, I will contact you back without any doubt.

9.4 Appendix D

Table 16: Differences by qualities for cooks and waiters

Quality	High	Medium	Low
<u>Both</u>			
Number of $\neq$ experiences	4	4	3
Age	21	22	23
<u>Cooks</u>			
Total worked hours	81 to 84	65 to 69	68 to 69
Contact means	0.234	0.219	0.214
	(0.422)	(0.418)	(0.413)
<u>Waiters</u>			
Total worked hours	81 to 84	68 to 74	61 to 63
Contact means	0.216	0.242	0.144
	(0.415)	(0.425)	(0.345)