TEPP WORKING PAPER

N° 2019 - 06

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www.tepp.eu

TEPP - Institute for Labor Studies and Public Policies
TEPP - Travail, Emploi et Politiques Publiques - FR CNRS 3435

ISSN 2110-5472

Counterproductive Hiring Discrimination Against Women: Evidence From a French Correspondence Test*

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Abstract. Stating one's automobile and motorcycle licence in a resume sends a signal of strong mobility, which should increase the chances of employment in areas of high traffic congestion. However, we have found that this signal can lead to a counterproductive rejection of female candidates, since their highest commuting mobility corresponds to their lowest hiring rate.

Keywords: hiring, mobility, gender, discrimination.
JEL: C93, J16, J24, J71.

*This research was conducted with support from the *Agence nationale pour la cohésion sociale et l'égalité des chances*. We thank participants at the GAINS seminar (Université du Maine), EPEE seminar (Université Paris-Saclay UEVE), the annual conference of the French Economic Association, and several anonymous referees for their useful suggestions and comments. Corresponding author: Emmanuel Duguet, Université Paris Est, 61 avenue du General de Gaulle, 94010 Creteil Cedex, France. emmanuel.duguet@u-pec.fr

Introduction

Mobility is an individual characteristic that is generally valued by employers. This fact is confirmed by a large number of applied studies that have attempted to measure the impact of driver's licenses and privately owned vehicles on employment access (Raphael and Rice [2002], Ong [2002], Gurley and Bruce [2005], Ong and Miller [2005]). It would therefore seem relevant to state one's ownership of a driver's licence or vehicle in employment resumes.

But it may not be that simple. The effect of owning a driving licence depends on the class of the licence, as well as on the driver's gender. We have found that, for men, owning a motorcycle licence does not significantly increase the chances of obtaining a job interview. For women, stating one's ownership of a motorcycle licence in a resume will, in fact, decrease their chances of obtaining a job interview.

Complex forms of conditional discrimination exist, all of which involve a number of dimensions. Female motorcyclists who encounter difficulties in employment access are a good example of this. This paper will examine certain effects that have not yet been observed in the literature. More specifically, it will consider the intersectional effects of the gender and license class stated in the resume. The first part of this study will explain the data collection framework. The second part will present the methodology and shows the interest of stochastic dominance and of components' models for the measurement of discrimination. The third part will provide comments on the results.

1. Study Design

The aim of the correspondence tests is to measure potential discriminations in hiring. This methodology has been in use since the 1970s to assess hiring discrimination, particularly between women and men (Riach and Rich, 2002; Rich, 2014). Previous studies have found that women suffer hiring discrimination in high-paying leadership positions (Firth, 1982; Neumark et al., 1996; Petit, 2007). These studies also identified occupational discrimination with regard to gender overrepresentation. Discrimination against men appears in positions traditionally held by women (secretaries, for example). Similarly, discrimination against women appears in positions traditionally held by men (mechanics, for example), regardless of the personality traits exhibited by the female candidate. Weichselbaumer (2004) compared employment access for three fictitious candidates: one man and two women. The first woman stated "female" hobbies, and the second woman stated "male" hobbies.[1] Using incomplete information regarding the productivity of the candidates during the hiring process, the recruiter was expected to favour the women exhibiting "male" characteristics, when such characteristics were considered necessary for the job. The author found that both women were treated equally, while the man was preferred over both women.

This section describes our data collection protocol. Four similar applications for a skilled and

[1] "The manliness of the masculine female was indicated by her good but masculine looks, the short, dark hair, the broad shoulders and the business jacket. Her manly hobbies such as rock-climbing, canoeing, playing drums, and motorcycling, as well as the plain style of her resume's layout, served as further signals for her gender type. The feminine applicant, alternatively, appeared much more playful and traditionally feminine in her looks and leisure time activities as well in the layout of her resume. Her photograph indicates long, blond hair and flowing clothes, she enjoys drawing as well as designing and making clothes. While her colleague gained international experience while travelling through Australia with her motorcycle, the feminine woman used to work in the United States as an au pair." (Weichselbaumer, 2004, pp. 169-170).

high-demand profession were sent in response to 300 job postings. Two involved a man and a woman who live in Paris and use public transportation, and two more involved a man and a woman who live in Paris and hold both a motorcycle license and an automobile licence. The four applications, identical in every other aspect, were sent in response to a single job posting seeking a Master's Degree in the greater Paris area (Île-de-France). We selected the profession of Management Controller, normally considered a "feminine" profession. For the most part, Management Controllers require a Master's Degree. Even if the profession is considered less "feminine" than accounting professions, Management Controller positions are nevertheless predominantly held by salaried women, particularly within banks and insurance companies, which tend to employ the largest number of these professionals.

Choice of high-demand profession and resume design. In order to limit the number of refusals by employers, we chose a skilled and labour-intensive profession. The Management Controller profession was chosen due to its high rate of availability for job seekers. This methodological precaution proved especially useful in the context of an economic recession[2]. However, choosing an occupation with a high tightness indicator can influence discrimination measurements. When Baert et al. (2013) studied ethnic discrimination from Belgian data collected between 2011 and 2012, they found that the magnitude of hiring discrimination is inversely related to labour market tightness. This result can be explained by the fact that discrimination is more costly to an employer when few candidates are available, since the position will remain vacant for a longer period of time.

The importance of mobility stems from the fact that Management Controllers are required to perform on-site customer or subsidiary-related audits and control assignments outside of their company's offices. This requires mobility beyond the daily commutes from home to office, and beyond the inherent commuting difficulties that all Parisian employees face. We included the motorcycle licence for this reason. Motorcycles provide mobility and the ability to avoid transportation strikes. Some job postings explicitly indicated a need for mobility; these postings were treated separately.

Management Controller is a skilled profession for which candidates currently require a Master's Degree. Our candidates correspond to this profile. It is also a profession in which women make up the majority of those hired and, increasingly, make up a predominant portion of the company's stock of employees (this is not the case for independent accountants, who are predominantly male). The profession's high rate of feminization is confirmed by the aggregated statistics in both Management Controller and Audit Accountant professions, and by more detailed statistics on specific sectors, such as banking and insurance. According to a survey conducted in 2006 (*Observatoire de l'évolution des metiers de l'assurance*), women represented 66.7% of workers and 52.7% of executive positions in the overall accounting occupations. For management control occupations, women represented 52.1% across all positions and 49.7% of executives.

The applications that were sent for the same job postings were similar in terms of their

[2]According to the French employment agency *Pole Emploi*, Management Controller occupations in the Paris area are characterized by a large labour demand (3,327 jobs between March, 2009, and March, 2010), and a large labour supply (777 applications by jobless workers in the same period). The labour market tightness for this occupation is 777/3327=0.23, higher than many other sectors. For instance, over the same period in Paris, marketing occupations had a tightness of 724/7026=0.10, or half the tightness of Management Controller occupations.

productive characteristics[3]. They were identical in terms of diplomas, career paths and professional experience from both a qualitative and quantitative perspective. The candidates held identical computer and language skills. None of them listed a period of prior unemployment, and all were employed when applying for the job. Moreover, these applications appeared adequate and credible with regard to the targeted professions. Upon request, they were appraised and validated by competent professionals in the sector. Their expertise ensured that all applications were similar, realistic, and relevant.

Since the applications were sent simultaneously, some differences were introduced. These differences involved resume presentation, or font type, font size and lay-out, but the content standards remained. The candidates indicated work experience acquired in actual companies which, while different, were comparable in terms activities, size and market share. Applicant hobbies also varied but remained impersonal (sports, cinema, reading, music, etc.). The cover letters were very specific and used different writing styles but remained typical overall. A postal address, a cell phone number and an e-mail address were assigned to each fictitious candidate.

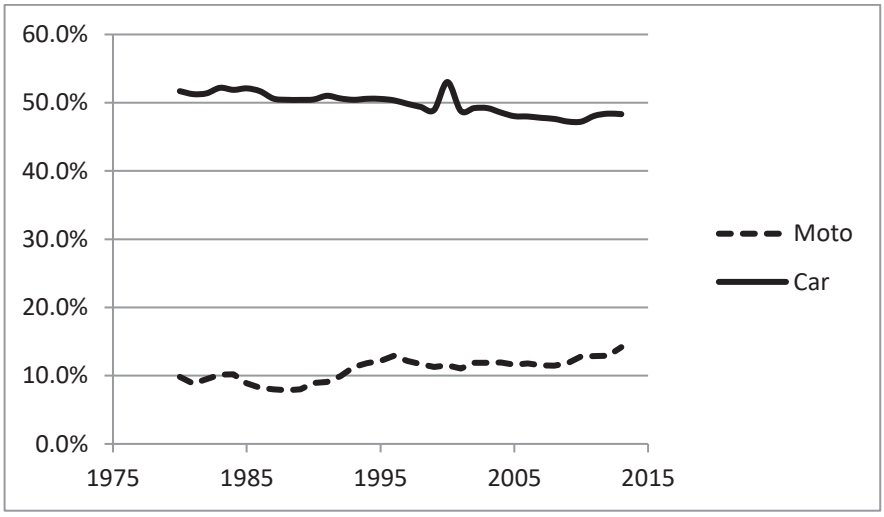
To prevent a particular candidate's style and content from systematically influencing the choice of firms (despite the precautions taken during the application design), we developed a system of randomized resume permutation regarding the identities of the fictitious candidates. A similar procedure involving the resume and cover letter was used alternatively for different candidate identities while sending in their applications to different companies. Applications for the same job offer were sent a few minutes apart on the day the offer was posted on the internet. Applications were sent from the e-mail addresses of each specific candidate. A positive response consisted of an interview invitation from the recruiter, or a request for more information on the candidate's current job situation and qualifications. In contrast, a negative response consisted of a formal rejection of the application from the recruiter, or a failure to respond.

Job candidate profiles. Four identical resumes were drafted for young Management Controllers with Master's Degree. They varied only by gender and mobility, as indicated by the explicit mention of a motorcycle and automobile licence in the resume. The four fictitious applicants were given widely used and traditional French names and surnames to prevent other forms of discrimination. Their first names were the most commonly used in 1980, their year of birth. They all lived in Paris' 11th and 12th districts. The resumes of two candidates (one male and one female) explicitly indicated a driver's licence valid for both motorcycles and automobiles. This suggests intra-regional mobility, irrespective of distances, traffic congestion and interruptions in the public transportation network. This is of particular importance due to frequent labour strikes in France. Workers with a motorcycle licence are not impacted from interruptions in public transportation, or the traffic congestion that results from these interruptions. This benefits motorcycle licence owners, since they offer the best possible mobility, greater than that of car owners. The resumes of the other two candidates (one male and one female) did not mention any capacity for independent mobility, nor did they indicate ownership of any class of driver's licence. This would suggest that, given their city of residence, they were forced to depend on the public transportation system. The resumes of all four candidates indicated their age (28), nationality (French), and marital status

[3] The correspondence test was limited to employment offers made through job postings. Other networks are likely to influence the hiring process, but these do not seem to be incompatible with job postings. According to APEC (Association for the Employment of Executives), 81% of recruitments in 2009 were made through job postings, 15 points above the 2006 rate.

(single and childless). Figure I shows the share of women who own these driver's licences: their share of automobile licences is roughly 50% and declining, while their share of motorcycle licences has increased from 10% to 15% over the last thirty years.

Figure I – Share of women in drivers' licences



The under-representation of women among motorcycle licence holders suggests that this characteristic may be interpreted as masculine. Motorcycling represents one of the masculine characteristics found in the female candidate in Weichselbaumer (2004). A motorcycle licence may therefore signal stronger mobility and punctuality, but it may also signal a masculine personality. As women tend to be overrepresented among Management Controllers when compared to other occupations, recruiters may consider that a feminine personality fits better, regardless of the lack of information on the candidate's productivity[4]. In such cases, a candidate sending masculine signals may be subject to discrimination.

The four job candidates held the same academic and professional credentials: the French equivalent of a high school science diploma, or a "Baccalaureat S", a Bachelor's Degree in Management and a Master's Degree in Management Control from one of the following universities in the greater Paris area (Île-de-France): Université Paris II Pantheon-Assas, Université Paris X Nanterre, Université Paris XII Val-de-Marne, and Université Paris I Pantheon-Sorbonne. To homogenize the diplomas, we excluded the Master's Degree from Université Paris Dauphine due to its top ranking. Upon entering the labour market after graduation, our four fictitious candidates accumulated 5 years of work experience in consulting firms. They held the position of Assistant Management Controller for 2 years before obtaining the position of Management Controller in other consulting firms for 3 years. Identical skills, duties and work experience were detailed in their resumes. They were currently employed and offered their candidacy for the position of Management Controller in a consulting firm or company.

Job posting characteristics. The main French internet Web sites were browsed on a daily basis in an effort to identify and respond to the job postings that fell within the scope of our testing procedure. Two types of recruiters posted jobs for Management Controllers: recruitment agencies, and the actual companies seeking to hire. The study included every

[4] One determinant of recruitment may be "the degree of congruence between the gender of the applicant and the sex type of the job" (Glick et al., 1988).

permanent and temporary full-time Management Controller job posting in the greater Paris area (Île-de-France). We tested all the postings we found between the end of October, 2008, and the beginning of March, 2009. A total of 300 job postings were tested, which corresponds to 1,200 applications (4 x 300).

2. Methodology

We use the same dataset as Du Parquet et al. (2011), but in different ways. First, we use the ranking order of the candidates in order to better assess the intensity of discrimination. Do recruiters call candidate A when candidate B is not available, or do they never call candidate A? We perform a first order stochastic dominance (FOSD) analysis in order to answer similar questions. In addition, we make another use of the percentage of answers: we develop a components model. These models can be seen as useful tools for finding the right identification conditions; they also have a strong generalization potential through the method of asymptotic least squares.

2.1 Ranking order of the candidates

We used the same methodology as Duguet et al. (2015). Recruiters were assigned preferences (or tastes) for candidates A and B, represented by utilities v_A and v_B. These utilities are specific to each recruiter and stem from pre-conceptions regarding the candidates, as every candidate was equally productive according to the construction of the experiment. Each recruiter has a reservation utility level v_R. Above this utility, candidates were invited to an interview. We defined the relative utility levels $u_A = v_A - v_R$ and $u_B = v_B - v_R$. The two candidates were compared to allow four potential response cases. If $u_A < 0$ and $u_B < 0$, no candidate was invited to an interview. When $u_A < 0 < u_B$, only Candidate B was invited. When $u_B < 0 < u_A$, only Candidate A was invited. Finally, when $u_A > 0$ and $u_B > 0$, both candidates were invited.

Standard discrimination coefficient. The literature's standard measure of discrimination against Candidate B considers only cases in which one of the two candidates is invited (Firth, 1982). We defined this discrimination coefficient as $\Delta_1(\mathrm{A},\mathrm{B})$:

$$\Delta_1(\mathrm{A},\mathrm{B}) = \Pr(\mathrm{u_B} < 0 < \mathrm{u_A}) - \Pr(\mathrm{u_A} < 0 < \mathrm{u_B})$$
$$= \Pr(\text{A invited, B uninvited}) - \Pr(\text{B invited, A uninvited})$$

According to this measure, no discrimination occurs when both candidates present equal chances of obtaining an interview, while a positive number indicates that Candidate A is, on average, preferred over Candidate B.

First order stochastic dominance. Using this measure, the order in which the candidates were contacted also matters. In the standard correspondence test procedures, the fictitious candidates were instructed to respond that they had already found a job when contacted, thereby declining the job offer. The recruiters were therefore required to look further down their short list of candidates, thus providing us with a ranking of the candidates. The following considers the ranking differences between the four candidates. Using this method, we were able to rank the candidates when both were invited[5].

[5] We can confirm that the firms involved do not rank candidates by alphabetical order.

In order to compare the rankings of two candidates, we used the concept of first order stochastic dominance. If k candidates are ranked according to the recruiter's utilities, the candidates that were not invited satisfy the condition $u_j = v_j - v_R < 0$. The ranking of the candidates (from 1st to k-th) results from the recruiter's candidate preferences. The highest utility corresponds to the candidate ranked first, and negative utilities correspond to the candidates who were not invited. In order to perform our analysis, we had to separate the candidates who were not invited from those who were by creating the ranking $k+1$. This additional rank is required as candidates who were not contacted cannot be ranked amongst themselves. This also allows us to define Δ_1 directly. We only know that uninvited candidate utilities sit below the recruiter's reservation utility levels, thus ranking below the candidates who were contacted.

First, consider a case in which all candidates are invited. Using the order statistic, we can rank the utilities of the candidates, $0 < u_{(1)} \leq u_{(2)} \leq \ldots \leq u_{(k)}$, which corresponds to the ranking $k, k-1, \ldots, 1$. When only j candidates are invited, we obtain a ranking of $u_{(1)} \leq \ldots \leq u_{(k-j)} < 0 < u_{(k-j+1)} \leq \ldots \leq u_{(k)}$, which corresponds to a ranking of $k+1, \ldots, k+1, j, \ldots, 1$. The first order stochastic dominance of Candidate A over Candidate B is defined as:

$$\Pr(u_A \geq u) \geq \Pr(u_B \geq u) \ \forall u \text{ and } \exists \bar{u} \text{ such that } \Pr(u_A \geq \bar{u}) > \Pr(u_B \geq \bar{u})$$

indicating that Candidate A has a higher probability of reaching a given utility level than Candidate B, whatever the utility level. This relationship is simple to interpret when u is set to the recruiter's reservation utility level, as it indicates that Candidate A has a higher probability of being invited to an interview than Candidate B. We also see that FOSD, which uses all possible utility thresholds, covers more cases than the standard discrimination measure. We worked with ranks for practical purposes since, unlike utilities, they are observable. We simply need to reverse the inequalities inside the probabilities, since the higher the utility, the lower the rank (rank 1 for the most preferred candidate with utility $u_{(k)}$):

$$\Pr(r_A \leq r) \geq \Pr(r_B \leq r) \ \forall r \in \{1, \ldots, k+1\} \text{ and } \exists \bar{r} \text{ such that } \Pr(r_A \leq \bar{r}) > \Pr(r_B \leq \bar{r})$$

In the case where $r = 1$, $\Pr(r_A \leq 1) = \Pr(r_A = 1)$ gives the probability of being ranked first. If the corresponding inequality holds, Candidate A has a higher probability of being contacted first than Candidate B. Next, we set $r = 2$. Here, we may conclude that Candidate A has a higher probability of being ranked among the first two candidates than Candidate B. Performing the comparisons up to $= k$, $\Pr(r_A \leq k)$ represents the probability that Candidate A will be invited to an interview. Candidate A therefore has a higher probability of receiving an invitation than Candidate B. In summary, when A FOSD B, Candidate A always has a higher probability of being in the leading group than Candidate B, whatever the definition of leading group. This definition is especially relevant when measuring discrimination and motivates our use of FOSD. Graphically, FOSD means that the CDF of Candidate A, defined by rank, stands above the CDF of Candidate B. Duguet et al. (2015) demonstrated that if A FOSD B, then $\Delta_1(\mathrm{A}, \mathrm{B}) > 0$.

2.2 Components model and asymptotic least squares

In this section, we will consider a components model. We wish to relate observable percentages, also known as auxiliary parameters in the literature, to discrimination

measurements, also known as interest parameters. Asymptotic Least Squares (ALS) is a method for estimating the interest parameters from the auxiliary parameters.[6] In a first step, we discuss identification by writing the relationship between our model and the percentages. In a second step we apply ALS.

Success rate decomposition. Our results can be used to perform an interesting decomposition. If $p_{g,\ell}$ represents the probability of getting an interview by gender g and licence ℓ, with $g \in \{m, f\}$ for "male" and "female", and $\ell \in \{b, n\}$ for "both" and "none", respectively, one can write:

$$p_{m,b} = \alpha_m + \beta_b$$
$$p_{m,n} = \alpha_m + \beta_n$$
$$p_{f,b} = \alpha_f + \beta_b$$
$$p_{f,n} = \alpha_f + \beta_n + \gamma_{f,n}$$

where α_g measures the effect of gender ($g \in \{m, f\}$), β_ℓ measures the effect of owning a licence ($\ell \in \{b, n\}$), and $\gamma_{f,n}$ is the joint effect of being a woman without licence. The latter is included to investigate whether discrimination components are additive. In the standard case, a woman without a licence could be rejected because she is a woman or because she lacks a driver's licence. There is superadditivity (case $\gamma_{f,n} < 0$) when a woman without a licence reduces the interview probability more than the sum of the gender and mobility weakness effects. There is subadditivity in the reverse case ($\gamma_{f,n} > 0$). Using the previous equations, we get:

$$\alpha_m - \alpha_f = p_{m,b} - p_{f,b}$$
$$\beta_b - \beta_n = p_{m,b} - p_{m,n}$$
$$\gamma_{f,n} = p_{f,n} - p_{f,b} - (p_{m,n} - p_{m,b})$$

where the first line measures gender discrimination, the second line the direct effect of mobility, and the last line the joint effect of gender and mobility.

The ALS method uses a matrix notation for this system. Let *d* denote the vector of the structural parameters and *c* the vector of the auxiliary parameters. *d* is defined by the three discrimination coefficients :

$$d = \begin{pmatrix} \alpha_m - \alpha_f \\ \beta_b - \beta_n \\ \gamma_{f,n} \end{pmatrix}$$

In order to make these coefficients appear in the components model, we need to write the percentages in differences. Consider the differences of all the percentages with $p_{f,b}$, we would get :

$$p_{m,b} - p_{f,b} = \alpha_m - \alpha_f$$
$$p_{m,n} - p_{f,b} = \alpha_m - \alpha_f - (\beta_b - \beta_n)$$
$$p_{f,n} - p_{f,b} = -(\beta_b - \beta_n) + \gamma_{f,n}$$

so that

$$\begin{pmatrix} p_{m,b} - p_{f,b} \\ p_{m,n} - p_{f,b} \\ p_{f,n} - p_{f,b} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 1 & -1 & 0 \\ 0 & -1 & 1 \end{pmatrix} \begin{pmatrix} \alpha_m - \alpha_f \\ \beta_b - \beta_n \\ \gamma_{f,n} \end{pmatrix}$$

[6] This approach was set out in Gouriéroux, Monfort and Trognon (1982, 1985) and Chamberlain (1982, 1984).

which suggests the following auxiliary parameter :

$$c = \begin{pmatrix} p_{m,b} - p_{f,b} \\ p_{m,n} - p_{f,b} \\ p_{f,n} - p_{f,b} \end{pmatrix}$$

and we finally get the identification constraints, which relate the auxiliary parameters (*d*) to the discrimination coefficients (*d*) :

$$c = Ad$$

When A is square and invertible, the system is just identified: there is only one way to write the discrimination parameters (d) as functions of the percentages (c) :

$$d = A^{-1}c$$

It is our case and we simply obtain the standard difference estimators:

$$d = \begin{pmatrix} p_{m,b} - p_{f,b} \\ p_{m,b} - p_{m,n} \\ p_{f,n} - p_{f,b} - (p_{m,n} - p_{m,b}) \end{pmatrix}$$

but in the general case the components models are overidentified, there are several ways to write the discrimination coefficients as functions of the percentages. The ALS method can then be used both to get an optimal estimator and to perform an overidentification test. It generally requires additional information about the covariance matrix of the estimated percentages. In this paper, the model is just identified and the optimal ALS is numerically identical to our estimates. All the computations were done with SAS 9.4.

3. Results

First, we will present the results on the FOSD property, followed by the results on the standard discrimination coefficient. Next, we will provide a decomposition of the discrimination coefficient that allows for the separate measurement of gender and mobility discrimination.

Test level. Our first discussion involves the test level. Considering the null hypothesis, or the absence of discrimination, we set the Type I error when performing a test, which represents the probability of rejecting the null hypothesis while it is true, that is, the probability that we will accept the existence of discrimination where none exists. The Type II error is set free and represents the probability that we will accept the absence of discrimination where discrimination exits. This can be very high in small samples. When choosing the test level, we could compare the social costs of both errors to reduce the expected social cost (or loss function, according to the literature). The Type I error generates a small social cost. If there is no discrimination, concluding that discrimination exists will not generate any cost for the firms. Indeed, nobody can legally prove that firms discriminate by default, and no sanction can occur. This situation does not generate any cost for the workers as well, since they are not subjected to discrimination. By contrast, the social cost of the Type II error should be high, since it leads to a situation in which actual discrimination remains undetected. The cost is borne by those subjected to discrimination. Therefore, we must properly reduce the Type II error. The only way to achieve this is to increase the test level. For our purposes, we often performed our tests at 10% instead of 5%.

Test on the experiment. We must first ensure that the characteristics of the resumes did not influence the results by using independence tests (Table I). We found that we could not reject

the null hypothesis of independence between the sending order and a positive response, the sending order and the rank of the response, the CV type and a positive response, and the CV type and the rank of the response.

FOSD. The CDFs are reported in Table II and the FOSD comparison appears in Table III. We found five cases of FOSD out of 6 possible cases. All are significant at the 1%, 5% or 10% levels. Consider the differences for the same gender: among women, holding no licence FOSD holding both licences (at 1%), therefore holding a motorcycle and automobile licence reduces the probability of obtaining an interview. For men, the exact opposite was true: holding both licences FOSD having none (at 10%). Here, mobility increases the probability of obtaining an interview. Mobility has the expected effect among men, but not among women. Next, consider the gender comparison for each mobility case. Among workers that depend on public transportation, women FOSD men (at 5%). Women have a greater chance of obtaining an interview when they do not exhibit extra commuting mobility. Among workers with both motorcycle and automobile licences, men FOSD women (at 5%). Men have a greater chance of obtaining an interview when mobility is strong. Overall, women are preferred when mobility is slighter, while men are preferred when mobility is stronger.

Standard discrimination coefficient. The estimates are reported in Tables IV (in levels) and Table V (in differences, with ALS estimates). Since FOSD implies a positive discrimination coefficient, we found similar qualitative results. The application that received the most positive responses belonged to a female candidate who did not mention any driving licence in her resume (12.3%), followed by a male candidate who stated his motorcycle and automobile licences (10.0%), and another male candidate who did not mention any driver's licence in his resume (9.3%). This preference toward the female candidate is sensitive to the presence of a driver's licence in the resume; the female candidate who stated both a motorcycle and an automobile license obtained the lowest success rate (7%).

The effect of a driver's licences on the chances of obtaining a job interview is clearly different for men and women. For men, revealing a capacity for independent mobility by holding a licence for both classes of vehicles has a positive but insignificant effect on the probability of obtaining a job interview (Table IV). By contrast, the same signal appears to penalize women, as it reduces their chances of obtaining a job interview.

Decomposition. The estimates are reported in Table V. We found a significant discrimination against women ($\alpha_m - \alpha_f > 0$), since men with licences enjoy a significantly higher success rate than women. We found no direct effect of mobility by itself ($\beta_b - \beta_n = 0$), since men with and without licences enjoyed equal success rates, and no discrimination occurred against them. Eventually, we found a positive and counter-intuitive effect of mobility for women without licences ($\gamma_{f,n} > 0$). This effect means that women with a low mobility are preferred to women with a strong mobility, whether or not the posting explicitly valued mobility. This effect clearly leads to a counterproductive selection of women when planning interviews, as lesser mobility leads to greater transport-related absenteeism.

Offers requiring a high mobility. We investigated this issue further by performing separate analyses on the job postings that explicitly mentioned a need for mobility, as compared to those that did not (Table VI). While we expected fewer penalties for women, our findings stated otherwise. Since there were 60 job postings that explicitly sought mobility, we performed the tests at the 10% level. We found that postings seeking mobility discriminated against women *more* (-6.7%) than those that did not (-5%). We therefore concluded that such

discrimination against women was counterproductive. A motorcycle licence granted them stronger mobility and immunity against transportation strikes, but the recruiters reduced their chances of obtaining an interview for jobs that explicitly require mobility. The ALS estimates are of a comparable magnitude with or without mobility explicitly indicated in the offer. However they are not significant in the group with mobility explicitly indicated because of the low number of observations in this group (60 offers).[7] Indeed, the joint effect is bigger in the group with explicit mobility but its variance is too big for the Student statistic to be significant at the 10% level. This has two implications: on the one hand, the effect is not significant in the explicit mobility group while the effect is bigger in this group than in the group without mobility indicated and, on the other hand, the effects in the two groups are not significantly different from each other. Since the absence of significance comes from a bigger variance, not from a lower coefficient, we consider that our findings are consistent. This problem disappears when both groups are taken together (Table V) and this estimate makes sense because, in the two groups of offers, the ALS coefficients are not significantly different at the 5% level.

Conclusion

Our first set of results deals with the signal related to the capacity for independent mobility. This signal had no significant effect on men's chances of obtaining a job interview. It did, however, have a negative effect for women. Overall, stating a licence for both classes of vehicles in a resume reduced their chances of obtaining a job interview.

The second set of results involves the effect of gender when accessing job interviews. Among resumes that stated a license for both classes of vehicles, the female candidates had fewer chances of obtaining an interview than the male candidates. The opposite pattern applied to candidates who stated their use of public transportation; among these candidates, men still enjoyed a greater chance of obtaining a job interview for permanent positions.

Should candidates who hold a motorcycle licence state this fact in their resumes? The answer is clearly no. For men, it will not significantly increase their chances of obtaining a job interview, nor will it improve their access to employment, irrespective of the contract involved. For women, a motorcycle licence in a resume will reduce their chances of obtaining a job interview. We interpret this as counterproductive for recruiters, since Paris is a congested traffic area.

Stating one's motorcycle and automobile licence on a resume does not always send a positive signal to employers. This could be linked to the dense public transportation network in the greater Paris area. Nonetheless, another perception of this signal seems to prevail, namely, one based on gender stereotypes which, for instance, might reveal autonomy and independence, which are likely to counterbalance the effect of the candidate's gender. A man with a motorcycle licence is a man like any other. On the other hand, a woman with a motorcycle licence may no longer represent a typical woman. Our results illustrate the existence of complex forms of conditional discrimination that interact with other dimensions. The employer's perception of mobility is conditioned by the gender of the candidate and the type of driver's licence stated in the resume.

[7] The variance of the mean decreases with the number of observations. This implies that there is a minimum size of the effects that can be detected for a given sample size and test level. In our case, 60 observations are not sufficient. When the sub population are regrouped, the sample size becomes sufficient.

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Table I. Independence test involving the sending order and the CV type

Bilateral independence tests.

Contingency table	Chi squared test p-value	Fisher exact test p-value
Sending order and positive answer	0.9728	0.9730
Sending order and answer ranking*	0.5949	0.5595
CV type and positive answer	0.2728	0.2839
CV type and answer ranking*	0.4982	0.4923

* Computed from the offers with a least one positive answer.

Table II. Calls' ranking distributions

Cumulative distribution functions

Candidate	(1) Female, No licence		(2) Female, Licences		(3) Male, No licence		(4) Male, Licences	
Rank	Number	Pr[R ≤ r]	Number	Pr[R ≤ r]	Number	Pr[R ≤ r]	Number	Pr[R ≤ r]
$r \leq 1$ (called first)	20	0.067	11	0.037	10	0.033	18	0.060
$r \leq 2$	30	0.100	17	0.057	19	0.063	24	0.080
$r \leq 3$	36	0.120	21	0.070	26	0.087	28	0.093
$r \leq 4$	37	0.123	21	0.070	28	0.093	30	0.100
$r \leq 5$ (not called)	300	1.000	300	1.000	300	1.000	300	1.000

Table III. First order stochastic dominance (FOSD) analysis

The numbers between parentheses refer to Table II. Student statistics between parentheses. The critical values for the one-sided tests are: 1.282 (10%), 1.645 (5%) and 2.326 (1%).

Rank	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
$r \leq 1$	0.030 (1.62)	0.033 (1.90)	0.007 (0.33)	0.003 (0.22)	-0.023 (1.35)	-0.027 (1.52)
$r \leq 2$	0.043 (2.22)	0.037 (1.87)	0.020 (1.00)	-0.007 (0.38)	-0.023 (1.26)	-0.017 (0.82)
$r \leq 3$	0.050 (2.73)	0.033 (1.90)	0.027 (1.42)	-0.017 (1.00)	-0.023 (1.30)	-0.007 (0.33)
$r \leq 4$	0.053 (2.96)	0.030 (1.81)	0.023 (1.30)	-0.023 (1.46)	-0.030 (1.74)	-0.007 (0.35)
Conclusion	(1) FOSD (2)	(1) FOSD (3)	(1) FOSD (4)	No FOSD	(4) FOSD (2)	(4) FOSD (3)
Threshold	1%	5%	10%	Crossing	5%	10%

Table IV. Rates of success

Sample: 1200 resumes sent on 300 job advertisements.

Correspondence test	Positive response rate	Student	90% confidence interval	
			Lower	Upper
Motorcycle and car licences				
Female	7.0%**	4.74	4.6%	9.4%
Male	10.0%**	5.76	7.1%	12.9%
No driving licence				
Female	12.3%**	6.49	9.2%	15.5%
Male	9.3%**	5.55	6.6%	12.1%
At least one positive answer		18.7%		

Asymptotic Student statistics and confidence intervals. **: significant at the 5% level. *: significant at the 10% level.

Table V. Difference of treatments on the same job advertisements

The estimations account for the correlations between the answers.

Comparison	Difference	Student	90% confidence interval	
			Lower	Upper
Transportation mode (licences vs no licence)				
Female	-5.3%**	2.96	-8.3%	-2.4%
Male	0.7%	0.35	-2.4%	3.8%
Gender (male vs female)				
Motorcycle and car licences	3.0%*	1.74	0.2%	5.8%
No licence	-3.0%*	1.81	-5.7%	-0.3%
Asymptotic least squares				
Gender effect : $\alpha_m - \alpha_f$	3.0%*	1.74	0.2%	5.8%
Mobility effect : $\beta_b - \beta_n$	0.7%	0.35	-2.4%	3.8%
Joint effect : $\gamma_{f,n}$	6.0%**	2.30	1.7%	10.3%

Asymptotic Student statistics and confidence intervals. **: significant at the 5% level. *: significant at the 10% level.

Table VI. Difference of treatments on the same job advertisements: effect of an explicit mobility indication

The estimations account for the correlations between the answers.

Comparison	Difference	Student	90% confidence interval	
			Lower	Upper
Mobility explicitly indicated (60 ads)				
Transportation mode (licences vs no licence)				
Female	-6.7%*	1.66	-13.3%	-0.1%
Male	0.0%	0.00	-3.9%	3.9%
Gender (male vs female)				
Motorcycle and car licences	1.7%	0.44	-4.5%	7.8%
No licence	-5.0%*	1.76	-9.7%	-0.3%
Asymptotic least squares				
Gender effect : $\alpha_m - \alpha_f$	1.7%	0.44	-4.5%	7.8%
Mobility effect : $\beta_b - \beta_n$	0.0%	0.00	-3.9%	3.9%
Joint effect : $\gamma_{f,n}$	6.7%	1.43^{+}	-1.0%	14.4%
Mobility not indicated (240 ads)				
Transportation mode (licences vs no licence)				
Female	-5.0%**	2.48	-8.3%	-0.1%
Male	0.8%	0.36	-2.9%	4.6%
Gender (male vs female)				
Motorcycle and car licences	3.3%*	1.71	0.1%	6.5%
No licence	-2.5%	1.28	-5.7%	0.7%
Asymptotic least squares				
Gender effect : $\alpha_m - \alpha_f$	3.3%*	1.71	0.1%	6.5%
Mobility effect : $\beta_b - \beta_n$	0.8%	0.36	-2.9%	4.6%
Joint effect : $\gamma_{f,n}$	5.8%*	1.92	0.8%	10.8%

Asymptotic Student statistics and confidence intervals. **: significant at the 5% level. *: significant at the 10% level. + : the p-value is 0.15 for a bilateral test.

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