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Mathieu Bunel, Yannick l'Horty, Pascale Petit

TEPP WORKING PAPER

N° 2014 - 11

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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

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Mathieu Bunel

Université de Bourgogne –Laboratoire d'économie de Dijon (UMR 6307 CNRS)

Travail, Emploi et Politiques Publiques (TEPP) CNRS : FR3435

Yannick L'Horty

Université Paris-Est Marne-la-Vallée (UPEMLV)

Equipe de Recherche sur l'Utilisation des Données Individuelles Temporelles en Economie (ERUDITE)

Travail, Emploi et Politiques Publiques (TEPP) CNRS : FR3435

Pascale Petit

Université Paris-Est Marne-la-Vallée (UPEMLV)

Equipe de Recherche sur l'Utilisation des Données Individuelles Temporelles en Economie (ERUDITE)

Travail, Emploi et Politiques Publiques (TEPP) CNRS : FR3435

Version : juin 2014

There are huge local disparities in the unemployment rates across metropolitan areas in Europe as well as in the United States. Many explanations for these disparities have been given in the urban economics literature, including skill mismatches among the residents, physical distances to the job, and local social networks. In the present paper we explore the role of hiring discrimination based on the reputation of the place of residence of the applicant. We use the field experiment methodology of correspondence testing to study the impact of a poor neighbourhood reputation on French young job seekers in accessing employment in the metropolitan Paris region.[1]

In all previous papers dealing with employment discrimination based on the place of residence, and more generally in the literature on neighbourhood effects, the definition of the boundaries and the scope of the neighbourhood are rarely considered. [2] It is most often based on a single level administrative definition (Duguet *et al.*, 2010) or on a statistical index (Tunstall, 2014). Nonetheless, the measure employed for a place of residence effect may vary *a priori* according to the boundaries, and therefore it is interesting to consider higher or lower levels of aggregation. It is also useful to investigate whether the effect of the neighbourhood can be sensitive to its urban context. Our methodology allows us to verify whether a disadvantaged place of residence, which is officially labelled (in the French context) as a geographical priority area, has the same effects if that area is located in a more advantaged locality or a less advantaged one.

This study's novelty lies in the experimental measuring of place of residence effects derived from a multi-level protocol that allows one to discern the effects at different levels of spatial aggregation: large administrative units (the "département" in France), municipalities, and neighbourhoods. This protocol was applied to two administrative units (Seine-Saint-Denis and

[1] A poor neighborhood has a high concentration of low-income residents who are considered to be disadvantaged. In France many such neighborhoods are officially designated as *zones urbaines sensibles* (sensitive urban zones) (ZUS hereafter).

[2] Beyond the modifiable areal unit problem (MAUP) that is well-known to geographers, the boundaries of the neighbourhood are not well documented. According to the principle of Suttle (1972), the definition of one's neighborhood has a multi-dimensional nature, while Galster (2001) shows that the representations of the limits are not stable and vary according to the daily activities performed by individuals (i.e. consumption, transportation, ...).

the city of Paris) in the Paris region, which are geographically close but quite different in terms of socio-economic status, in order to compare the effects associated with three types of neighbourhoods: favoured areas, intermediate reputation areas, and disadvantaged areas.

The study is organized as follows. We provide a survey of the literature of the place of residence effect in the context of hiring discrimination in Section 2. Section 3 describes the protocol that was used to build the database. The fourth and fifth sections present the results and describe the econometric methods. We discuss our results in the final section.

2. Place of residence effect in Labour Markets

Four broad categories of explanations have been developed in the literature to explain unemployment local rate disparities: skill mismatches, spatial mismatches, neighbourhood social effects, and postal code discrimination. We focus mainly on the last of them, but it is useful to give a short description of the others.

First, the skill mismatch hypothesis highlights a mismatch between the (typically low) skills of the unemployed and the (typically high) skills demanded by local employers. Because of residential sorting, low-skilled people are concentrated in low-income and low-rent suburbs in Europe (but tend to be concentrated in core urban areas in the US). In Paris area, according to Gobillon *et al.* (2011), the skill mismatch hypothesis explains a small part of intra-urban unemployment rate heterogeneity.[3]

Second, the physical distance between the place of residence and the available jobs complicates the job search process and decreases the chances of leaving unemployment. This is to the so-called 'spatial mismatch' hypothesis (Kain, 1968). An unemployed worker who resides far away from job centers will experience longer and more costly job search (Rogers, 1997; Immergluk 1998; Wasmer and Zenou, 2002). Potential employers will prefer an employee whose place of residence is closer because he/she will be able to exert a level of greater effort at his work (Zenou, 2002). He/she runs the risk of tardiness or absenteeism and might generally be less flexible in his/her scheduling (van Ommeren *et al.*, 2011). Finally, employers can internalize the phenomenon whereby travelling long distances reduces the worker's utility

3. Gobillon *et al.* (2011) using administrative data from Paris area pointed out that only 30% of the unemployment survival rates are related to individual variables.

levels associated with employment at the firm for a given wage. As the most distant employees may have a relatively high quit rate, companies that employ them are less likely to maximize their profit (Sattinger, 1998).

Third, the socio-demographic composition of the labour force of the area affects the chances of accessing employment through neighbourhood, peer, or social networks effects, all three of which play a major role in the search for employment (see Galster, 2010, Ioannides *et al.*, 2004, Hellerstein *et al.*, 2014). Furthermore, the presence of local amenities, and notably the incidence of public sector employment and subsidised employment, influence the employment and unemployment dynamics of the localities.

Finally, employers can have particular preferences for workers from a certain locality and use the address as a screening criteria (McGregor, 1977; Tilly *et al.*, 2001; Zenou, 2002). Many surveys seem to confirm the existence of this phenomenon of postal code discrimination. According to Atkinson et al. (2001), in response to the question "*Is there anything about living in this area which makes getting a job more difficult?",* between one-third and one-quarter of the residents of deprived areas in Scotland responded that the reputation of the area is problematic. In France, 19% of job seekers located in the *zone urbaine sensible* (ZUS) report that their localisation makes getting a job more difficult (ONZUS, 2012).[4]

Theoretically this territorial preference can be explained by statistical discrimination (Phelps, 1972; Fang and Moro, 2011) driven by the preferences of the employer, employees, or consumers. In this case, the place of residence plays a role of signaling productive and non-productive characteristics of its inhabitants. Based on 250 face-to-face interviews in the US, Tilly *et al.,* (2001) confirmed that employers use their own mental map in order to predict a worker's characteristics on the basis of their place of residence. They concluded that this place is strongly interrelated with race as well as worker's skills and attitudes as perceived by employers.

A lot of papers attempt to explain the effect of residential segregation or spatial mismatch on the unemployment rate or on unemployment duration (Galster, 2010; Ioannides *et al.*, 2004; Hellerstein *et al.,* 2013). However surprisingly few papers attempt to measure the level of

[4] According a recent survey carried out in 2013, two-thirds of the inhabitants of ZUS say that living in such area make harder searching to work 2/3 (IFOP, 2013). Tunstall *et al.* (2014) present different qualitative studies that conclude that such a phenomenon exist in the UK.

residential stigmatisation on labor outcome's. In UK, McGregor (1977) used a survey of 900 unemployed men job seekers living in Paisley area in the south-west of Glasgow (Scotland) to examine the neighbourhood reputation effect on unemployment duration. Estimating a linear model with the least squares technique[5] based on a sub-sample of job seekers with completed spells of unemployment and controlling for observed individual's characteristics, he found that residing in a poor reputation neighbourhood (in this case Ferguslie Park) hugely increases (by around 45%) the average unemployment duration.

A French study conducted in 2008 used the "*Trajectories and Origins*" survey seems to confirm this result (ONZUS, 2012). Implementing the Blinder-Oaxaca decomposition procedure on the probability of access to employment, the authors of this study found that two-thirds of the gap between deprived areas and control areas cannot be explained by individual characteristics, and thus are attributable to a location effect. However, such results based on surveys are not fully convincing, because stigmatization of workers on the basis of the reputation of their neighbourhood is what Manski (1993) called a correlated effect. This empirical challenge is inherent in many strictly cross-sectional regressions. By using survey data, it is quite difficult to identify such effects due to the presence of other endogenous or exogenous omitted effects.

To address this problem, recent papers propose a new methodology to measure spatial discrimination based on the field experiment of "*Correspondence Testing"*. This method allows one to compare, *all other things being equal*, the access rates to employment opportunities of fictitious candidates who are similar by design in all respects (i.e. the content of their application) except for the characteristic whose impact is the focus of the test (Riach and Rich, 2002). It allows one to measure an effect specific to the place of residence independently from other channels which are frequently advanced in the literature pertaining to a localisation effect (e.g. skill mismatches of the residents, physical distance to the job, local social network).

This type of experimental approach has already been successfully implemented in order to measure the interacted effects of the place of residence, gender, and ethnic origin on the chances of being called in for an interview in the United-States by Bertrand and Mullainathan (2004) and in France by Duguet *et al.* (2010), L'Horty *et al.* (2012) and Petit *et al.* (2014).[6]

[5] Note that this specification and estimation technique does not take into account the distribution of duration times nor the censoring processes.

[6] Bonnet *et al.* (2014) test the impact of place of residence in the housing market by using correspondence testing in Paris area (France).

Bertrand and Mullainathan (2004) compared job access outcomes for young whites and blacks living in advantaged and disadvantaged neighbourhoods in the cities of Boston and Chicago. They found that living in a privileged neighbourhood increased the probabilities of employer's calling back applicants for administrative and sales jobs by 5.4 percentage points for all candidates (with no significant differences between races).

Duguet *et al.* (2010) studied the chances of obtaining a job interview for 140 posted job vacancies for accountants located in Paris area for 16 variations of fictitious candidates who differed by their nationality, origin, surname and given name, and reputation of place of residence. All candidates were young males. They found no significant effect for the place of residence's reputation at the municipal level. Petit *et al.* (2014) replicate the same kind of study in the Paris area for 117 actual job openings for waiters using 16 candidates as well. The selected privileged or underprivileged town where candidates are located are situated at equal distance to the core of Paris. They estimated a degree of postal code discrimination to the tune of 4.5 percentage points. L'Horty *et al.* (2012) carried out another correspondence testing experiment in the Paris region for computer scientists and found that the people most affected by hiring discrimination based on the reputation of the place of residence were women of French origin.

More recently, Tunstall *et al.* (2014), based on 2010 data), tested for the presence of discrimination within several occupations (office administration, cleaner, security guard, sales assistant, accounts clerk, kitchen hand and chefs) in three local labor markets in the UK that differ by their unemployment rates. They measure hiring discrimination based on gender and based on two places of residence that differ by their reputation ("bland" and "poor"). Among 192 ads that elicited at least one positive answer from an employer, they show that applicants who reside in a poor reputation neighbourhood have 2.6 percentage points lower probability to be invited to an interview by the employer than applicants from the bland reputation neighbourhood. According to the authors, this postal code discrimination is not significant at the 10% level, but it is at the 15% level. They mentioned that "*It remains possible that, in a larger correspondence test study, the net preferences found would achieve statistical significance"*. Moreover, by using simulation methods like bootstrapping for standard errors instead of a parametric test, they could have reached a different conclusion for their inferences (Duguet *et al.*, 2010).

The present paper follows the same path. Its aim is to investigate the effect of the place of residence‘s reputation on employment access at different spatial levels. In ascending order of aggregation, they are the neighbourhood, municipality, and the larger administrative unit.

The Field Experiment’s Design

In this paper we used the "correspondence testing" field experiment method. The procedure consisted of sending over 2,988 applications in response to a sample of 498 real job offers that were posted between October 2011 and February 2012 in the catering industry. Our testing procedure consists of drafting from scratch six fictitious résumés which are perfectly identical in terms of qualifications and career paths. We now present our experimental protocol in greater details.

If one seeks to evaluate the extent of employment discrimination related to the place of residence, one requires a comparison of access to employment of individuals who are similar in all respects except for the location of their residence. This involves comparing the apparent chances of hiring of two candidates for which the only difference between them is their place of residence. These candidates must therefore share all the individual characteristics (e.g. sex, origin, age, marital status, mobility, hobbies), the same human capital (e.g. degrees, experience, technical and language skills), exert the same job search efforts, display the same level of motivation and apply to the same type of vacancies for the same positions at the same time. At this early stage of the recruitment process, involving only applications and call-backs, we hold the level of motivation and the level of job search fixed by sending resumes simultaneously in response to the same job offers at the same companies. Our measure of access to employment is therefore the discrete and observable event of whether or not the applicant received a call-back for an interview.

Six Locations

The places of residence of the six fictitious candidates are selected in order to measure three distinct effects that are nested or embedded within each other, on the access to employment, all other things being equal: the effect of the reputation of the large administrative unit of residence, of the municipality, and of the neighbourhood. We focus on two of the eight large administrative units in the Greater Paris area (these units correspond to a "département" in the French administrative division) which are geographically close to each other but are quite economically and socially differentiated: Paris[7] and Seine-Saint-Denis[8] (see **table 1**). The latter has a lower average standard of living of their residents (in 2006 the median income is €10,000 lower than in Paris), a higher share of inhabitants living in *zone urbaine sensible* (ZUS) (20% versus 6%), and a higher job seeking rate (16.9% versus 11% in 2009).

Insert Map 1 here

Within these two geographical units, we have chosen three actual addresses located in neighbourhoods having very distinct reputations but situated in close proximity to each other. This proximity facilitates the measurement of the neighbourhood effects for a given travelling distance to work. The first set of three fictitious candidates resides in the North of Paris in the 18th district. They are distinguished by the reputation of their neighbourhood, which is identified by the street where they reside (see **Map 1**). One of the candidates resides in an area which is considered to be advantaged (*place du Tertre*). Another lives in a disadvantaged neighbourhood known and classified as a ZUS. The third candidate is located in an area having an intermediate reputation (*rue Championnet*).

The second set of three fictional candidates resides in the center of Seine-Saint-Denis. Two of them live in the same municipality (the city of Bondy): one of them in a neighbourhood that is classified as ZUS, and the other one is an area of intermediate reputation. The third candidate

[7] Paris is both a department (75) and a municipality, a configuration which is unique in France.

[8] The other six units in the greater Paris area are Hauts-de-Seine (92), Val-de-Marne (94), Essonne (91), Yvelines (78), Seine-et-Marne (77), and Val d'Oise (95).

lives in another municipality called Le Raincy with a bland reputation. **Table 1** presents statistics for these neighbourhoods.

Insert Table 1 here

Choice of two occupations present in tight labour markets: waiters and cooks in restaurants

The methodology of testing is particularly costly to implement. Among all occupations, we have chosen jobs in the restaurant industry (cooks and waiters) because restaurants are spatially widely dispersed in Ile-de-France and because such occupations are characterised by relatively tight labour markets. [9]

Insert Map 1 here

By selecting an occupation with a high number of job seekers, one lowers the probability of recruiters detecting a suspicious job application when a large number of resumes are sent simultaneously. By selecting an occupation characterized by tightness in the labour market, one limits the number of refusals from employers with or without discriminatory behaviour. This methodological precaution proved to be particularly useful in the context of an economic recession during which our datas are collected. Nevertheless, the flipside of somewhat high success rates of applicants in an occupation with a tight labour market in terms of discrimination is that the call-back process becomes less selective, and it is therefore more difficult to observe discrimination in hiring under these conditions.

[9]According to data drawn from the historic data file of the French unemployment agency (Pôle Emploi), the "kitchen staff" occupations in Ile-de-France include both a large number of job applications (5,529 job applications a year from March 2009 to March 2010) completed with a significant number of job offers (13,164 during that same period). The tightness rate for this occupation (the number of job offers recorded in one month of a year divided by the number of job applications per year) is high (0.62) relative to other professions or occupations. These same statistics for the occupation of waiters in restaurants are 5,622 job applications and 8,875 job offers, respectively, for a tightness rate of 0.48. For the purposes of comparison, the figures for masonry in Ile-de-France over the same period are 4,075 job applications and 2,371 job offers, for a tightness rate of 0.26.

As the location of our candidates is listed in his/her application, we assert that the dispersion in distances from homes to workplaces will be sufficient to evaluate the effect of residence regardless of commuting time between residences and workplaces. Note that the two occupations selected, namely cooks and waiters, are characterized in particular by their face-to-face exposure to customers, which may play a role in discrimination in hiring (Neumark *et al.*, 1996; Bouvard *and al.*, 2009). For each of these two occupations, two skill levels were examined, namely medium-skilled and low-skilled.

Similar fictitious candidates

The applications that were sent in response to the same job offers are identical in terms of productive characteristics and individual characteristics other than the one for which the effect is subjected to testing, namely the place of residence. In particular, these applications are similar with respect to educational background, career path, and job experience in both quantitative and qualitative terms. These applications will appear as normal to the targeted occupations, as they were vetted and validated by professionals with experience working in the industry before being submitted. This expertise ensures that applications are similar, realistic, and relevant for this very particular labour market.

The six fictitious candidates are French, and the sound of their surnames and given names does not suggest that they are first or second-generation immigrants. They are all males, and their given first names are among the most common in France. Their given names indicate their gender and are also most common for their year of birth. The six medium-skilled candidates are 27 years old, and the low-skilled ones are 22 years old. All candidates display on their job applications that they are single, without children, hold a driver's license, and have a car.

These six candidates all followed the same training path. The low-skilled ones received in 2007 a Professional Aptitude Certificate (CAP), that is a vocational certification inferior to a high school diploma. The medium-skilled ones hold a professional high school diploma specialised in a profession (BAC-PRO) validated in 2004. These precise qualifications have been obtained in the framework of an apprenticeship (two years for a CAP and four years for BAC-PRO).

Since leaving the education and training system, the six most qualified candidates that are cooks or waiters have accumulated seven and a half years of experience working in three different restaurants. It is mentioned in their job application that one of the restaurants where the candidate

has worked was a gourmet type, and the other two restaurants were the traditional type. The six less-qualified candidates worked in three different restaurants, all of which are of the traditional type, since receiving their diploma four and a half years ago. None of the candidates has reported a prior period of unemployment: they were all currently employed when they applied for the job. In total, we have drafted a total of 24 fictitious applications (consisting of a résumé and cover letters): six duplicate profiles for two occupations (cooks and waiters) for two levels of qualification (skilled and less skilled).

Marginal differentiation and the permutations for job applications

Since the applications were sent in response to the same job offers, they had to include some elements of differentiation. These differences relate to the presentation of the resumes while remaining standard in terms of format, i.e. the type of font, font size, layout of the page, etc. There are also no photographs of the candidates on their written applications.

The candidates' experiences refer to actual companies which are different yet comparable (in terms of service line and size). They all received their degree(s) and began their careers outside of Ile-de-France in different cities, but they have lived and worked in the Ile-de-France region for more than a year. The candidates' recreational activities and hobbies are also different, but they not appear to be excessively original or esoteric (sport, cinema, reading, music, etc...).The brief cover letters accompanying the CVs were also formulated differently without being too unique. A postal address, or cell phone number and an email address have been assigned to each candidate.

To avoid having the style or content of a particular application systematically influencing the employer's selection for a particular candidate (and this risk might be present despite the precautions taken during the drafting of the application), we have developed a system of random rotations between the CVs of the identities of the fictitious candidates. The sources for the listings of job offers were alternated between the candidates throughout the job search process.

Collection of job offers and field testing

Centralized websites from French employment agency ("Pole Emploi") and from "L'Hôtellerie-Restauration", that list most of the employment opportunities in the catering sector were consulted daily in order to compile job offers from mid-October 2011 to early February 2012. We sent applications to all offers that are relevant for the study that were available on the two websites, insofar as the employer allowed a contact by either regular post or by email.

All job offers for waiters or cooks requiring a CAP or a professional high school diploma, with either fixed-term or permanent contracts, and located in Ile-de-France, fall within the scope of the study. A total of 498 job offers from separate restaurants were subjected to testing: 253 job offers for cooks and 245 job offers for waiters. This corresponds to sending a total of 2,988 applications (6×498).

We modelled the outcome of obtaining a job interview. In the event of a positive response, however, no candidate was sent subsequently to an interview for the following two reasons related to our methodology. First, physically sending candidates for interviews would introduce a bias due to the subjective judgment by recruiters with respect to the appearance, behaviour, or personality of candidates. As this inevitable bias is unobservable to researchers and cannot be controlled for, it would generate a flawed measure of discrimination in hiring. We believe that as long as the organizing and arranging of interviews generates a cost to the recruiter, he/she will only convoke candidates who actually have a fair chance of obtaining the job. We therefore assume that discriminatory behaviour on the part of employers occurs primarily during the selection of written applications of candidates who are granted an interview (for which the potentially discriminating factor is the place of residence explicitly appearing on the resume, as explained above).

Applications in response to the same job offer were usually sent on the day of the release of the offer by e-mail from the mailbox of each candidate, or by the post. In the latter case, applications were mailed from various post offices in Ile-de-France in order to reduce the risk of detecting patterns in our *testing* procedures.

3. Descriptive Statistics on Success Rates

We first present descriptive statistics generated from our experiment. The response is considered to be positive when the recruiter invites the applicant to an interview, or if he/she conveys interest in obtaining more information regarding the candidate or his qualifications. However, the response is considered negative if the recruiter formally refuses the application, or if there is no reply.

Success rates by place of residence of the candidate

Overall, 192 job offers out of 498 (38.5%) that were subjected to testing led to a positive response for at least one of the six fictitious candidates. This positive response rate is slightly higher for cooks (41.9%) than for waiters (35.1%), reflecting a looser labour market in the case

of the latter. This finding is consistent with what was reported in the survey data contained in *The Labour Force Needs,* conducted by French employment agency, in which employers in the catering sector reported having greater difficulty in recruiting cooks (45% in Paris and 59% in Seine-Saint-Denis) than waiters (38% in Paris, 25% in Seine-Saint-Denis). We also note that success rates are lower for the low-skilled qualification profiles (31.7%) than for the medium-skilled ones (48.3%).

Tables 2 and 3 show the results in terms of gross success rates cross-tabulated for each type of candidate and in terms of pair-wise differences in success rates. In Table 2, we compute the direct and joint effects of the reputation of the area of residence, at the large administrative unit level and at the neighbourhood level. In Table 3, we present these results broken down by occupation and skill levels. Estimated standard deviations and confidence intervals are obtained by using the cluster-bootstrapping technique with 10,000 draws.[10]

The first part of the tables 2 and 3 lists the estimates of the joint effects of the large administrative unit's reputation (Seine-Saint Denis versus Paris) and the neighbourhood reputation (disadvantaged versus advantaged). We highlight this estimate because it is the most marked disparity among several other cases. The effect is significant and large (around 9.4 percentage points, third row in Table 2). We discern a similar result for all of the profiles of candidates, albeit with differences among them. Between waiters and cooks, disparity is almost doubled (see Table 3). One possible interpretation of this result is that the market for cooks is a bit tighter, which makes discriminatory behaviour more costly for employers. An alternative interpretation is that waiters work in face-to-face contact with customers, which can potentially generate an additional source of discrimination. A server requires strong interpersonal communication skills. Employers could exert prejudice by believing that living in a poorer area could be associated with lower expressive and communication skills of candidates. Discrimination related to the place of residence against waiters would be a case of statistical discrimination evoked by Arrow. This interpretation is consistent with the results of an earlier study derived from French data, which indicated that discrimination is more pronounced in France for professions and occupations that interact with the customers (Duguet *et al.*, 2010, Petit *et al.*, 2013).

[10] Cluster-bootstrap is based on drawing with replacement the cluster units (the offers) instead of observations.

Tables 2 and 3 show also the specific effects of residing in large disadvantaged administrative units as well as the effects associated with neighbourhood and municipality reputation. We found that only the two first effects are significant. Moreover, the effect of residing in a large deprived administrative unit (Table 2: - 7.7 %) is larger than the neighbourhood effect (-2.8 %). The neighbourhood effect is significant only among the inhabitants of Paris. We find no significant neighbourhood effect for inhabitants of Seine-Saint-Denis (bottom row, Table 2).

We now turn to our measures of discrimination broken down by occupation and skill level. The results are pretty similar compared to the global pattern with two exceptions. First, the effect of residing in a large disadvantaged administrative area is not any more significant for the low-skilled cooks. An interpretation for this finding is that we might not have enough observations to be able to discern this effect. Secondly, for higher-skilled workers, whether they be cooks or waiters, we do not find any more significant neighbourhood effects within Paris. This could be due to a lack of observations as well as tightness of the labor market for that level of skill, factors which do not facilitate discriminations by the employers.

We also conduct a more formal test for the existence of discrimination by carrying out a binomial test whose null hypothesis is that no group is preferred over another (see Duguet *et al.*, 2010 for a presentation). Results are very close to those contained in tables 2 and 3. [11]

Insert table 2 here

Insert Table 3 here

Controlling for the distance effects of the location of restaurants

This first set of results is quite interesting, but it also seems worthwhile to distinguish between the location of restaurants as opposed to solely the location of the candidates. In this vein, we compute the distance between the locations of candidates and restaurants. We have chosen addresses for the three Parisian candidates that are close to each other as well as for the three candidates residing in Seine-Saint-Denis (distances less than 2km; see Map 1). However, these two groups of candidates are situated quite far away from each other (14 km).

[11] Complete results of this tests are available upon request.

A distance effect could be reflected in the previously estimated effect of the reputation of the large administrative unit and could account for some of the apparent discrimination that we discern. Table 4 presents the results concerning the effect of reputation at the level of the large administrative unit when taking into account the distance to employment.

The unequal localization of employment assumed by the spatial mismatch framework is confirmed in our dataset, as the job offers registered during the experiment are located in Paris more frequently (56.6%) and less often in Seine -Saint- Denis (4.8%). For candidates who received at least one positive response, the distance to the average job is 11 km for the group of candidates located in Paris versus 21 km for other candidates. This difference is slightly offset by a stronger effect of congestion for Paris candidates. According to our calculations, at peak times they travel these distances by car at an average speed of 37 km / h versus 41 km / h for the candidates of Seine-Saint-Denis. Thus, in 62% of cases commuting time is over 10 minutes for Parisians, and in only 8% of cases this commuting time is more than 10 minutes for the candidates of Seine -Saint- Denis.

As listed in table 4, the effect of the reputation of large administrative unit is the strongest (-10.4 percentage points for response rates for the same job offers) when jobs are relatively further away from candidates located in Seine-Saint- Denis. This result is expected because it combines the spatial mismatch effect and the reputation effect of the region of reference. In contrast, when jobs are situated relatively closer to Seine -Saint- Denis, the sign of the coefficients becomes slightly positive (but not significant). Employers who are situated relatively close to Seine-Saint-Denis do not seem to prefer candidates living in Seine-Saint-Denis, despite their shorter commutes. This is particularly marked in the case of waiters. This result calls into question the general assumption stated in Tilly *et al.* (2001) that employers still have a preference for candidates located closeby irrespective of their location and occupation. The candidates' reputation of the place of residence effect plays a role in the choice of employer recruitment and might reinforce the spatial mismatch effect.

Insert Table 4 here

4. Econometric Estimates

In the protocol of our experiment, we do control for the characteristics of job seekers, but we do not control for the attributes of job offers made by companies. It is therefore necessary to

verify whether the results generated by the descriptive statistics depend on the specific characteristics of the job offers. To determine, *all other things being equal*, the effects of the reputation of both the neighbourhood and the large administrative unit on the probability of obtaining a positive response, it is possible to use a hierarchical discrete choice model (Bryk and Raudenbush, 1992 ; Hox, 2002). Our specification is:

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_{0j} + \beta_{1j}\text{DAU} + \beta_2\text{ZUS} + \beta_3\text{ZUS*DAU} + \gamma X_{ij} \qquad (1)$$

with p_{ij} being the probability that the application **i** to the offer **j** receives a positive response. The exogenous variables are the following.

X: level of education, the position posted (cook or waiters), characteristics of the job offer
ZUS: dummy variable for being located in a *Zone Urbaine Sensible*
DAU: dummy variable for being located in the disadvantaged large administrative unit (Seine-Saint-Denis).

The hierarchical structure of the model allows one to take account of the structure of the data generated through the testing procedure and to test the sensitivity of the estimated coefficients associated with the effects of the reputation of both the large administrative area and the neighbourhood to the characteristics of job offers. The objective is to control for the observable influences and to adjust for the unobservable influences associated with job offers to which résumés were sent. The form of the hierarchical model allows for parameters that are specified as follows:

For the intercept: $\beta_{0j} = \beta_0 + u_{0j} \qquad with \qquad u_{0j} \sim N(0, \sigma_{u0}^2) \qquad (2)$

For the coefficient of DAU :

$\beta_{1j} = \sum_{k=1}^{3} \alpha_k Time_k + u_{1j} \quad with \qquad u_{1j} \sim N(0, \sigma_{u1}^2) \qquad (3)$

The parameter $\boldsymbol{\beta_{1j}}$ is a linear combination of the average effect for each offer expressed by the coefficients α_k, which are fixed effects related to the location of offers, plus a random disturbance term $\boldsymbol{u_{1j}}$. $Time_k$ with k=1,...,3 denotes a set of dummy time variables. $Time_1$ is equal to one if the commuting time gap between our Paris Neighourhoods and those of Seine-Saint-Denis is at least of 5 minutes shorter for the Seine-Saint-Denis neighourhoods. $Time_2$ is

equal to one when this commuting time gap is lower than 5 minutes. $Time_3$ is equal to one if the commuting time gap is at least of 5 minutes shorter for the Paris neighourhoods. [12]

Model 1 corresponds to the case where only $\boldsymbol{\beta_{0j}}$ varies according to the offers, and thus $\alpha_1 = \alpha_2 = \alpha_3 = \sigma_{u1}^2 = 0$. This model is identical to a logit model with random effects. The estimating sample contains all 2,988 observations for which an indicator is observed for each qualitative variable regarding both the candidates and the job offers. We note the intra-class correlation is strong because more than 80% of the total variance is explained by the hierarchical structure of the data.

Insert Table 5 here

The results confirm a very marked effect for the large administrative unit and a strong neighbourhood reputation effect, albeit of lower magnitude. Table 6 presents the marginal effects that are obtained from these results. [13] The negative effect for DAU (Seine-Saint-Denis) is 4.26 points, and the effect of the disadvantaged neighbourhood in Paris is 2.59 percentage points. These effects are lower than those reported in table 2 but remain high in absolute terms and are close in magnitude to the effect of having a medium-skilled diploma.

The interacted effect of the large administrative unit and the neighbourhood is of the opposite sign, which means that a disadvantaged neighbourhood is less detrimental when one lives in a department that is already disadvantaged. We observe that the penalty associated with hiring people from disadvantaged neighbourhoods in Seine-Saint-Denis is not significant. Note that these estimates take into account firm characteristics. Contrary to the results published in Neumark *et al.* (1996), we do not observe differences among employers according to their type of restaurant.

Model 2 estimates several area effects taking into account potential spatial mismatch effects. We no longer impose the restriction that $\alpha_1 = \alpha_2 = \alpha_3$. Several tests were performed, and only the coefficient β_{1j} changes significantly depending on the location of the job offers. We note that the large administrative unit reputation effect is offset by the distance effect when offers

[12] We compute several thresholds but our conclusions remain the same.

[13] The average marginal effect has been computed by using the formula for discrete variables (Greene, 2002).

are situated to Seine-Saint-Denis (the estimated coefficient of DAU × TIME1). But the reputation effect has a significant influence on the propensity of being granted to an interview when jobs are situated close to the Parisian candidates or equidistant from Paris and Seine-Saint-Denis. A hypothesis test shows that the gap is not statistically significant. One can note that marginal effects derived from model 2 are close to those obtained from the model 1, except for the diploma effect, which is weaker.

Finally, Model 3 estimates equations (1) to (3) without any constraints. It improves the Akaike's information criteria (revealed in the lower AIC) and can be interpreted as being a tighter fit. In regards to lower the cross effect of the large administrative unit reputation and the commuting time gap, we obtain the following relationship:

$$\widehat{\beta_{1J}} = \underset{(0,685)}{-1.095} Time1 + \underset{(0,618)}{-2.165} Time2 + \underset{(0,380)}{-2,492} Time3 + \widehat{\mu_{kJ}}$$

with $\widehat{\mu_{kJ}} \sim N(0, 4.34^2)$

The negative effect of the bad reputation for the large administrative unit is distributed normally with mean - 2.492 and variance 4.34^2 for job offers situated closer to the Paris area. The average of this effect is only -2.165 for job offers located almost at the same distance from Paris and the Seine-Saint-Denis area with the same underlying variance. The average of this effect is not significant for jobs located closer to the Seine-Saint-Denis area.

Insert Table 6 here

The marginal effects associated with model 3 are in the same order than those derived from models 1 and 2. The principle difference is that the effect of the ZUS for Paris is weaker. We notice that the effect of living in a large administrative unit reinforces the spatial mismatch effect (as reported in Mouw, 2002 for racial stigma).

As an implication of our results, it appears that unemployed workers have a strong direct incentive to change their place of residence, both the neighbourhood as well as the department (Oreopoulos, 2003). This will necessitate paying a higher rent. Using the Insee House Survey, we found that rent gap between a ZUS or an attractive dwelling in the 18ème arrondissement for a 50 m^2 flat is approximately of 10,700 euros per year. Therefore, the effect of changing one's place of residence on the chance of getting a job is -2.83 percentage points for a job paying 20,400 euros on average per year. The expected salary gain is 580 euros per year. One

can conclude that on the net basis, there is no incentive for discriminated peoples to change place of residence.

5. Conclusion

We have showed that the reputation of the place of residence can strongly influence the probability of obtaining a job for waiters and cooks in the metropolitan Paris region. It plays an active role in the determinants of an individual's returns from working through the behaviour of employers, who appear to use the address as screening criterion.

To explain the effect specific to the place of residence, we evoke sources of statistical discrimination, that is to say discrimination based not on preferences *per se* but rather on information available to the employer. In the absence of perfect information about the productivity of job applicants, employers attribute to these individual candidates what they perceive to be the average characteristics of populations represented particularly in these neighbourhoods, i.e. French immigrants with low incomes and unstable employment patterns. Based on these perceptions, the place of residence could be perceived as a signal of lower professional reliability or of an undiversified social network.

Therefore, reputation of place of residence operates through complex channels. It is not simply additive with respect to the effect of departmental reputation. Moreover, because residents of disadvantaged areas with poor reputations are not that mobile, they cannot easily move in order to avoid these reputational effects. This behavioural mechanism might serve to weaken upward mobility of these workers.

These conclusions are based on a field experiment carried out in 2011 in the Paris area for the occupations of waiters and cooks. They are not necessarily applicable to other locations, other time periods, and other professions or occupations.

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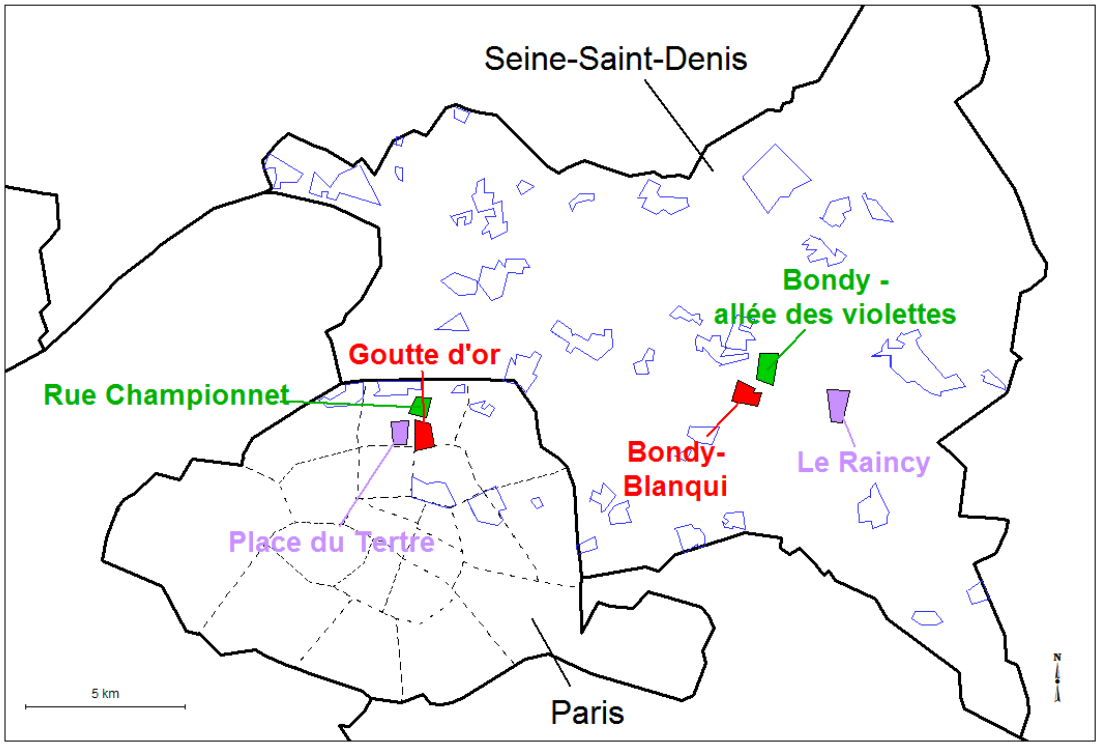
Table 1

Descriptive Statistics pertaining to the place of residence of the fictitious candidates

	Population	Share of foreigners	Median household income in Euros in 2009	Unemployment rate in 2009	Share of the population living in a ZUS (number of ZUS)	Share of individuals with some post secondary education
Paris (city and departement)	2,234,100	14.9%	€25,040	11.0%	6% (9)	54.0%
The 18th district of Paris	200,630	19.0%	€18,400	13.1%	17% (3)	45.7%
• Neighbourhood of Place du Tertre*	1,935	17.5%	€25,400	11.7%	0% (0)	57.1%
• Neighbourhood of Championnet*	2,225	18.8%	€14,565	12.4%	0%(0)	48.9%
• ZUS of the 18th district	23,190	32.7%	€13,700	20.1%	100% (1)	41.7%
Seine-Saint-Denis	1,515,980	21.2%	€15,080	16.5%	21% (36)	21.0%
• Le Raincy	13,780	5.4%	€26,630	9.3%	0% (0)	39.0%
Bondy	53,450	32.5%	€14,110	17.7%	29% (2)	18.6%
• Neighbourhood of Violettes*	2,558	19.1%	€15,923	16.3%	0%(0)	21.4%
• ZUS of Bondy	15,595	24.0%	€13,200	23.1%	100% (1)	13.2%

ZUS: Zone Urbaine Sensible (see note 1); *: This statistics are calculated at the Infra-communal census zone (IRIS).level.
Source: French Census and Fiscal Database of INSEE.

Map 1. Location of the deprived, intermediate and advantaged neighbourhoods



Red: deprived neighbourhoods; Green: Intermediate neighbourhoods; Violet: advantaged neighbourhoods
The others Zones Urbaines Sensibles (ZUS) of Seine-Saint-Denis and Paris are in blue (not part of our sample).

Table 2
Gross rate of success and differences in success rates for the same job offers

	Level	Standard deviation	90% confidence interval Lower bound	Upper bound
Joint effect of the disadvantaged large administrative area and disadvantaged neighbourhood				
Gross rate of success Disadvantaged neighbourhood in Seine-Saint-Denis (N=498)	17.1%	0.017	14.3%	19.8%
Advantaged neighbourhood in Paris (N=498)	26.5%	0.020	23.3%	29.7%
Differences in success rates for the same job offers- % points	-9.4***	1.93	-12.54	-6.33
Effect of the disadvantaged large administrative area				
Gross rate of success				
Seine-Saint-Denis (N=1,494)	16.7%	0.010	15.1%	18.3%
Paris (N=1,494)	24.4%	0.011	22.5%	26.2%
Differences in success rates for the same job offers- % points	-7.7***	1.342	-9.89	-5.52
Effect of disadvantaged neighbourhood (overall)				
Gross rate of success				
Disadvantaged neighbourhood (N=996)	19.2%	0.013	17.1%	21.2%
Advantaged neighbourhood (N=996)	22.0%	0.013	19.9%	24.2%
Differences in success rates for the same job offers- % points	-2.8***	1.102	-4.57	-1.06
Effect of disadvantaged neighbourhood (Paris only)				
Gross rate of success				
Disadvantaged neighbourhood (N=498)	21,3%	0,018	18,3%	24,3%
Advantaged neighbourhood (N=498)	26,5%	0,019	23,3%	29,7%
Differences in success rates for the same job offers- % points	-5,3***	1.751	-8,0	-2,5
Effect of the disadvantaged municipality (within Seine-Saint-Denis)				
Gross rate of success				
Disadvantaged municipality (Bondy)) (N=996)	16.3%	0.012	14.3%	18.2%
Advantaged municipality (Le Raincy) (N=498)	17.5%	0.017	14.7%	20.2%
Differences in success rates for the same job offers- % points	-1.21	1.287	-3.21	0.80

*N: number of observations; Standard deviation and confidence intervals were calculated using the clustering-bootstrapping method based on 10,000 draws.*** significant at the 1% level*
Source: Data generated through testing experiment, with 2,988 observations.

Table 3
Differences in response rates for the same job offers

Breakdowns according to skill level and occupation

pairwise comparisons for the same job offers	Gap (in % points)	Standard deviation	Gap (in % points)	Standard deviation
Joint effect of disadvantaged large administrative area and disadvantaged neighbourhood				
	Cooks		**Waiters**	
Low-skilled	**-6.6***	**3.385**	**-10.3*****	**2.725**
Medium-skilled	**-7.8***	**4.216**	**-14.7*****	**5.611**
Effect of disadvantaged large administrative area				
	Cooks		**Waiters**	
Low-skilled	-1.7	2.272	**-8.7*****	2.273
Medium-skilled	**-8.9*****	**2.984**	**-13.4*****	3.451
Effect of disadvantaged neighbourhood				
	Cooks		**Waiters**	
Low-skilled				
Paris	**-5.8***	**3.074**	**-4.5****	**-2.108**
Seine-Saint-Denis	-2.9	2.513	0.01	1.000
Medium-skilled				
Paris	-3.5	3.653	-8	5.320
Seine-Saint-Denis	1.75	3.431	0.00	0.003

Standard Deviation were calculated using the clustering-bootstrapping method based on 10, 000 draws.
In our testing experiment we have 822 Low-skilled cooks, 936 Low-skilled waiters, 696 medium-skilled cooks and 524 medium-skilled waiters.
**** significant at the 1% level, ** at the 5% level, and* at the 10% level*
Source: Data generated through testing experiment, with 2,988 observations.

Table 4
Differences in response rates for the disadvantaged large administrative area according to the commuting time between the place of residence and the workplace (gap in % points)

Gap in commuting time	Commute of Paris-based candidates at least 5 minutes longer (N=342)	No large gap in commuting times (N=324)	Commute of Paris-based candidates at least 5 minutes shorter (N = 2,322)
ALL	0.5 (2.917)	**-5.4**** **(2.507)**	**-10.4***** **(1.783)**
Cooks			
Low-skilled	1.5 (7.310)	-5.0 (6.095)	-1.8 (2.511)
Medium-skilled	2.0 (6.043)	-3.3 (8.612)	**-11.6***** **(3.529)**
Waiters			
Low-skilled	-8.4 (5.801)	-7.1 (7.886)	**-9.1***** **(2.514)**
Medium-skilled	-6.6 (11.195)	no obs	**-16.0***** **(3.744)**

Standard deviation are in parenthesis. They were calculated using the clustering-bootstrapping method based on 10, 000 draws.
In our testing experiment we have 822 Low-skilled cooks, 936 Low-skilled waiters, 696 medium-skilled cooks and 524 medium-skilled waiters.
Source: Data generated through testing experiment, with 2,988 observations

Table 5
Estimates of the probability of receiving a positive response

Results from hierarchal discrete choice model

	Model 1		Model 2		Model 3	
Location of the offer	Coef.	std. err	Coef.	std. err	Coef.	std. err
Located in Seine St Denis (DAU)	-1.395***	0.183				
DAU×TIME1			-0.423	0.376	-1.095	0,685
DAU×TIME2			-1.300***	0.341	-2.165***	0,618
DAU×TIME3			-1.662***	0.217	-2,492***	0,380
Located in a Zone Urbaine Sensible (ZUS)	-0.642***	0.208	-0.656***	0.211	-0,749***	0,227
ZUS×DAU	0.742**	0.306	0.756***	0.308	0,882**	0,344
Characteristics of the individual						
Medium-skilled certification	1.147**	0.491	1.224***	0.502	1,415**	0,565
Offer for a cook (ref. waiter)	1.019**	0.450	0.979**	0.462	1,009*	0,521
Characteristics of the offer and the enterprise						
Restaurants located in Paris (Paris)	1.005**	0.455	1.189***	0.478	1,396***	0,540
Offer found in Pôle Emploi	0.933*	0.519	0.956*	0.532	1,020	0,602
Constant	-4.966***	0,832	-4.786***	0.837	-5,572***	0,956
Sigma u0	3.699***	0,287	3.775***	0.296	2,610***	0,362
Sigma u1					4,335***	0,346
Intra-class correlation	80.6%		81.3%		67.5%	
Pseudo-R2	4.86%		5.17%		7.42%	
Log-likelihood	-989.2		-985.9		-960.0	
Akaike Information criterion	2,018.3		2,015.9		1,966.0	

Time1 is equal to one if the commuting time gap between our Paris neighourhood and those of Seine-Saint-Denis is at least of 5 minutes in favour of Seine-Saint-Denis neighourhoods.
Time2 is equal to one when this commuting time gap is shorter than 5 minutes.
Time3 is equal to one if the commuting time is at least of 5 minutes in favour of Paris neighourhoods.
DAU: disadvantaged large administrative unit
**** significant at the 1% level, ** at the 5% level, and* at the 10% level*
Source: Data generated through the testing experiment, with 2,988 observations.

Table 6

Determination of marginal effects associated with commuting time

	Model 1	Model 2	Model 3
Located in Seine St Denis (DAU)	-5.50*** [-7.69 ; -3.40]		
×TIME1		-2.08 [-5.29 ; +2.31]	-4.03** [-6.79 ; -1.72]
× TIME2		-5.05*** [-7.77 ; -2.77]	-5.16*** [-7.94 ; -2.79]
× TIME3		-5.82*** [-8.13 ; -3.62]	-5.32*** [-8.17 ; -2.92]
Located in the ZUS in Seine-St-Denis (DAU)	-5.18*** [-7.39 ; -3.15]		
× TIME1		-1.20 [-4.90 ; +4.19]	-3.65** [-6.51 ; -1.10]
× TIME2		-4.66 [-7.42 ; -2.16]	-5.04*** [-6.51 ; -2.74]
× TIME3		-5.56*** [-7.89 ; -3.38]	-5.25*** [-8.08 ; -2.89]
Located in the ZUS in Paris	-3.27*** [-5.07 ; -1.59]	-3.25*** [-5.05 ; -1.55]	-2.83*** [-4.72 ; -1.25]
Medium-skilled certification	+4.99*** [+2.07;+8.37]	+4.83*** [+2.03 ; +8.47]	+3.50*** [+1.27 ; +6.51]

Time1 is equal to one if the commuting time gap between our Paris neighourhood and those of Seine-Saint-Denis is at least of 5 minutes in favour of Seine-Saint-Denis neighourhoods.

Time2 is equal to one when this commuting time gap is shorter than 5 minutes.

Time3 is equal to one if the commuting time is at least of 5 minutes in favour of Paris neighourhoods.

The 90% confidence intervals in square brackets are obtained via the clustering-bootstrapping technique using 10,000 draws

**** significant at the 1% level, ** at the 5% level, and* at the 10% level*

Source: Data generated through testing experiment, with 2,988 observations.

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