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Residential-based discrimination in the labor market*

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Abstract

Through a correspondence study, this paper investigates whether employers discriminate job applicants based on their living conditions. Exploiting the natural setting provided by a Rapid Re-housing Program, we sent 1,347 job applications for low-qualified front-desk jobs in Brno, Czech Republic. The resumes exogenously differed in only one main aspect represented by the address of the applicants, signaling both the quality of the neighborhood and the quality of the housing conditions in which they were living. We found that while the higher quality of the district has a strong effect in increasing the hiring chances (+20%) the actual improvement of the living conditions standards, *per se*, does not generate any significant positive effect.

Keywords: correspondence study, labor discrimination, housing conditions, Rapid Re-housing.

JEL codes: C93, J08, J71.

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1 Introduction

Ending homelessness is slowly becoming a focal point of public policies. Rapid Re-housing Programs provide support services to move families or individuals experiencing homelessness into stable housing (Burt et al., 2016). In most of the cases, homeless people are relocated from shelters located in a disadvantaged neighborhoods to standard apartments which are often located in very similar deprived districts.1

Parallel strands of literature have accumulated evidence documenting how people are discriminated based on how and where they live. Previous research in urban studies (Bonnet et al., 2016) has documented how living in deprived suburbs relates to systematically lower chances of getting an appointment for a housing vacancy in better neighborhoods. Similar evidence has stemmed from studies in labor economics.

People living in deprived neighborhoods have lower chances of being hired for a job (Nunn et al., 2010). Poor housing conditions could also signal a lower productivity to potential employers as those are associated with sleep deprivation (Léger et al., 2017; Gonzalez and Tyminski, 2020) that lowers productivity. This aspect can plausibly represent fundamental trigger for statistical-based discrimination thus negatively affecting both employment and wage prospects (Gibson and Shrader, 2018).2

A paramount objective of Rapid Re-housing programs is to enhance the job prospects of the people they target. However, can these programs deliver even if participants eventually stay in deprived neighborhoods? In most cases, living in a disadvantaged neighborhood is associated with low-quality housing. This makes it difficult to disentangle the effect of the neighborhood from the effect of living in poor quality accommodations. Both the deprived neighborhood and the poor quality of the housing can generate different signals and impacts on the level of worker productivity (Healy, 1971).

To disentangle the effect of poor housing conditions and living in deprived neighborhood we conduct a correspondence study3 based on the setup of the Rapid Re-Housing

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1The extensive and updated survey paper by Byrne et al. (2021) offers a systematic literature review concerning Rapid Re-housing projects.
2In the Rapid Re-housing program conducted in Brno the treated adult participants (i.e., those who were moved in better quality housing) were 1.73 times less likely to suffer sleep deprivation than adults from the control group 12 months after the treatment (Ripka, Černá and Kubala, 2018). Golabek-Goldman (2016) argues that homeless job applicants indeed face discrimination in the labor market when they provide the address of a shelter or do not have any address to provide.
3Correspondence testing (also called audit studies) is a field-experimental technique used to investigate discrimination in multiple contexts. In labour economics, carefully matched, fictitious applications are forwarded in response to advertised job vacancies. To avoid detection the applications cannot be identical, but the logic of the technique is to control strictly for all objective factors. Consequently, the only distinguishing feature of the applications is the main characteristic—the specific address of the applicant in our case—that is being tested. To safeguard against the possibility that letter style may influence employer response the letters are regularly reversed and allocated equally between the candidates. In this way, the influence of the main characteristic of interest on selection for interview is isolated. For more details and examples see e.g., Bertrand and Duflo (2017); Gaddis (2018); Giulietti et al. (2019); Horváth (2020); Rooth (2021).
project in Brno (Ripka, Černá, Kubala, Krčál and Staněk, 2018). We investigate whether employers discriminate job applicants living in poor housing conditions (shelters) placed in a deprived neighborhood compared to applicants relocated to a conventional accommodation located in the very same deprived neighborhood. We sent 1,347 job applications (short cover emails with resumes) to 449 job calls for low-qualified front-desk jobs in Brno, Czech Republic, during 2018. The resumes differed in correspondence addresses signalling neighborhood and accommodation quality: One applicant was living in a standard apartment in a good neighborhood (treatment T0), one in a standard apartment in a deprived neighborhood (treatment T1), and one in a shelter located in the deprived neighborhood (treatment T2).

We find that a large and statistically significant negative effect on the callback rate is generated by the neighborhood *per se*. Employers’ response rates decrease by approximately 20% for applicants living in the deprived neighborhood compared to comparable candidates residing in a standard residential area. The difference between the good housing conditions represented by the conventional apartment and the poor living conditions provided by the shelter is small (1 percentage point) and not statistically significant at any conventional level.

2 Experimental Design

In the correspondence field experiment we exogenously manipulate the applicants’ addresses and observe the callback rate of the employers interested in having an interview with the candidate. According to Quillian et al. (2018), this measure captures the lower bound of the discriminatory behavior.

In the experiment, a fictitious young woman with small children searched for a low-qualified front-office job in Brno or in an adjacent municipality. This profile fits the situation common to the poorest families in Brno (see the Rapid Re-Housing Project in Brno, Ripka, Černá, Kubala, Krčál and Staněk, 2018). To minimize the social cost generated by the experiment (Zschirnt, 2019; Crabtree and Dhima, 2021), we immediately responded to positive callbacks that the applicant was no longer interested in the job offer.

2.1 Treatments

Living in poor housing conditions is frequently associated with living in a deprived neighborhood, which can *per se* generate multiple negative signals to potential employers (Bunel et al., 2016; Tunstall et al., 2014). To disentangle these effects, we produced a series of similar fictitious resumes exogenously varying the implicit information about

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*Rapid Re-housing Programs usually cover too few participants to allow for reliable inference of labor market effects using observational data.*
their living conditions signaled by the address reported in the resume. Housing conditions are indicated by living in a shelter (poor condition) or in a standard apartment (good condition), and the quality of the neighborhood by the street name. We selected three real addresses located in the city center of Brno (within walking distance of less than 1 km) and well-connected to public transportation system (see Figure 1):

**T0**: good neighborhood and standard housing conditions: “tř. Kpt. Jaroše 15”.

**T1**: deprived neighborhood and standard housing conditions: “Cejl 18”.

**T2**: deprived neighborhood and poor housing conditions: “Ubytovna [shelter] Pohoda, Cejl 10a”.

The deprived neighborhood in T1 and T2 is signaled by Cejl street, eponymous to a neighborhood that does not enjoy a favorable reputation among locals. The neighborhood is also nicknamed “Bronx-of-Brno” (Ruzicka et al., 2017). Data for the sample of young women in their twenties from 2011 census shows (see Table A.2 in the online appendix) that the population of this neighborhood, on average, lags behind in education, economic activity and access to the internet in comparison to T0 as well as to the full sample of all neighborhoods in Brno. It also exceeds T0 and full sample in the number of children per capita.

Poor housing conditions in T2 are signaled by the address as well as the name of the building “Ubytovna Pohoda” is explicit about the shelter status as “ubytovna” is a Czech term for a shelter or public dormitory.

The design rests on variation in the address signaling the quality of neighborhood and housing conditions. All three applicants were applying to each call. This allows us to identify potential hiring discrimination using within-call design. Data were collected from April to December 2018.

### 2.2 Field Setup

The job calls were selected from a popular employment website prace.cz on the basis of the following criteria: (i) The workplace was located in Brno or in an adjacent municipality; (ii) The call was for a front-desk job – i.e., position involving direct interaction with customers; (iii) No or only primary education was required, or it was usual not to require higher education for such a position.

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*Buildings at addresses signalling good housing conditions are similar in appearance (see Figure A.3 in the online appendix).*

*The correspondence study is designed to identify overall discrimination regardless of the motivation to discriminate. Our results can thus provide general guidance to policy-makers but we cannot explicitly disentangle statistical-based from taste-based discrimination.*
The three experimental applications were submitted to a relevant call in randomized order. Applications were sent every 24 hours, via an online form (specific to each call) on prace.cz (see Figure A.4 in the online appendix). We used the following fields:

- **First and second name**: we used three Czech-sounding names typical for women of respective age: Michaela Benešová, Kateřina Černá, and Lucie Dvořáková. For the construction of names, we used a database of names provided by the Ministry of Interior of the Czech Republic. We have combined the three most frequent first and second names of females born in the early 1990s. All first and second names indicate that the applicant is a female.

- **E-mail address**: we used three e-mail accounts at seznam.cz – a dominant provider of online services in the Czech Republic.

- **Resume**: attached as a file (for details see below).

- **Cover letter**: in a text box, we intended to limit all signals to the resume. Therefore, we attached three short, simple cover letters to each call containing just a greeting and 1–2 non-informative sentences and signature (see Sections A.2/A.3/A.4 in the online appendix).

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5 The database is no longer available due to GDPR regulation.
6 michaela.benesova578@seznam.cz; katerina.cerna420@seznam.cz; lucie.dvorakova297@seznam.cz.
7 New version of the on-line form at prace.cz no longer contains this field.
The key element representing the treatment manipulation was embedded only in the resumes. The language, polite but rather simple, as well as a structure and outline of resumes were inspired by real-life sample of resumes send by low-qualified applicants. Resumes were sent as MS Word docx files. To conceal the fact that these applicants were fictitious and very similar on purpose, we differentiated the experimental resumes with ancillary details that were randomly varied within-call, such as the layout style in three different fashions (A, B, and C) and the chronology of the previous appointments (job history configurations A and B).

3 Results

Our analysis focuses on the callback rates (via email) registered under the three main treatments (see Figure 2). Candidates living in standard housing conditions located in a standard neighborhood (T0) were approached for a job interview in 18.5% of the cases. The callback rate decreased under T1 and T2 to 15.8% and 14.9%, respectively. The relative success of the candidate—keeping her abilities constant—declined by approximately 20% (in relative terms) when the quality of the neighborhood and housing conditions decreased.

Non-parametric testing, for each pairwise comparison of the treatments, statistically validates this descriptive evidence. Exploiting the within-subject design of our experimental setting, McNemar permutation tests (Westfall et al., 2010; Marchegiani et al., 2016) reveal statistically significant differences between T0 and T1 (18.5% > 15.8%; \( p\)-value= 0.034), T0 and T2 (18.5% > 14.9%; \( p\)-value= 0.006). No statistically significant difference emerges from the comparison between T1 and T2 (\( p\)-value= 0.371).

Table 1 refines the non-parametric analysis employing a regression framework that allows us to easily control for the randomized ancillary within-call variations we implemented in the individual applications to disguise them.

Given the binary nature of our outcome measure, we adopt a parsimonious panel-LPM that allows us both to use fix effects as well as clustered standard errors at job call level, and capturing the dynamics of the sending sequence.

Our empirical exercise is summarized by the following model:

\[
\text{Callback}_{jit} = \beta_0(T0) + \beta_1(T1) + \beta_2(T2) + \epsilon_{jit}
\]  

(1)

Results reported in column (1) replicates the non-parametric analysis. Compared to the baseline case T0 (18.5%), callback chances under T1 and T2 decreased by \(-2.7\) and \(-3.6\) percentage points, respectively. Both coefficients are statistically significant, and their relative magnitudes are quite considerable in size: \(-14.6\)% and \(-19.5\)%.
Figure 2: Callback rates, by treatments.

Notes: McNemar permutation tests; *, ** and *** denote statistical significance at the 10%, 5% and 1% level. Error bars based on the standard deviations of the means (dashed bars).
### Table 1: Callback probability, by treatments

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable: Callback (0-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Constant (standard apartment in good neighborhood; T0)</td>
<td>0.185***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
</tr>
<tr>
<td>Standard apartment in deprived neighborhood (T1)</td>
<td>−0.027**</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
</tr>
<tr>
<td>Shelter in deprived neighborhood (T2)</td>
<td>−0.036***</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
</tr>
</tbody>
</table>

**Ordering and ancillary characteristics**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordering: 2(^{nd}) day</td>
<td>−0.024**</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
</tr>
<tr>
<td>Ordering: 3(^{rd}) day</td>
<td>−0.038***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
</tr>
<tr>
<td>Job history “B”</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
</tr>
<tr>
<td>Layout style “B”</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
</tr>
<tr>
<td>Layout style “C”</td>
<td>−0.019*</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
</tr>
</tbody>
</table>

Job call fixed effects: Yes

Observations: 1,347

$R^2$: 0.011

Notes: panel-LPM, clustered standard errors are reported in parentheses: *, ** and *** denote statistical significance at the 10%, 5% and 1% level.
we test the two coefficients, the null-hypothesis of equality is not rejected (Wald test $p$-value $= 0.371$). In column (2), we extend model (1) controlling for the configuration of the job history of the candidate, the layout of the cover letter/resume, and if the resume of a given candidate was sent the 1st, 2nd or 3rd day after the release of the job call. The layout turned out to have virtually no impact on the outcome as well as the job history of the worker. Resumes sent the 2nd and 3rd day—contrasted against resumes sent on the 1st day—registered a significantly lower probability of being selected by $−2.4$ and $−3.8$ percentage points, respectively. This effect is fully compatible with conventional temporal trends in hiring procedures. As expected, due to full randomization of the resumes’ ancillary configurations across treatments, both the coefficients of our leading treatment dummies ($T1$ and $T2$) remained largely unaffected after the introduction of the multiple control variables.

4 Conclusion

In this study, we investigated whether employers discriminate job applicants living in poor housing conditions and deprived neighborhoods compared to candidates—of comparable skills—living in standard residential areas.

We measured the effect of residential discrimination within-call. We sent three resumes for every call, one had an address of an apartment in a good neighborhood, one an apartment in a deprived neighborhood and one of a shelter locate in a deprived neighborhood. We registered a negative and relatively large effect of the neighborhood: compared to standard residential conditions, the response rate for a job interview decreases by approximately 20% for applicants living in a deprived neighborhood. The difference between the apartment and the shelter both located in a deprived neighborhood is small (1 percentage point) and not statistically significant at any conventional level. Our findings show that employers systematically discriminate against job applicants living in more disadvantaged districts without emphasising the actual housing conditions.

Our results stress the need to design Rapid Re-Housing programs not only to provide better living conditions but also to move participants out of deprived neighborhoods. Our results also provide an empirical bases for suggestions made by Golabek-Goldman (2016) to introduce “address blind” recruiting policies.
References


Rooth, D.-O. (2021), ‘Correspondence testing studies’, *IZA World of Labor*.


A Online Appendix

A.1 Neighborhood characteristics

Table A.2: Neighborhoods: Summary statistics

<table>
<thead>
<tr>
<th></th>
<th>Neighbourhood</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cen (T1 and T2)</td>
<td>Tř kpt. Jarol. (T0)</td>
</tr>
<tr>
<td>Tertiary education (share)</td>
<td>0.152 (0.360)</td>
<td>0.422 (0.495)</td>
</tr>
<tr>
<td>Primary education (share)</td>
<td>0.259 (0.440)</td>
<td>0.076 (0.265)</td>
</tr>
<tr>
<td>PC with internet at home (share)</td>
<td>0.312 (0.466)</td>
<td>0.616 (0.488)</td>
</tr>
<tr>
<td>Children per capita</td>
<td>0.705 (0.999)</td>
<td>0.173 (0.554)</td>
</tr>
<tr>
<td>Economically active (share)</td>
<td>0.527 (0.502)</td>
<td>0.627 (0.485)</td>
</tr>
<tr>
<td>Observations (n)</td>
<td>112</td>
<td>185</td>
</tr>
</tbody>
</table>

Notes: Table reports characteristics of population of women in their twenties living in Brno obtained using 2011 census data. Columns (1) to (3) report means and standard deviations in parentheses. Columns (4) to (6) report differences in means and results of t-tests: * , ** and *** denote statistical significance at the 10%, 5% and 1% level.

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A.2 Representative resume layout

Name
[Address]

Education:
*Primary school located in Brno

Experience:
*Call-irrelevant position before maternity leave
*Maternity leave

Last year experience:
*0 or 2 call-irrelevant positions
*Call-relevant position
A.3 Ancillary treatment configurations

Pre-maternity leave call-irrelevant positions

Between years 2010 and 2011, I worked as an assistant of a plastic press operator in PlastBrno s.r.o. in Brno.

I worked for two years as a textile quality controller in Nová Mosilana in Brno, where I started in 2010.

After finishing school, I worked two years until 2011 on a production line in Modus in Brno, where televisions and computers were assembled.

Maternity leave signals

I was home on maternity leave with my two kids for five years.

Then I was home on parental leave for five years, where I took care of my two kids.

I was on parental leave with my two kids from 2012 to 2016.

Call-irrelevant experience

Packer of promotional items

Cleaner in Olamn company

I worked in a warehouse in Zator.

Metalworker in BMI, Brno
A.4  Cover letters

Variant 1:

Dobrý den,
ráda bych se přihlasila k vám do práce.

Dear Sir or Madam,
I would like to apply for a job in your company.

Variant 2:

Dobrý den,
odpovídám na vas inzerat. Budu rada když se ozvete.

Dear Sir or Madam,
I am writing in response to your advertisement. I am looking forward to hear from you.

Variant 3:

Zdravím,
posilám vám muj životopis. Rada bych u vás pracovala.

Hello,
You can find my resume attached. I would like to work in your company.
A.5 Pictures

Figure A.3: Houses in the correspondence experiment

(a) T0: tř. Kpt. Jaroše 15

(b) T1: Cejl 18

(c) T2: Ubytovna Pohoda, Cejl 10a

Source: Google Maps
Figure A.4: Application form at \textit{prace.cz}
Lucie Dvořáková
Ubytovna Pohoda
Cejl 10a
lucie.dvorakova297@seznam.cz

Škola
Základní škola Kotlářská, Brno

Předchozí zaměstnání
- 2010-2011 jsem dělala pomocnici lisuře plastů v Brně v PlastBrno s.r.i.
- Od 2012 do 2016 jsem byla s mými dvěma dětmi na rodičovské dovolené.

V minulém roce jsem dělala:
- Pracovala jsem ve skladu v Zatoru.
- kovodělnice v BMI v Brně
- Prodavačka v obchodě s botami Obuv Gryc v Brně