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Disability Discrimination in the Rental Housing Market
– *A Field Experiment on Blind Tenants*

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Disability Discrimination in the Rental Housing Market – A Field Experiment on Blind Tenants

Luca Fumarco[a]

Abstract. Although discrimination against disabled people has been investigated in the labor market, the housing market has received less attention in this regard. This paper focuses on the latter market and investigates whether blind tenants assisted by guide dogs are discriminated against in the rental housing market. The data are collected through a field experiment in which written applications were sent in response to online advertisements posted by different types of advertisers. I find statistically significant evidence that one type of online advertiser, that is, the apartment owner (i.e., a person who advertises and rents out his/her own apartment(s) on his/her own), discriminates against blind tenants, because of the presence of the guide dog, not because of the disability. According to the legislation, this behavior qualifies as illegal discrimination.

[a] Linnaeus University, Department of Economics and Statistics, Växjö, Sweden.
E-mail: luca.furmaco@lnu.se

1   Introduction

Over 2.7 million people are blind in Europe (Pascolini & Mariotti, 2012).[1] This population, along with those who are affected by other types of impairments, is discriminated against despite the protection provided by the European Union legislation (e.g., Jones, 2008, for disability discrimination in the labor market). Art. 21 of the Charter of Fundamental Rights of the European Union, 2000, states that any discrimination based on disability shall be prohibited.[2] Although discrimination against disabled people has been investigated in the labor market (Jones, 2008, for a literature review), the housing market has received less attention in this regard. However, also this type of discrimination deserves attention. A dwelling is a primary necessity that determines social inclusion, job opportunities, and the enjoyment of public services; therefore, discrimination in the housing market against disabled people harms their quality of life.

Studies that have investigated whether blind tenants, and more in general impaired tenants, are discriminated against in the housing market have used the experimental methodology referred to as the "in-person audit test." Within the context of disability discrimination, this experimental technique is used in the US by the Urban Institute (Turner et al., 2005) and by specialized law firms for audit reports (e.g., Murphy, 2007). Two actors, playing the role of tenants enquiring about housing, are matched over all characteristics except for one (e.g., one actor is blind

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[1] I use the term "blind" because I am referring to persons who specifically have the maximum visual impairment. Alternative terms, such as "visually impaired," lack specificity regarding the intensity of the impairment; differently, there are clinical and legal parameters that define whether a person is "blind." For example, according to the WHO definition, a person is to be considered blind when her best eye acuity is lower than 20/500 or is characterized by a visual field lower than 10 degrees (Maberley et al., 2006). The disability benefit systems used by individual countries are based on slightly different legal definitions.

[2] There also are precise EU directives to which individual member countries should align their legislations. The 2000/78/CE Directive also prohibits employment discrimination on grounds of disability. Directive Proposal COM, 2008, 426, aims at also protecting disabled people beyond the employment market; because this directive is still a proposal, single countries' legislations remain heterogeneous on this matter.

and the other is not) or two (e.g., one actor is blind and owns a guide dog; the other actor neither is blind nor owns a dog). The disabled actor visits a number of housing agencies to inquire about available housing units; if he owns an assistance dog, he also requests a waiver of restrictions on and/or fees related to the dog. The non-disabled actor who owns no dog visits the same housing agencies and inquires about housing units. There is evidence of discrimination against disabled tenants when the percentage of housing units made available for the disabled actor is statistically significantly lower than that made available for the non-disabled actor (e.g., Turner et al., 2005, for a similar analysis on discrimination against deaf tenants).[3] Additionally, there is evidence of discrimination whenever the blind applicant receives a refusal to accommodate his guide dog (e.g., Turner et al., 2005; Murphy, 2007).[4]

Results from American in-person audit tests suggest that blind tenants might be treated differently, with a lower percentage of housing units made available to them (e.g., Murphy, 2007). Additionally, blind tenants receive refusals to waive restrictions and/or fees on their guide dogs (e.g., Murphy, 2007).

There are at least three concerns with these studies. First, in-person audit experiments on disabled tenants do not typically involve large samples and do not perform statistical hypothesis testing (Turner et al., 2005), so that it is not possible to infer predictions about larger populations than the sample. Second, in general, in-person audit tests may produce biased results if some actors' characteristics are not appropriately accounted for (Heckman & Siegelman, 1993; Heckman,

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[3] Other studies investigate discrimination against blind tenants but do not make any statistical inferences. Turner et al. (2005) propose an experimental design to investigate discrimination against blind tenants with and without guide dogs and then conduct a pilot experiment, which is not suitable for statistical inference. Murphy (2007) is an example of the type of audit report typically implemented by American law firms; although these experiments use matched pairs of applicants, they do not generally implement any statistical inference.

[4] In the US, refusal to accommodate guide dogs violates the Reasonable Accommodation Under the Fair Housing Act, 2004.

1998; Riach and Rich, 2002; Pager, 2007), so that these characteristics are observed by the landlords but not by the researchers. In the jargon used for experiments in the social sciences, it is standard to call them unobserved characteristics, and they might result from poorly matching the actors. Pager (2007) and Riach and Rich (2002) suggest that such characteristics might be reflected in subtle differences in how applicant tenants conduct the interactions with the housing brokers. Furthermore, in studies on blind tenants with a guide dog, the dog's features might represent an additional source of unobservable disturbances.[5] Taken together, these unobservable characteristics might unwillingly convey systematically different information on the matched applicants, driving the differential treatment and thus causing biased estimates of discrimination (Pager, 2007). Third, a serious general threat to the validity of in-person audit tests is the experimenter effect (Pager, 2007). Actors might be (sub)consciously motivated to obtain evidence of discrimination and consequently adjust their behavior during their interactions with brokers (Pager, 2007).

This study circumvents these three problems by utilizing data from a written field experiment, known as correspondence test, which permits obtaining unbiased estimates of discrimination (Riach & Rich, 2002).[6] Written applications are delivered via the Internet, which facilitates contacting a large number of landlords and thus allowing for statistical inferences to be made. Time and budget limitations are much less important than they are in-person audit experiments because it takes only a few additional minutes to send additional inquiries and register the re-

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[5] For instance, the conditions of the dog's hair, its smell and its behavior during interactions with housing brokers might be perceived as relevant and affect the experimental results if they were interpreted by the brokers as signals of the applicant's socioeconomic status and ability to manage his possessions.

[6] Because of the unbiased results, this methodology is also used to investigate other types of discrimination in the rental housing market, namely, discrimination based on ethnicity (e.g., for Italy, Baldini & Federici, 2011; for Sweden, Carlsson & Eriksson, 2013), gender (e.g., for Sweden, Ahmed & Hammarstedt, 2008), sexual orientation (e.g., for Sweden, Ahmed & Hammarstedt, 2009), age and employment status (for Sweden, Carlsson & Eriksson, 2013).

sponses and the cost of contacting additional landlords is virtually null. Because no actor is involved, the use of written field experiments also allows for almost perfect control over the applications (Pager, 2007), thus reducing the bias caused by unobservable characteristics and by the experimenter effect.

However, correspondence tests present one problem. The target characteristic, in this case the blindness, has to be signaled in a way that does not seem unnatural (Pager, 2007).[7] Blind applicants would rarely reveal their health conditions directly when applying for apartments. However, because guide dogs are an international symbol for the blind and dogs in general are often seen as family members by their owners, this experiment solves this problem by mentioning in the application the presence of the assistance dog.[8] This information serves as a cue for the tenant's disability.

The actual implementation of the correspondence test is simple. First, I prepared the bogus applications for the control group, composed of married tenants,[9] and for the target group, composed of married tenants where the wife is blind.[10] Then, I sent these applications in response to online housing advertisements in Italy. Finally, I compared the invitation rates to visit the apartments across the control and target groups.

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[7] For instance, in experiments aimed at analyzing ethnic or gender discrimination in hiring, the applicant's name is used as a signal (e.g., for Sweden, Carlsson & Rooth, 2007; for the US, Bertrand & Mullainathan, 2004).

[8] For instance, in the US and in Italy, many people consider their dogs friends/family members (Eurispes, 2013, and the online website of the American Veterinary Medical Association). Thus, informing a landlord about the presence of the guide dog seems a natural behavior.

[9] The usage of households rather than individuals is a strategy that is also adopted in studies on sexual orientation discrimination in the rental housing market (e.g., for Sweden, Ahmed & Hammarstedt, 2009), where the tenants' sexual orientation is indirectly communicated through a brief description of the household.

[10] I do not opt for married tenants where the husband is blind to avoid the risk that online advertisers would have discriminated these households based on expected lower household income, which would confound the estimates for disability discrimination. This risk is attenuated with a blind wife because women's employment rates and wages are already lower than men's in many OECD countries. Source: OECD Employment and Labour Market Statistics.

Although Italian legislation protects disabled people from discrimination (Italian Law no. 67, 2006),[11] the data suggest that on average married tenants with a blind wife assisted by a guide dog are less likely to receive an invitation to visit the apartment.

However, this information alone would say little about the reason online advertisers of apartments for rent discriminate and how to possibly reduce this discrimination. Therefore, I add two variations to the standard correspondence tests. First, this test includes a second control group composed of married tenants with a pet dog. The comparison between the invitation rates to visit apartments for this second control group and for married tenants where the wife is blind permits investigating whether blind tenants assisted by a guide dog are discriminated against specifically because of their disability. Second, I analyze two separate sub-samples of online advertisers. There are "housing brokers," that is, professional intermediary agents who advertise and rent out apartments that belong to someone else, who in return pays the housing brokers' commissions,[12] and there are "apartment owners," who advertise and rent out their own apartments, managing the process entirely on their own;[13] no housing broker is involved in managing these apartments. It is likely that these two groups of online advertisers differ in terms of knowledge of and respect for the legislation. In contrast to apartment owners, in Italy, housing brokers must either pass a specific exam or spend a period of at least 12 months as practitioners in a housing agency in order to obtain a brokerage license (Federazione Italiana Mediatori Agenti d'Affari, 2006). Thus, housing brokers are more likely to have complete knowledge of the legislation.

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[11] According to this law, disabled people cannot be discriminated against based on their impairment (i.e., blindness) or, more indirectly, on factors related to it (i.e., the presence of the guide dog). This law embodies the principles suggested in Directive Proposal COM, 2008, 426.

[12] For instance, after the housing broker has found a new tenant for an apartment, she might be paid the equivalent of one month of rent, or a certain percentage of the total yearly rent, by the actual apartment owner.

[13] For instance, apartment owners might rent out part of the housing unit they are living in, or they might own a few apartments and rent out some of them.

They also conduct many more housing transactions, which increases their risk of being taken to court in case of misconduct and thus might decrease illegal behaviors. All things considered, a legitimate expectation seems to be that housing brokers discriminate against disabled tenants less often than apartment owners. If this is the case, policies aiming at decreasing discrimination against blind tenants should be tailored to apartment owners.

The results provide evidence that household tenants where the wife is blind and is assisted by a guide dog are discriminated against by apartment owners because of the presence of the guide dog, not because of their disability, and this behavior qualifies as discrimination. In contrast, there is no evidence of discrimination from housing brokers.

The remainder of the paper is organized as follows. In Section 2, I present the experiment design and the descriptive results. Section 3 describes the model and the results. Section 4 concludes.

2 Experiment Design and Descriptive Results

2.1 Experiment Design

I use data from a correspondence test I conducted in the Italian rental housing market from the 12th of April to the 22nd of June, 2013. I sent 1,000 fictitious written applications in response to advertisements on the Italian classified website *Subito.it*.

The fictitious applications are "non-paired," meaning that each online advertiser received only one application. The usage of non-paired written applications provides at least four advantages over the paired written applications technique. First, only one fictitious application per group needs to be sent to a landlord, further reducing the risk of being exposed. Second, one application per advertiser minimizes the advertisers' inconvenience because each receives only one

inquiry. Third, it is possible to apply for a larger sample of house units over a given period. Fourth, this methodology is not affected by any bias related to the order of inquiries.

The randomization of the applications occurred as follows. I created three tenants' identities (i.e., Andrea Rossi, Francesco Russo, and Alessandro Ferrari)[14] and also an email account for each of them.[15] Then, I entered them into a spreadsheet on which the three identities were repeated approximately 330 times each; after that, I randomly ordered the identities by drawing without resampling using a normal distribution. Afterwards, I created three applicants' statuses (i.e., married tenants, married tenants with blind tenant plus guide dog, and married tenants with pet dog), I prepared a list on which the applicants' statuses were repeated approximately 330 times each, and again I randomly ordered them by drawing without resampling using a normal distribution. Thereafter, I paired the list of applicants' statuses with that of applicants' identities. Finally, for all of the fictitious applicants, I also randomly determined the general location of the apartment for which they would be applying (i.e., the region of the apartment and whether the apartment had to be in a metropolitan city or not).[16] The number of applicants per region reflects the proportion of the regional population in the national population, and within each region, the number of applicants per metropolitan city reflects the proportion of its population in the regional population.[17]

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[14] These are the most frequent Italian names and surnames. Sources: demo.istat.it and italygen.com. The matching name/surname occurred randomly.

[15] The email accounts took the form of name.surname###@gmail.com.

[16] Similar to the two previous steps, I first created the list of randomly ordered locations, and then I paired this list with the list of applicants.

[17] A "metropolitan city" is an administrative institution that is expected to be operative as of 2015. However, this administrative institution was already described in Law no. 142, 1990, and, before that, it was solicited in the Italian Constitution, art. 114. A metropolitan city includes a large core city and its smaller surrounding towns; the core city and towns are closely related in terms of economic activities, provision of public services, cultural aspects and territorial features. The metropolitan cities have large populations, ranging from hundreds of thousands to a few million inhabitants.

Because of the particular nature of this experiment, I use household tenants rather than single tenants. Although technologies exist that allow blind persons to use computers, some people might ignore their existence. There would have been the risk of detection if some landlords viewed with suspicion applications written by blind persons. Therefore, each application was written by the (normal-sighted) husband, who revealed the composition of the household, which implied revealing whether the wife owned a dog and whether this dog was either a pet or a guide dog.

The standard application message for a vacant housing unit can be translated as follows:

"Good xxxxx,

My family is interested in the apartment for rent described in the advertisement you posted at the website Subito.it. I would like to move in with my wife [and her (guide) dog].

If the apartment is still available, we would like to visit it."

When the actual experiment began, I sent applications, following the list of applicants with assigned apartment locations. Applications were sent to the most recent advertisements in order to minimize the probability of contacting an advertiser whose apartment had already been rented out. However, advertisements for apartments smaller than 40 square meters or more expensive than 1,500€ per month were not taken into consideration. The size restriction was adopted because of the Italian law that legislates the maximum number of tenants per square meter;[18]

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[18] Ministerial Decree, 20th of June, 1975, art. 5, and its modification in 1986.

this limit does not apply to pets. The rent restriction was adopted to avoid overly conservative estimates of discrimination,[19] assuming that discrimination is lower for very high rents.

2.2   Descriptive Results

The mean invitation rate for each of the three groups is presented in Table 1. A landlord's response represents an invitation to visit the apartment either when it includes a direct invitation or when it requests a phone call to discuss day and time of the visit.

** Insert Table 1 about here **

Group A is the reference group and comprises applications from married tenants; Group B consists of applications from married tenants where the wife is blind and is assisted by a guide dog; and Group C is composed of applications from married tenants with a pet dog.

This table helps to illustrate how the three-group comparison strategy allows for more insights. Comparing the mean invitation rates for Groups A and B suggests the presence of disability discrimination. In fact, according to the Italian legislation, landlords cannot discriminate based on either i) disability status (i.e., being blind) or ii) specific conditions related to that disability (i.e., owning a guide dog); these are the two characteristics that differ between groups A and B. Comparing Groups A and C suggests the presence of discriminatory behaviors against pet dog owners, which is legal; the only difference between these two groups is the presence of a pet dog in Group C. Comparing the invitation rates for Groups B and C suggests that tenants with a guide

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[19] The estimated average monthly rent in Italy is 1,000€. Source: number.com.

dog are treated equivalently to tenants with a common pet dog.[20] Additional insights can be gained from these comparisons contingent on what I call the *"equality assumption."* This assumption requires that, from the point of view of the online advertisers, there were no differences between pet and guide dogs in terms of burden on the apartment and that online advertisers had no preferences for one over the other.[21] If the reader accepted this assumption, the wife's blindness would be the only difference between Groups B and C, and thus, this comparison would suggest that blindness per se is not the cause of discrimination. Consequently, because there appeared to be no discrimination based on blindness, the gap of 12 percentage points in the mean invitation rates for Groups A and B might be caused by the presence of the guide dog alone. Independent from the reason landlords discriminate based on the presence of the guide dog—they are unaware of the legislation or they consciously ignore it—this form of discrimination is illegal. Vice-versa, if the reader did not accept the equality assumption, the finding that blind tenants are discriminated against would still hold, although it would not be possible to gain any additional insights on the causes of discrimination.[22]

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[20] Independent group t-tests for the three comparisons give statistical support to the interpretation of the data in Table 1. The difference in the invitation rates between Groups A and B is highly statistically significant (df=664, t=-3.459, p=0.000); that between Groups A and C is also highly statistically significant (df=666, t=-4.314, p=0.000); the difference in the invitation rates between Groups B and C is not statistically significant at any standard level (df=664, t=-0.836, p=0.403).

[21] Accounts from members of associations for the visually impaired people lead to the thought that this is a credible assumption. Many Italians appear to consider guide dogs as having the same behavior as pet dogs within housing units (e.g., they bark and scratch the furniture), even though guide dogs are trained and selected from particular breeds.

[22] If the equality assumption does not hold, it is not possible to understand whether discrimination were due to the guide dog or to the blindness status. In fact, the similar invitation rates (lower than that of the reference group) for tenants with pet dogs and blind tenants with guide dogs might be a result of different combinations of landlords' preferences for (guide) dogs and their owners. For instance, suppose that landlords are actually indifferent toward guide dogs (which are usually trained Labradors or Golden Retrievers or German Shepherds), so that they are not bothered by their presence within the housing unit, but they do not like pet dogs (a much broader range of species, which also include Chihuahuas or Bull Terriers, and they are not necessarily trained) because they think pet dogs would more likely ruin the apartment or annoy the neighbors. At the same time, landlords might discriminate against blind tenants only because of their disability. In this case, by chance, blind tenants' invitation rate might be the same

The analysis of separate sub-samples for each type of online advertiser offers additional insights. In the Italian rental housing market, there are two very different online advertisers, namely, housing brokers and apartment owners. As was previously explained, housing brokers have greater knowledge of the legislation; moreover, they conduct many more housing market transactions, which increases their risk of being taken to court in case of misconduct and thus decreases illegal behaviors on their parts. Therefore, it should be reasonable to expect them to be more respectful of the legislation that protects disabled tenants. Table 2 reports the main statistics for the three groups of tenants, divided by online advertiser type.

** Insert Table 2 about here **

As expected, the statistics in Table 2 suggest that the two types of online advertisers behave very differently: housing brokers do not discriminate against blind tenants with guide dogs, whereas apartment owners do discriminate.[23]

3   Model and Results

In this section, I further analyze the data using a linear probability model. The main purpose of this analysis is to verify whether the randomization process described in Section 2 worked as in-

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as that for tenants with pet dogs. Other combinations of landlords' discriminatory behaviors may lead to similar results. In these cases, the policy implications of the results would be similar, although less specific, to those mentioned in the concluding section.

[23] Independent group t-tests for the three comparisons in the two sub-samples of advertisers give statistical support to the interpretation of the data in Table 2. In the sub-sample of housing brokers, the difference in the invitation rates between Groups A and B is not statistically significant (df=269, t=-0.144, p=0.885). In contrast, the differences between Groups A and C and Groups B and C are statistically significant (respectively, df=284, t=-2.182, p=0.030 and df=279, t=-2.012, p=0.045). In the sub-sample of apartment owners, the differences in the invitation rates between Groups A and B as well as Groups A and C are highly statistically significant (respectively, df=380, t=-4.417, p=0.000, and df=372, t=-3.884, p=0.000), but the difference between Groups B and C is not (df=372, t=0.472, p=0.637).

tended. The dependent variable, *Invitation_rate$_i$*, is a dummy that equals one if the applicant received an invitation to visit an apartment and zero otherwise. This outcome variable is regressed on two variables of interest: the dummy *Blind$_i$*, where i is a household with a blind wife who owns a guide dog, and *Dog$_i$*, where i is a household with a pet dog.[24] A vector of control variables, *X_i*, includes apartment and advertisement characteristics: logarithms of apartment square meters and of monthly rent; rent per square meter;[25] a dummy for the apartment being in a metropolitan city; a dummy for the apartment being furnished; and dummies for apartment pictures as well as for a phone number in the advertisement. The variables for the logarithms of apartment square meters and of monthly rent as well as for the rent per square meter were rescaled by subtracting their minimum values; the rent per square meter is also rescaled, specifically, divided by 10. The model also includes *F_i*, a vector of fixed effects,[26] as well as a stochastic individual term, ε_i. The linear probability model looks as follows:

$$Invitation\_rate_i = \beta_0 + \beta_1 Blind_i + \beta_2 Dog_i + \boldsymbol{\beta X_i} + \boldsymbol{\beta F_i} + \varepsilon_i \qquad (1)$$

This model is first estimated only with the variables of interest, then the vector of control variables is added, and finally the vector of fixed effects is also included. Because the descriptive results in Section 2 suggest that housing brokers and apartment owners are quite different in terms

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[24] Therefore, household tenants without a pet dog and where the wife is not disabled (Group A) is the reference group.

[25] This variable is intended to act similarly to an interaction between the logarithm of apartment square meters and the logarithm of monthly rent.

[26] This vector includes: dummies for each applicant's identity (e.g., Andrea Rossi and Francesco Russo; Alessandro Ferrari is the base identity), dummies for each Italian region (with Lombardy being the base region) and a dummy for the application being sent after a new condominium national regulation came into force (i.e., Law no. 220, 11th of December 2012, which came into force on the 18th of June, 2013). According to this law, condominium regulations can no longer include pet restrictions, but this does not apply to other types of apartments. For most of the advertisements, I was not able to differentiate between condominium apartments and other types.

of discriminatory behaviors, the model is estimated on the two separate subsamples of online advertisers. The main estimates are reported in Table 3.

** Insert Table 3 about here **

Table 3 confirms the insights provided by the descriptive statistics. These estimates show no evidence of disability discrimination by housing brokers; in fact, $\hat{\beta}_1$ is close to zero and never statistically significant. However, households with a pet dog experience discriminatory behaviors; $\hat{\beta}_2$ is highly statistically significant and negative. The difference between $\hat{\beta}_1$ and $\hat{\beta}_2$ is also statistically significant. The model augmented with control variables and fixed-effects gives equivalent estimates.[27] The combination of these results suggests that housing brokers treat household tenants where the wife is blind and owns a guide dog similarly to the reference group (i.e., household tenants with no dog). Table 3 also provides evidence of disability discrimination by apartment owners. Given that $\hat{\beta}_1$ is negative and highly statistically significant, blind tenants are discriminated against; their invitation rate to visit an apartment is 20 percentage points lower than that of household tenants with no dog. Moreover, household tenants with a pet dog have an invitation rate that is 18.5 percentage points lower than that of the reference group; $\hat{\beta}_2$ is highly statistically significant. The difference between the estimates for $\hat{\beta}_1$ and $\hat{\beta}_2$ is not statistically significant. The model augmented with control variables and fixed-effects finds $\hat{\beta}_1$ and $\hat{\beta}_2$ to be both larger and even closer to each other. All of the estimates in the table are robust to different speci-

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[27] The estimates of the constants in columns (1.C) and (2.C) depend, though, on the reference region, which is Lombardy. The Appendix explores the possibility that discrimination varies by geographic dimensions.

fications.[28] Heterogeneity analyses suggest the absence of any statistically significant difference in terms of discriminatory behaviors between metropolitan and non-metropolitan cities or between different Italian macro-regions, i.e., north, central and south.[29] See the results in the Appendix.

If the reader accepted the equality assumption, the direction and size of the estimates suggest that discrimination against blind tenants occurs because of the presence of their guide dogs alone. According to EU and Italian legislation, this behavior qualifies as discrimination.

4   Discussion and Conclusions

In this paper, I have analyzed discrimination against blind tenants who are assisted by guide dogs in the Italian rental housing market. I have found evidence that blind tenants are discriminated against by apartment owners (i.e., landlords who advertise and rent out their own apartments) because of their guide dogs alone despite the legislation. According to both EU and Italian legislation, this behavior can be referred to as *indirect discrimination* because it is based on a tenant's characteristic that is indirectly related to the disability. These legislations define indirect discrimination as occurring when an apparently neutral requirement that is assumed to apply to everyone (e.g., pet restrictions) has an unfair effect on disabled people (e.g., blind tenants) and is also unreasonable considering the circumstances of the case.

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[28] I have implemented two alternative linear models. In one model, I introduce a partial interaction between $Blind_i$ and Dog_i without including the main effect for $Blind_i$. The results are equivalent. In this alternative linear model specification, the variable Dog_i equals 1 regardless of the nature of the wife's dog that is,, without distinguishing between pet dogs and guide dogs. In the other model, I pool the observations on housing brokers and apartment owners and introduce the interaction between the variable $Company_i$, which equals 1 if the advertiser is a housing broker, and $Blind_i$ as well as Dog_i. The results are equivalent.

[29] Northern regions are: Emilia-Romagna, Friuli-Venezia-Giulia, Liguria, Lombardy, Piedmont, Trentino-South Tyrol, Aosta Valley, Veneto. Regions from central Italy are: Lazio, The Marche, Umbria, Tuscany. Southern regions are: Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise, Sardinia, Sicily. Italy's regions are divided into these three macro-regions following the Italian national institute (i.e., ISTAT).

These results are in line with those from American studies which investigate disability discrimination and reasonable accommodation for guide dogs. Within that context, the refusal to provide reasonable accommodation could be interpreted as indirect discrimination.

Awareness and information campaigns should be tailored to apartment owners to decrease discrimination. Awareness campaigns could focus on the role of guide dogs, conveying the message that they not only provide emotional support to their handlers, as all other dogs do, but that they also assist them in multiple activities throughout the day. For instance, guide dogs identify, and help to avoid, obstacles that the handler would not identify alone; guide dogs help the handler to board public transportation, and they also help their handlers proceed safely along roads and cross them. These campaigns could also illustrate the particular characteristics of guide dogs: they are well trained and are selected from particularly obedient breeds. These awareness campaigns could potentially favorably shape the perception of those apartment owners who know the law but choose to ignore it. These awareness campaigns centered on the importance of guide dogs would be more relevant if the equality assumption illustrated in Section 2.2 were fully accepted. Differently, information campaigns should be conducted to educate apartment owners about the legislation; some of them might still not be fully aware of what is considered illegal discrimination. Information campaigns would be useful even if indirect discrimination were not the (only) cause of discrimination.

These results call for future research to further explore disability discrimination in the rental housing market. For example, a correspondence test might be adapted to investigate discrimination against tenants with mobility impairments, such as tenants who need wheelchairs, walkers, or rollators. Given that mobility declines with age (Rantakokko et al., 2013), this research could add important knowledge also on discrimination against elderly tenants.

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Tables

Table 1. Mean invitation rates for the groups of applicants.

Tenants' group	N	Mean	Std. Dev.
	(1)	(2)	(3)
A (Not blind, no dog)	334	0.784	0.412
B (Blind, guide dog)	332	0.666	0.472
C (Not blind, pet dog)	334	0.635	0.482

Note: Columns (1)-(2)-(3) report, respectively: number of observations and means and standard deviations of groups' invitation rates.

Table 2. Mean invitation rates for the groups of applicants by online advertiser type.

	Online advertiser type					
	Housing brokers			Apartment owners		
Tenants' groups	N	Mean	Std. Dev.	N	Mean	Std. Dev.
	(1)	(2)	(3)	(4)	(5)	(6)
A (Not blind, no dog)	138	0.819	0.386	191	0.764	0.425
B (Blind, guide dog)	133	0.812	0.392	191	0.555	0.498
C (Not blind, pet dog)	148	0.709	0.455	183	0.579	0.495

Note: In the panel "Housing brokers", columns (1)-(2)-(3) report, respectively: number of observations and means and standard deviations of groups' invitation rates from housing brokers. In the panel "Apartment owners", columns (4)-(5)-(6) report the equivalent statistics for apartment owners. For each group of tenants, the total number of observations in the two panels is lower than that reported in Table 1 because of a small number of missing observations about the online advertisers' type.

Table 3. Linear probability model main estimates by online advertiser type.

	Housing brokers			Apartment owners		
	(1.A)	(1.B)	(1.C)	(2.A)	(2.B)	(2.C)
Constant	0.818***	0.581***	0.621***	0.764***	0.940***	0.983***
	(0.032)	(0.170)	(0.188)	(0.034)	(0.098)	(0.109)
$\hat{\beta}_1$ (Blind, guide dog)	-0.007	-0.008	-0.009	-0.209***	-0.225***	-0.238***
	(0.045)	(0.047)	(0.050)	(0.065)	(0.061)	(0.064)
$\hat{\beta}_2$ (Not blind, pet dog)	-0.109***	-0.117***	-0.111***	-0.185***	-0.211***	-0.234***
	(0.041)	(0.040)	(0.043)	(0.041)	(0.042)	(0.041)
Control variables	N	Y	Y	N	Y	Y
Fixed-effects	N	N	Y	N	N	Y
P-value ($\hat{\beta}_1 - \hat{\beta}_2$)	0.029	0.027	0.043	0.705	0.833	0.952
R-squared	0.015	0.031	0.072	0.038	0.067	0.127
N	419	409	409	565	526	526

Note: Missing apartment characteristics, including the type of agent, cause the total sample to be smaller than 1,000 observations. Group A, which includes married tenants, is the reference group. Robust standard errors corrected for day of inquiry are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

This appendix includes heterogeneity analyses based on different geographic dimensions. Discriminatory behaviors might differ between metropolitan and non-metropolitan cities, and also between different Italian macro-regions, i.e., north, central and south, for a wide range of reasons.

Overall, the results are not statistically significant and should be considered carefully. Whether a town is included within a metropolis is somewhat arbitrary; a similar consideration should be made during the interpretation of the results from the analyses by macro-regions.

Metropolitan and non-metropolitan cities

The behavior of landlords in metropolitan cities might differ from that of landlords in non-metropolitan cities for a number of reasons. For instance, apartments in metropolitan cities might have fewer outdoor spaces where pets can be kept, so that pets might have to remain indoors for longer and be considered more of a burden from the landlords' point of view; as a consequence, online advertisers might treat tenants worse whether they have a pet dog or a guide dog. As another example, apartment owners in metropolitan cities might conduct more frequent housing transactions, and thus they might discriminate less against blind tenants with guide dogs.

In this additional analysis, interactions of the variables $Blind_i$ and Dog_i with the dummy variable for the apartment being in a metropolitan city are added. The resulting model is the following:

$$Invitation\_rate_i = \beta_0 + \beta_1 Blind_i + \beta_2 Dog_i + \beta_3 Metro_i + \beta_4 Blind_i * Metro_i + \beta_5 Dog_i * Metro_i + \boldsymbol{\beta X_i} +$$

$$\boldsymbol{\beta F_i} + \varepsilon_i \tag{1.A}$$

The estimates are provided below, in Table A.1.

Table A.1 Linear probability model estimates, interaction with metropolitan city.

	Housing brokers			Apartment owners		
	(1.A)	(1.B)	(1.C)	(2.A)	(2.B)	(2.C)
Constant	0.825***	0.576***	0.614***	0.795***	0.965***	0.921***
	(0.033)	(0.170)	(0.189)	(0.034)	(0.100)	(0.102)
$\hat{\beta}_1$	-0.018	-0.027	-0.034	-0.239***	-0.256***	-0.266***
(Blind, guide dog)	(0.050)	(0.050)	(0.055)	(0.067)	(0.067)	(0.070)
$\hat{\beta}_2$	-0.107**	-0.117**	-0.112**	-0.191***	-0.223***	-0.243***
(Not blind, pet dog)	(0.049)	(0.048)	(0.050)	(0.039)	(0.042)	(0.040)
$\hat{\beta}_3$	-0.075	-0.141	-0.161	-0.195**	-0.165*	-0.141
(Metro)	(0.135)	(0.131)	(0.135)	(0.090)	(0.094)	(0.103)
$\hat{\beta}_4$	0.101	0.135	0.169	0.187	0.187	0.169
(Blind, guide dog)×(Metro)	(0.147)	(0.146)	(0.148)	(0.138)	(0.148)	(0.150)
$\hat{\beta}_5$	0.007	0.011	0.028	0.062	0.071	0.056
(Not blind, pet dog)×(Metro)	(0.186)	(0.180)	(0.184)	(0.138)	(0.148)	(0.151)
Control variables	N	Y	Y	N	Y	Y
Fixed-effects	N	N	Y	N	N	Y
R-squared	0.017	0.033	0.076	0.049	0.070	0.130
N	419	409	409	565	526	526

Note: Missing apartment characteristics, including the type of agent, cause the total sample to be smaller than 1,000 observations. Group A, which comprises married tenants, is the reference group. Robust standard errors corrected for day of inquiry are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

The estimates do not provide statistically significant evidence of an interaction effect between the apartment being in a metropolitan city and having either a pet or a guide dog. However, the results suggest that blind tenants with a guide dog are slightly favored by housing brokers in metropolitan cities. Moreover, blind tenants also appear to experience less discrimination by apartment owners in metropolitan cities because the interaction term is positive. There are no similar differences between metropolitan and non-metropolitan cities for tenants with pet dogs because

the interaction term is very close to zero for these tenants and for both groups of advertisers and for all of the specifications.

These results should be considered carefully because it is to some extent arbitrary whether a city is labeled metropolitan.

Northern, central and southern regions

The behavior of landlords in different macro-regions might also differ for multiple reasons. For instance, attitudes toward pets might differ on a geographic basis.

In this additional analysis, interactions of the variables $Blind_i$ and Dog_i with dummy variables for the apartment being in northern or central Italy are added; the reference macro-region is southern Italy. In this model specification, dummy variables for individual regions are not included in the fixed-effect vector. The model is thus the following:

$Invitation\_rate_i = \beta_0 + \beta_1 Blind_i + \beta_2 Dog_i + \beta_3 North_i + \beta_4 Center_i + B_5 Blind_i*North_i +$

$\beta_6 Blind_i*Center_i + \beta_7 Dog_i*North_i + \beta_8 Dog_i*Center_i + \boldsymbol{\beta X_i} + \boldsymbol{\beta F_i} + \varepsilon_i$ (1.B)

The estimates are provided below, in Table A.2.

Table A.2 Linear probability model estimates, interactions with macro-regions.

	Housing brokers			Apartment owners		
	(1.A)	(1.B)	(1.C)	(2.A)	(2.B)	(2.C)
Constant	0.820***	0.634***	0.632***	0.712***	0.934***	0.886***
	(0.0538)	(0.180)	(0.189)	(0.056)	(0.101)	(0.098)
$\hat{\beta}_1$	-0.042	-0.068	-0.072	-0.204**	-0.242***	-0.247***
(Blind, guide dog)	(0.075)	(0.074)	(0.073)	(0.083)	(0.083)	(0.084)
$\hat{\beta}_2$	-0.139	-0.167**	-0.173**	-0.212***	-0.251***	-0.259***
(Not blind, pet dog)	(0.0853)	(0.080)	(0.080)	(0.077)	(0.077)	(0.077)
$\hat{\beta}_3$	-0.046	-0.091	-0.087	0.095	0.069	0.065
(North)	(0.078)	(0.075)	(0.076)	(0.073)	(0.067)	(0.066)
$\hat{\beta}_4$	0.103	0.049	0.046	0.045	0.017	0.015
(Center)	(0.074)	(0.073)	(0.075)	(0.081)	(0.075)	(0.075)
$\hat{\beta}_5$	0.061	0.089	0.090	-0.041	-0.015	-0.011
(Blind, guide dog)×(North)	(0.104)	(0.103)	(0.102)	(0.109)	(0.098)	(0.096)
$\hat{\beta}_6$	0.019	0.070	0.078	0.069	0.129	0.131
(Blind, guide dog)×(Center)	(0.125)	(0.131)	(0.129)	(0.137)	(0.135)	(0.133)
$\hat{\beta}_7$	0.090	0.116	0.118	0.022	0.030	0.036
(Not blind, pet dog)×(North)	(0.119)	(0.113)	(0.113)	(0.104)	(0.104)	(0.103)
$\hat{\beta}_8$	-0.065	-0.028	-0.026	0.092	0.125	0.134
(Not blind, pet dog)×(Center)	(0.129)	(0.131)	(0.130)	(0.115)	(0.119)	(0.119)
Control variables	N	Y	Y	N	Y	Y
Fixed-effects	N	N	Y	N	N	Y
R-squared	0.026	0.042	0.044	0.048	0.075	0.079
N	419	409	409	565	526	526

Note: Missing apartment characteristics, including the type of agent, cause the total sample to be smaller than 1,000 observations. Group A, which comprises married tenants, is the reference group. Robust standard errors corrected for day of inquiry are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The estimates do not provide statistically significant evidence that discrimination against tenants with pet vs. guide dogs differ by macro-region. However, they suggest that blind tenants could be favored by housing brokers in the northern and central regions. Furthermore, apartment owners

appear to discriminate against blind tenants independently of the macro-region where the apartment is located.

These results should be considered carefully because the division of Italian regions into macro-regions may be assessed differently and it is somewhat arbitrary (e.g., in some studies ISTAT divides regions into sub-macro-regions, such as north-eastern and north-western or southern and insular regions).