How does ethnic discrimination on the housing market differ across neighborhoods and real estate agencies?

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Abstract

Ethnic discrimination proves to be a persistent problem on the private rental market. However, little attention has been paid to contexts that might impact discrimination on the housing market, partly due to the fact that these factors have not been integrated into a comprehensive study. We aim to investigate whether the types of discriminatory behavior vary and/or are moderated by three types of contextual factors: (1) dwelling indicators, such as type of dwelling and price category; (2) neighborhood indicators, such as socio-economic and ethnic composition of the neighborhood; and – to the best of our knowledge the first time in research - (3) real estate agency indicators, such as the gender structure and size of the agency. For this purpose, we made use of data from 2,014 matched correspondence tests on ethnic discrimination among 493 real estate agencies in Brussels Capital Region in Belgium. Our findings suggest that candidates of North African origin face discrimination when searching for an apartment to rent. We also found that discrimination is lower in poorer and more ethnically mixed neighborhoods and higher in smaller and male-dominated real estate offices. We call for a bigger focus on both spatial and organizational context in research on discrimination.

Key words: ethnic discrimination; housing market; correspondence tests

1. Introduction

Ethnic discrimination proves to be a persistent problem on the rental housing market (Auspurg et al., 2019; Flage, 2018; Quillian et al., 2020). The effects of discrimination not only determine access to proper housing but can also result in accumulating social and economic disadvantages.

Many scholars have already examined the magnitude of ethnic discrimination on the rental housing market. Ethnic minorities seeking housing are still confronted with discrimination by both private landlords and real estate agents at high rates (Auspurg et al., 2019; Flage, 2018; Quillian et al., 2020). More concretely, a recent meta-analysis of Flage (2018) indicated that the likeliness of being invited to visit a rental dwelling is 50 percent higher for a majority candidate, than an ethnic minority candidate. Whereas previous research focused on measuring and addressing ethnic discrimination on the housing market, we aim to examine how discrimination relates to contextual factors such as company structures and neighborhood characteristics. In our view, approaches that highlight individual preferences and prejudices as the primary driver for discrimination are necessarily limited. Racism and discrimination do not emerge in a societal vacuum.

There has been little attention paid to contexts that might impact discrimination on the housing market, partly due to the fact that these factors have not been integrated into a comprehensive study, until now. In this paper, we will add as variables neighborhood and real estate office characteristics to a field experiment conducted with e-mail correspondence tests in a metropolitan city, to evaluate the importance of context in research on discrimination on the housing market.

This study aims to address these caveats of previous research in several ways. First, previous economic studies on the labor market have repeatedly included company characteristics when reporting about discrimination in hiring. These characteristics, including firm size (Baert et al., 2018), gender structure (Bertogg et al., 2020) and personnel turnover (Carlsson & Rooth, 2007) prove to be highly important when analyzing discriminatory behavior. We contribute to the economic literature on discrimination by including firm size and firm gender structure in our analysis of rental discrimination. Second, although previous studies have already examined the impact of neighborhood characteristics (Bonnet et al., 2016; Hanson & Hawley, 2014; Van der Bracht et al., 2015), this is to our knowledge the first study that investigates the context of real estate offices within a target neighborhood setting to study ethnic discrimination on the housing market. We were able to compare the differences in discrimination rates between realtor offices by including the size and gender structure of the real estate company in our analysis. The focus in previous economic studies on the housing market has mostly been on applicant characteristics, agent characteristics and differences in discrimination rates between a landlord and a real estate office (Carlsson & Eriksson, 2014; Flage, 2018); to our knowledge, this shall be the first to highlight contextual variation and differences between real estate offices. Additionally, we have controlled for ethnic composition and social-economic characteristics within a neighborhood. Although some research has been carried out where ethnic composition of a neighborhood has factored significantly (Auspurg et al., 2017), there have been few studies that have measured for socio-economic characteristics.

To study these gaps in research, we used data from a correspondence study conducted in the capital region of Brussels, Belgium. The use of field experiments to study ethnic discrimination has become increasingly popular (Gaddis, 2018). In addition, we used administrative data from official records on economic, social, and demographic characteristics of neighborhoods and real estate offices in the city. This allows us to discuss results of discrimination, how it relates to company structures and urban segregation patterns. By doing so, we attempt to build a broader and multidimensional explanatory model that results in concrete research recommendations.

2. Theoretical framework

The most obvious theoretical starting point for this study is Becker's (1971) *Economics of Discrimination*, in which he distinguishes two main mechanisms of discrimination: taste-based discrimination and statistical discrimination.

Taste-based discrimination describes behavior by actors that have exogenous preferences (tastes) towards certain groups of people with whom they interact. This behavior is influenced by those preferences which disfavor a member of a certain ethnic group based on the actor 'not liking' this group (Becker, 1971). Usually, the cost of disfavoring a person (by not inviting him/her to view a dwelling, for example) is taken into account by real estate agents. This has more impact in the profit-oriented housing market than at the private level, where the landlord can more easily bear the cost. Following this theory, Baert et al. (2018) argue that unequal treatment based on tastes or prejudices should yield worse financial health in a company or can even cause a company to go out of business (Pager, 2016).

Statistical discrimination, on the other hand, occurs when individuals are (falsely) ascribed certain characteristics associated with the ethnic group to which they belong (Arrow, 1973; Phelps, 1972). The average group value of characteristics enters into the landlord or realtor's decision to invite or not invite a person to visit a dwelling. For example, the average income of an ethnic group can be used to assess the potential reliability of rental payments (Auspurg et al., 2017). Real estate agents may assume that ethnic minorities have fewer resources and, therefore, might induce a higher risk for the owner. Raising the price of the dwelling and thus creating a premium for that risk can be a strategy to cope with this uncertainty (Auspurg et al., 2017).

In Becker's original formulation statistical discrimination is considered as economic 'rational and taste-based discrimination as 'economically irrational', on account of the counter-intuitive appearance of such behavior in the context of the financial incentive to rent out a property (e.g. a landlord or realtor missing out on a profit if they prefer to keep a dwelling unrented rather than renting it out to a "disliked" person). We might, however, question this conclusion in light of differential market conditions: in tight rental housing markets where it is difficult to find decent and affordable housing, it is doubtful whether a realtor would really miss out on profits as a result of discriminatory behavior. He/she would easily find other rental candidates.

To add context to these mechanisms, we will focus on three categories of contextual factors that might influence the process of rental discrimination by real estate agents: dwelling characteristics, real estate company characteristics, and neighborhood characteristics. This classification is partly based on the study by Carlsson and Eriksson (2014), who while examining rates of ethnic discrimination among private landlords in different municipalities in Sweden found that including these characteristics in their research greatly benefited the analysis.

First, we test our data for differences in real estate company characteristics. Flage (2018) found significantly higher discrimination rates with landlords than with real estate agents. This study will focus on discrimination with real estate agents, a focus on, what can be seen as, a first company characteristic. Following Hirsh and Konrich (2008), we argue that discrimination is embedded in a broader professional environment, in which the characteristics of the organization influence the way an employee perceives or applies discrimination. From a theoretical point of view, we distinguish between two clusters of arguments that are provided by previous studies concerning the negative relationship between size of a company and discriminatory behavior. First, larger firms are expected to be more formalized and therefore approach interactions with clients in a less biased way (Baert et al., 2018; Reskin et al., 1999). Individuals in a larger firm have less decision-making power, especially if those decisions are perceived as defying bureaucratic procedure or the purported ethos of a real estate company. The discriminatory behavior in question might come from a single person but is imbedded in a broader framework and company culture. Because larger offices will work with more formalized personnel practices and tend to have a formalized modus operandi, it follows that establishment size should have a negative effect on discrimination in invitations (Hirsh & Kornrich, 2008). Although formalization is difficult to measure, we use size of the office as a proxy for the formalization of the office (Hirsh & Kornrich, 2008). Second, it could be argued that larger offices have a better notion of the unobserved characteristics of applicants because they rent to more people than smaller offices do. This could result in a more true, objective selection of rental candidates, which may result in lower levels of statistical discrimination (Baert et al., 2018).

Next, we expect that there is gender homophily at work in the application process for rental dwellings.[1] Homophily is a concept that has been used to describe a preference for persons with the same gender in organizations and recruitment (McPherson et al., 2001). Previous studies on gender discrimination have found discrimination to occur in occupations where the dominant gender is the opposite one (Kübler et al., 2018; Weichselbaumer, 2004). Carrington and Troske (1998) have shown that, on the labor market, female-owned companies are more likely to hire female candidates than male candidates, with other characteristics controlled for. They have also found that the more female intensive the industry is, the more women will be hired and also have a bigger share of the jobs (Carrington & Troske, 1998). While mechanisms underlying gender discrimination are multifaceted and highly contextual, results from the study by Bertogg and colleagues (2020) indicate that the dominant mechanism for gender discrimination is statistical discrimination. In other words, their results indicate that the main driver for gender discrimination is the use of generalized characteristics because of imperfect information of the candidate. Real estate is a profession dominated by men,

[1] In contrast to what we first anticipated, the ethnic homophily theory could not be used because of the lack of real estate agents with a migrant background in Brussels.

with agency heads being men in almost all tested companies; therefore, we speculate that higher discrimination rates will be observed against women belonging to minority ethnic groups in companies where there are few women employees. Since we use aggregated data on the level of the real estate office, we include the gender composition of a company as a relevant data point. The gender of agents is assessed by the authors on the basis of the names of agents. This might be subject to measurement error, so that the effect of agent's identity on discrimination has to be interpreted with more caution.

Second, dwellings are categorized in function of their type and rental price. With regard to price discrimination, previous studies provide mixed and often non-significant findings. Including price differentials between dwellings to the analysis had in a number of recent studies only a small or non-significant effect (e.g. (Acolin et al., 2016; Bunel et al., 2019; Molla et al., 2019). In contrast, in Belgium, Van der Bracht and his colleagues (2015) found a curvilinear relationship between the rental price of the property and the amount of discrimination. The odds of being discriminated against were highest in both the cheapest and the most expensive part of the rental housing market. Aberrant results for Sweden were reported by Bengtsson et al. (2012) and Ahmed and Hammarstedt (2008), where discrimination was found to be stronger for high-priced apartments. Baldini and Federici (2011) reported that foreign names were more likely to be discriminated against in the case of small apartments; however, price level was shown to exert no additional influence. Hogan and Berry (2011) found for Toronto that inquiries for higher rent apartments were in general more likely to receive a response, but discrimination rates were the same for high- and low-priced apartments. An important note to add is that many applicants are excluded from a major share of the rental market in the first stages of the search. Financially limited renters are oriented towards a smaller part of the market where prices are low and sharing is an option (Verstraete & Moris, 2019). That leaves a segment of the rental market with high dwelling prices where realtors want to be more selective towards applicants because of the higher cost of the property, which in turn can lead to more (statistical) discrimination.

Third, we treat neighborhood characteristics as a leading factor for the decision-making process of the real estate agent. Based on the taste-based discrimination hypothesis, one could argue that realtors have their own prejudiced attitudes towards ethnic minorities and act accordingly, that a real estate agent discriminates on the basis of tastes or prejudice; in such cases, discrimination might be understood as the result of an individual decision that is a function of personal beliefs and attitudes (Ondrich et al., 2003). According to this model, discriminatory behavior should not vary across different neighborhoods or contexts, but only across characteristics of the applicant (Hanson & Hawley, 2014). Hence, there should not be any impact on discrimination rates due to variation in neighborhood characteristics; the result is rather constant discrimination against ethnic minority home-seekers and no discrimination against ethnic majority home-seekers. Our hypothesis for this study is based on the customer taste-based hypothesis (Verstraete & Verhaeghe, 2019), which assumes that landlords discriminate, not primarily according to their own prejudices, but based on what they anticipate the prejudices of their customers will be. The agent will choose to benefit the majority population of the neighborhood by discriminating against ethnic minorities, because the

entry of minorities can lead to the exit of the majority population, which in turn might lead to big turnover costs (Ahmed et al., 2010).

The results of studies that include neighborhood characteristics are rather mixed too. Ewens et al. (2014) found a reduction in discrimination in neighborhoods with a high percentage of minorities. Similarly, when comparing different cities is the U.S., both Yinger (1986) and Hanson and Hawley (2011) found higher ethnic discrimination on the rental housing market in predominantly white neighborhoods. On the contrary, several studies found higher rates of ethnic discrimination by realtors in neighborhoods with more ethnic minorities. Auspurg, et al. (2017) found evidence of higher ethnic discrimination when the proportion of foreigners was in the upper third of the distribution chart. Furthermore, Hanson et al. (2014) found that discrimination is gradually increasing as the percentage of minorities becomes larger. In line with the costumer prejudice hypothesis, we expect that discrimination will be higher in neighborhoods with less ethnic minorities.

Additionally, in order to account for other factors than ethnicity, we include socio-economic factors. In line with the research from Carlsson and Eriksson (2014), we also control for the number of rental dwellings in a neighborhood in our analysis. Real estate agents might be more selective and behave more discriminatorily when the property they are renting out is situated in a tight rental market. The chance of being invited to an apartment are, in general, slimmer when there is high demand but little supply. The "cost" of discriminating is lower when more candidates apply for a dwelling. When turning down ethnic minorities in a market where there are less candidates available, the realtor will have to include the cost of looking for different applicants.

Furthermore, as additional variables, we include the number of poor households in the neighborhood as well as the average rental price for a dwelling. These variables are used as a proxy for the socio-economic conditions of the neighborhood. Ethnic minorities might be class steered towards neighborhoods with lower incomes, lower homeownership rates and higher poverty rates (Galster & Godfrey, 2005). Besides the share of ethnic minorities in a neighborhood, realtors could discriminate or steer minorities towards certain neighborhoods as a result of the assessment that ethnic minorities are in general in a worse socio-economic situation, leading them to discriminate more in wealthier neighborhoods (Van der Bracht et al., 2015; Verstraete & Verhaeghe 2019).

3. Experimental design

3.1 Data

For this study, ethnic discrimination was measured by means of correspondence tests. In these tests, two rental candidates apply for a vacant dwelling. Both candidates are similar on all relevant characteristics, except for ethnic origin. The response of the realtor (or lack thereof) is then examined to determine whether both candidates were treated equally. Systematic unequal and adverse treatment of the candidate belonging to an ethnic minority group is assumed to be due to ethnic discrimination. Correspondence tests, which have been used for decades as a research tool (Auspurg et al. 2019;

Flage 2018; Gaddis 2018; Quillian et al. 2020), are considered by many scholars to be the "gold standard" of measurement for discriminatory behavior (Heath & Di Stasio, 2019).

In this paper, we used data from two separate studies on ethnic discrimination in the Brussels Capital Region: Discrimibrux 2017 (Verhaeghe et al., 2017) and Discrimibrux 2019 (Verhaeghe & Dumon, 2019). The first dataset represents results from correspondence tests conducted between November 2016 and March 2017, with a sample of 3,021 rental advertisements. In the second dataset, the tests were conducted between January and July 2019, with a sample of 956 rental ads. Both studies used rental advertisements published on the website Immoweb, the largest website for buying and renting real estate in Brussels Capital Region.[2] Only rental dwellings provided by real estate agencies were sampled. To avoid suspicion among real estate agents, only one advertisement per week was sampled per real estate agency. In addition, advertisements for very expensive dwellings with a rental price higher than €3,000 per month were excluded from the sampling frame. By merging both datasets, we could increase the number of cases on the level of real estate agencies and neighborhoods in the Brussels Capital Region.

Following the pairwise matched procedure (Gaddis, 2018), two fictious candidates responded to the same ad by inquiring about the possibility of scheduling a visit to inspect the rental dwelling (a common request in Belgium). The candidates applied by means of a message on Immoweb. The messages were very brief, in correct French and randomly ascribed to test and control profiles. In each test, the first candidate was of Maghrebian origin (test profile) and the second of Belgian origin (control profile). Following previous studies (Carpusor & Loges, 2006; Van der Bracht et al., 2015), ethnic origin was signaled through the names of both candidates,[3] which were disclosed through e-mail addresses, message sign-offs and profile information on Immoweb. Maghrebians are the largest minority group in Brussels Capital Region (Hermia & Sierens, 2017) and previous meta-analyses have already shown that they are severely discriminated against in Europe (Auspurg et al. 2019; Flage 2018). While in Discrimibrux 2017 both male and female candidates were used, in Discrimibrux 2019 only male candidates were used. Once both candidates had submitted their applications, we monitored the responses of the real estate agencies for seven days.

The correspondence tests were conducted in the Brussels Capital Region, a diverse, metropolitan city of 1.1 million inhabitants. In addition to being the capital of Belgium, Brussels is also the center of the European Union. Competition in its housing market is intense. Belgium has one of the smallest social housing segments in Europe, with waiting list that can stretch up to 13 years (Loopmans et al., 2014). Additionally, there is a demand excess on the private rental market too. These factors create a framework for negative selection in rental applications. Le Roy et al. (2008) worry about a big group of renters with a poor socio-economic profile, such as low-income groups, single and/or unemployed people, and minorities, who consistently end up in houses with low quality, comfort and

[2] The market of online rental advertisements in the Brussels Capital Region consists of three websites: Immoweb, Immovlan and Zimmo. Following McLaren and Shanbhogue (2011), we used google search data to estimate their relative popularity. During the periods of data collection, 82% of searches were for Immoweb, followed by Immovlan (13%) and Zimmo (5%) in second and third place.

[3] Examples of Maghrebian names used in this study are Ahmed Abdellaoui, Mohamed Buhari or Fatima Moussaoui. Examples of Belgian names used are Josephine Lambert, Léon Delval or Maxime François.

hygiene. Besides determining living conditions in terms of quality of environment, an individual's place of residence is a strong indicator of social status and mobility (Auspurg, et al. 2017).

By working together with the Brussels Institute of Statistics and the Belgian Bureau for Statistics, we were able to link the addresses of dwellings to their neighborhoods and characteristics, including ethnic composition, average income level, poverty level, share of rental dwellings and average dwelling price of the neighborhood. Brussels consists of 148 neighborhoods with an average of 8,434 inhabitants per neighborhood.

Finally, we were able to link characteristics of the real estate office to data garnered from the correspondence tests. Our dataset contained information on 493 real estate offices, which we used to gather information on social characteristics. Using public data from the Institute for Real Estate Agents in Belgium (BIV), we were able to include the number of official real estate agents in our data, as well as the distribution of this group in terms of sex (ratio of female to male realtors).

3.2. Dependent variable

The dependent variable in our analysis is derived from the written reactions of real estate agents during the correspondence tests. We distinguished between being invited to see the rental dwelling (value 1) and not being invited or receiving no reaction (value 2). A reply containing a phrase that explicitly affirms the possibility of visiting the dwelling (e.g. an offer to come and view the dwelling at a specific time or a request that the applicant mail/call back to set a time for a viewing) was considered an invitation for a viewing.

3.3. Independent variables

Ethnicity of the applicant is a dichotomous variable that indicates the ethnicity of the rental applicant, signaled through a name. The variable is equally dispersed, with half of the names signaling an applicant of North African origin and half signaling a Belgian applicant.

Gender of the applicant is also a dichotomous variable, the gender of the rental applicant likewise being signaled through the name attached to the application.

Dwelling type is a categorical variable consisting of three categories: apartments (61%), houses (28%) and studios/duplexes (10%). In the multivariate analyses, apartments serve as the reference category.

Rent of dwelling is a metric variable expressed in euro per month. It is equal to the monthly price of renting a dwelling, set by the landlord. The variable is divided by 100 to match the variance to the odds of the dependent variable (Snijders & Bosker, 2011).

In addition to the above independent variables, we included standard information contained in the rental advertisements to which our fictional candidates responded (such as the name of the real estate office) in order to account for real estate office characteristics. Belgian real estate agents are obliged to register with the Institute for Real Estate Agents in Belgium (BIV) before they are allowed to

operate legally on the housing market. Registration is only possible if they hold an accreditation of a higher educational institute focused on real estate. The institute defines a realtor as a mediator between renter and candidate who provides assistance in the process of renting out a property. Through the website of the BIV, we were able to collect the data on the size of each real estate office (number of realtors).

Number of realtors is a metric variable that indicates the number of licensed real estate agents employed by an office. It does not include administrative personnel, unregistered agents or other employees.

Proportion of women in the company is a metric variable, indicating the proportion of licensed real estate agents in the company that are women; the variable is relative to the number of men in the company, which is higher in the majority of agencies.

Lastly, we used administrative data from the Brussels Institute for Statistics and Analysis on the neighborhood level.

Percentage North African migrants is a metric variable that indicates the proportion of North African residents without Belgian nationality in the neighborhood. This variable serves as a proxy for the ethnic composition of a neighborhood and includes only individuals who were born in North Africa and migrated to Belgium. Since the percentage of ethnic minorities in a given Brussels neighborhood correlates highly with the percentage of migrants in that neighborhood, the percentage of migrants is a good approximation of the percentage of ethnic minorities in a neighborhood.

No earned wage is a metric variable which indicates the proportion of minors in a family who receive no income from employment. This variable serves as an indicator of subsistence insecurity and is measured on the neighborhood level. The percentage of minors living in a household without an income from work generally reflects the percentage of young people affected by precarious living conditions, and who may as a result experience restricted access to housing and other basic goods and services.

Average market rent is a metric variable indicating the average rental price for a dwelling in a given neighborhood. This variable is expressed in euro per month.

Test wave is a categorical variable with two categories that indicate the year that the data was collected in.

All metric variables have been grand-mean centered.

Table 1. Descriptive statistics of the variables (n=2,048)

Variable	Average or frequency	Range
Ethnicity of the applicant		0- 1
Belgian	50%	
North African	50%	
Gender of the applicant		0- 1
Male	63%	
Female	37%	

Rent of dwelling	950 €	355-3,000 €
Type		
Apartment	62%	0-1
Studio/duplex	11%	0-1
House	27%	0-1
Number of realtors	2.3	1- 35
Proportion of women in the company	0.22	0- 1
Percentage North African migrants	2.1%	.2- 11.5 (%)
No earned wage	12.8%	2.9- 27.9 (%)
Average market rent	817.2 €	593- 1113 €
Test wave		0- 1
2017	58%	
2019	42%	

3.4. Method

Since our data is hierarchical, the assumption of independence of observations is violated (Hox et al., 2017). Therefore, we have applied a three-level, cross-level multilevel model to estimate how different variables affect the probability of a candidate receiving an invitation to engage in further negotiations with the real estate agent. The specification of our model is expressed as:

$$y_{ijk} = \beta_0 + \beta_1 x_{1ijk} + \beta_2 x_{2jk} + \beta_3 x_{3k} + \beta_4 x_{1ijk} x_{2jk} + \beta_5 x_{1ijk} x_{3k} + v_k + u_k + e_{ijk}$$

Let y_{ijk} be the invitation to a dwelling. Our model consists of the individuals and dwellings in level 1 ($\beta_1 x_{1ijk}$) for individuals i=1, 2, …, 2014, nested in the real estate offices in level 2 ($\beta_2 x_{2jk}$) for real estate agents j=1, 2, …, 493, nested in neighborhoods in level 3 ($\beta_3 x_{3k}$) for neighborhoods k=1, 2, ..., 148. Our random intercept model contains three error terms, with e_{ijk} being the residual error. Since our dependent variable is dichotomous, we have used logistic multilevel models and interact our variables across levels with ethnicity ($\beta_4 x_{1ijk} x_{2jk} + \beta_5 x_{1ijk} x_{3k}$) to measure ethnic discrimination (Ahmed & Hammarstedt, 2008; Carlsson & Eriksson, 2014; Ewens et al., 2014). First, we present an analysis which includes the characteristics of the applicant and the main effects of each independent variable in order to account for mediation effects on discrimination (**table 2**). Each additional model includes the main effects of the contextual variables (dwelling, real estate office and neighborhood characteristics). For each model, we present the odds ratios that indicate the odds that a particular group will be invited to view a dwelling, as compared with the odds established for the reference category. An odds ratio lower than one means that the odds of being invited to visit a dwelling are lower for the tested group than for the reference group. When interacting with ethnicity, a lower odds ratio indicates more discrimination against the tested group. Second, we consider the main question: how does the interaction with the contextual variables affect invitation rates for Belgian women, men

of North African origin and women of North African origin, compared to the reference category of Belgian men (**table 3**). Each model in the analysis adds an additional level of context.

4. Results

Table 2 shows the results of the direct and mediation effects of contextual variables on invitation rates. From model 1a, there appears to be a clear effect of the ethnic origin and gender of the applicant on invitation rates: male candidates with North African names have roughly 1/3 lower odds when it comes to receiving invitations than male candidates with Belgian names ($p < 0.001$). In addition, gender appears to have a statistically significant impact on invitation rates: Belgian women have 1.33 higher odds of receiving an invitation than Belgian men ($p < 0.05$). These results are similar to what has been found in previous studies on ethnic discrimination on the Belgian rental market (Heylen & Van den Broeck, 2016). However, we found no significant effect on invitation rates for North African women when compared to Belgian men and equally no change in effect when compared to Belgian women. This result is possibly an effect of the dominant presence of male candidates in our sample (see **table 1**).

When adding the main effects of dwelling characteristics in model 2a, we did not find significant differences in levels of ethnic discrimination. However, rental price does appear to have a significant positive effect on invitation rates ($p < 0,01$). Model 3a adds the proportion of women in the real estate office as well as the total number of employees in the office. It appears that companies with more employees ($p < 0,001$), and with a relatively higher proportion of women among them ($p < 0,01$), display significantly higher invitation rates in general. Moreover, these variables seem to have an important mediation effect vis-à-vis discrimination rates. By including real estate office characteristics in the analysis, the odds ratio of receiving an invitation as a male of North African origin decreases to 0.58, with the reference category remaining Belgian men. This suggests that discrimination is higher among small offices with fewer women. Using the process method in SPSS provided by Hayes and Preacher (2014) to calculate direct and indirect effects from ethnicity, proportion of women and size of the company on invitation rates, we were able to calculate the mediation proportion of each variable (Ditlevsen et al., 2005). We found that 25% of this difference is mediated through the proportion of women in the company and 55% through the total number of realtors employed by the company. Finally, neighborhood variables do not seem to have a significant direct effect on general invitation rates (model 4a).

Table 2. Odds ratios of the binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics: direct and mediating effects

	Model 1a	Model 2a	Model 3a	Model 4a
Constant	1.02	1.1	1.01	1.19

Ethnicity (a)				
North African male	0.67***	0.68***	0.58***	0.57***
Belgian female	1.31*	1.41*	1.46*	1.51*
North African female	1.18	1.30	1.23	1.32
Rent of dwelling		1.03**	1.03	1.02
Type of dwelling (b)				
Studio		0.89	0.89	0.88
House		0.89	0.89	0.89
Real estate company level				
Proportion of women in the company			1.20**	1.19**
Number of employees			1.11*	1.10*
Neighbourhood level				
Percentage North African migrants				0.97
Percentage poor families				1.03
Average market rent				1.19

*p < .05. **p < .01. ***p < .001.
Notes: N_{obs} = 2,014 $N_{agencies}$ = 493; $N_{neighborhoods}$ = 148. The table reports results from a binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics. The reference group for ethnicity (a) is: Belgian male. The reference for type of dwelling (b) is: apartment.

4.1. Property characteristics

Results of the logistic regression with interaction effects are shown in **table 3**. To test the first cluster of variables on the property level, we looked at the impact of dwelling price and dwelling type on invitation rates (model 1b). When adding these two variables to the analysis, we found the former to have a significant positive effect on the invitation rate for women of North African origin. The fact that this positive effect is only significant for *women* of North African origin, and not men of North African origin, points to the significance of gender as a variable in the analysis. After controlling these results to test whether the effect was not curvilinear, we determined that this was not the case for our data. Our analysis indicated that *type of dwelling* has no significant effect on invitation rates. We concluded that women of North African origin experience an increase in potential showing, compared to Belgian males, when applying to more expensive dwellings.

4.2. Landlord and apartment characteristics

To test the hypothesis that discrimination rates vary according to differences in real estate office characteristics (i.e., total number of realtors and proportion of women employees), we constructed an additional model (model 2b) to address the effects of the following interaction terms: gender and ethnicity of the applicant, on the one hand, and total number of realtors and proportion of women in the real estate office on the other. The reference category remains a Belgian male applicant. It appears that what we addressed in table 2 holds in model 2b. The results reveal that the main discrimination rate significantly rises to an odds ratio of 0.58 for men of North African origin, but did not indicate

any significant interaction effect at the company level. While these results imply that variations in real estate office characteristics have no *direct* effect on discrimination rates for applicants belonging to an ethnic minority group, our analysis establishes a mediation effect arising from these variables that produces a situation where discrimination rates are higher in smaller, male-dominated offices. Thus, we found that our initial hypotheses were only partially supported by our data—for, while variations in office characteristics do not *directly* affect discrimination rates when interacting with ethnicity, they do appear to *mediate* rates of discrimination in a substantial way.

4.3. Neighborhood characteristics

In order to ascertain which variables account for the variation between neighborhoods in terms of discrimination and what the positive or negative effects of these characteristics might be, we tested for interactions between applicant characteristics and neighborhood characteristics. For this portion of the analysis, we considered the following three neighborhood characteristics: number of immigrants from North Africa, average dwelling price and poverty rate. Again, the reference category is an applicant with a Belgian male name.

As can be seen in **table 3**, model 3b, there appears to be a positive effect related to the number of North African immigrants in the neighborhood on the invitation rate of male ethnic minorities compared to Belgian males. As was the case with results from previous research in the USA (Hanson and Hawley 2011; Ondrich, Ross, and Yinger 2003) it appears that male ethnic minorities are discriminated against less in neighborhoods with more ethnic minorities. Consequently, we concluded that in Brussels, ethnic discrimination by realtors is indeed linked to the ethnic composition of a neighborhood.

When looking at the second interaction variable in the regression (model 3b)—namely, percentage of poor families—we find a similar result. The number of families living in poverty in a neighborhood appears to have a positive effect on invitation rates for men of North African origin and Belgian women, compared to the Belgian male. In other words, discrimination is also lower for North African men in *poorer* neighborhoods in the city of Brussels.

Finally, in the full model, the average market rent seems to exert a positive impact on invitation rates for both Belgian women and women of North African origin, compared to the Belgian male applicant. This is in line with our findings on the dwelling level, where discrimination against women of North African origin is lower when dwelling prices are higher. The higher the rent, apparently, the greater the likelihood that the realtor assumes the applicant is capable of paying on time—meaning the realtor might discriminate less (Carpusor & Loges, 2006). Our results suggest that this tendency translates to the neighborhood level as well. Real estate agents might assume that rental candidates who apply for a dwelling in a more expensive neighborhood are capable of paying on time, are familiar with the neighborhood's social codes and are trying to integrate in the city. We controlled the analysis for tightness of the rental market but found no significant effects. The overall results in the full model imply that neighborhood discrimination is predominantly focused on social economic characteristics of the neighborhood. The ethnic composition loses its significant effect when adding

the other characteristics. This is an important finding for future research on the intersectionality of these neighborhood characteristics related to discrimination and segregation in the city.

Table 3. Odds ratios of the binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics: interaction effects.

	Model 1b	Model 2b	Model 3b			Full model
			A	*B*	*C*	
Constant	0.99	1.24	1.20	1.19	1.21	1.15
Ethnicity / Gender (a)						
North African male	0.67**	0.58***	0.58***	0.57***	0.57***	0.56**
Belgian female	1.19*	1.29	1.39	1.38	1.39	1.43*
North African female	1.23	1.13	1.20	1.21	1.34	1.41
Rent of dwelling	1.01	1.03	1.03	1.03	1.03	1.00
Interaction:						
North African male	1.02	-	-	-	-	1.04
Belgian	1.00	-	-	-	-	.98
female	1.09**	-	-	-	-	1.11*
North African female						
Type of dwelling (b)						
Studio	0.85	0.90	0.89	0.87	0.89	0.89
House	1.26	0.92	0.96	0.99	0.86	1.08
Interaction:						
Studio X NA male	1.08	-	-	-	-	1.15
House X NA male	0.96	-	-	-	-	0.92
Studio X B female	1.14	-	-	-	-	0.60
House X B female	0.67	-	-	-	-	0.31
Studio X NA	1.30	-	-	-	-	0.86
female	0.65	-	-	-	-	0.35
House X NA female						
Real estate company level						
Proportion of women in the company	-	1.22**	1.20**	1.20**	1.20**	1.23**
Interaction:						
North African male	-	0.97	-	-	-	0.98
Belgian female	-	1.01	-	-	-	0.96
North African female	-	0.90	-	-	-	0.87
Number of employees	-	1.12	1.12*	1.12*	1.11*	1.12*
Interaction:						
North African male	-	1.01	-	-	-	1.02
Belgian female	-	0.92	-	-	-	0.82
North African female	-	0.91	-	-	-	0.82
Neighbourhood level						
Percentage North African migrants	-	-	0.89	-	-	0.84
Interaction:						
North African male	-	-	1.19*	-	-	1.16
Belgian female	-	-	1.19	-	-	1.24
North African female	-	-	1.12	-	-	1.37

Percentage poor families	-	-	-	0.98	-	0.99
Interaction:						
North African male	-	-	-	1.19*	-	1.05
Belgian female	-	-	-	1.08*	-	1.16*
North African female	-	-	-	1.02	-	1.05
Average market rent	-	-	-	-	1.12	0.93
Interaction:						
North African male	-	-	-	-	0.58	1.06
Belgian female	-	-	-	-	1.06	1.82*
North African female	-	-	-	-	1.10	1.51*
Test wave	0.83**	0.90	0.86	0.86	0.87	0.81

*p < .05. **p < .01. ***p < .001.
Notes: N_{obs} = 2,014 $N_{agencies}$ = 493; $N_{neighborhoods}$ = 148. The table reports results, including interaction effects, from a binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics. The reference group for ethnicity (a) is: Belgian male. The reference for type of dwelling (b) is: apartment. The reference category for test wave is 2017. The table including robust standard errors is reported in appendix 1. Full model pseudo R-squared= 0.20

5. Discussion and conclusion

The aim of this study was to elaborate the context in which discrimination takes place on the rental housing market in Brussels and to propose a broader theoretical framework within which to understand and study mechanisms of discrimination. Using correspondence tests, we measured ethnic discrimination against candidates of North African origin seeking rental dwellings on the housing market. Our findings are straightforward. They suggest that candidates of North African origin face differential treatment when searching for an apartment to rent in the city of Brussels. We measured discrimination through differences in invitation rates, which resulted in fewer invitations for men belonging to a minority group and more invitations for women of the ethnic majority group in all the tested models. No discrimination was found against women of North African origin, most possibly due to the overrepresentation of male candidates in our sample. Thus, our findings are in line with previous research on the rental housing market (Flage, 2018). The positive discrimination effect for the Belgian female compared to the Belgian male is in contrast with research on the labor market, where gender discrimination towards the majority female population is at stake (Triana et al., 2019).

There is evidence that neighborhood characteristics—including the proportion of North African residents and other, socio-economic factors—matter. Firstly, our results suggest that men of North African origin have a higher chance of receiving invitations from realtors when applying for a dwelling in poorer and more ethnically mixed neighborhoods. This pattern is consistent both with the theory that ethnic minorities are steered towards other ethnic minorities (Pearce, 1979) and with the customer prejudice hypothesis (Verstraete & Verhaeghe, 2019), according to which a realtor will anticipate the discriminatory intentions of their customers and act accordingly. The practice of steering minorities towards ethnically diverse and poorer neighborhoods perpetuates segregation in the long run. This form of steering exists alongside segregation that is created through discrimination by private landlords (Auspurg et al., 2017). However, we found that these patterns apply only partially to minority women. The average rental prices in the neighborhood appear to have a positive effect on invitation rates for ethnic minority women, suggesting that this group is predominantly

steered based on economic factors related to the neighborhood, whereas minority men seem to be steered mainly on the basis of the ethnic composition of the neighborhood and social factors such as the poverty rate. This result is an argument for the dominance of the statistical mechanism in gender discrimination, as argued by Bertogg, et al. (2020) and Flage (2020).

Secondly, when including real estate office characteristics in the analysis, we found these characteristics to have a main effect on invitation rates, but no interaction effect with ethnicity. However, while office characteristics do not *directly* affect the discrimination rate, they do help to clarify a large part of the discrimination process. More specifically, our observations suggest that invitation rates in larger, female-dominated offices are higher, but that these characteristics have no direct effect on the discrimination rate. Nonetheless, the presence of the mediation effect does imply that discrimination is lower in larger and less male-centered real estate offices. More elaborate company data (non-aggregated) on the real estate level would yield valuable additional results.

Third, we find that it is important to take contextual factors into account when analyzing discrimination on the rental housing market. The contextual characteristics we have discussed above show that an important part of the discriminatory process is mitigated by external factors. Of course, differences in discrimination rates would still exist if real estate agents acted in a purely isolated way, uninfluenced by the context in which they operated; yet our results suggest that factors relating to the kind of company in which an agent works and the neighborhood in which the dwelling is located *do* influence the behavior of realtors. What this implies, then, is that a real estate agent's taste is not the central cause of discrimination against minority home-seekers. We found major differences in discrimination rates across real estate agencies and neighborhoods, from which one can only conclude that there are more factors at play than mere taste-based discrimination among realtors. Interestingly, we found that the differences in invitation rates for Belgian and North African women is more fluctuant than those of ethnicity. Our results suggest that contextual factors have a larger impact on gender discrimination than on ethnic discrimination. This could be a result of larger levels of statistical discrimination, as suggested by Bertogg, et al. (2020) and Flage (2020). Real estate agents are influenced by the environment in which the rental dwelling is situated. Therefore, the perceived preference or future customer prejudice cause is a much more plausible mechanism. It appears to be the case that real estate agents anticipate the perceived preference of their costumers by steering minorities towards poorer and ethnically mixed neighborhoods. Future research should elaborate on steering mechanisms by including not just real estate agents, but landlords as well in the analysis and combining this with more detailed data on neighborhoods.

5.1. Limitations and further research

First, in discussing these findings, one must keep in mind that it is possible that a different city might generate different outcomes. As we do not know what role metropolitan characteristics such as overall housing market characteristics, segregation index, immigration flows or local services might play in analyses of housing discrimination, we acknowledge that different samples, or different urban contexts, could generate different outcomes (Auspurg et al., 2020). Especially, as the study was conducted in Brussels, a city that consists of a large international crowd, our results could be biased

by its superdiversity. We expect our result to be underrepresenting neighborhood taste-based discrimination, as the perceptions on ethnic diverse neighborhoods in less diverse cities could be more prejudiced. Future research should compare cities and municipalities to test for the influence of differences in ethnic diversity on discrimination rates. Second, have been limited to using only aggregated data for real estate office characteristics, this study lacks precise data on the real estate office level. The variables used are proxies for the characteristics that we intend to measure. More elaborated company data on the real estate level would lead to a more detailed and precise analysis. Third, the use of neighborhoods as the statistical level of scale can be questioned. We used administrative data that was available through the city of Brussels, with the following comment attached: "*Research has shown that certain phenomena need to be handled on a statistically sufficient scale (both in terms of population and geographical area) that far exceeds the size of the statistical sector (Poulain et al., 2001). A demarcation between the level of scale of the statistical sector and that of the municipality is therefore necessary*" (Corijn, 2008). Research on characteristics in smaller areas of the city could yield more accurate results. Lastly, when discrimination on the housing market is measured by means of correspondence tests, only a small part of the process of discrimination is uncovered. Later phases of renting a dwelling are not covered by correspondence tests, leaving out a large portion of discriminatory behavior that happens behind closed doors and is difficult to measure. Mystery shopping, used in combination with correspondent tests, could yield a more comprehensive understanding of this process.

Appendix 1

Table 3. Odds ratios of the binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics: interaction effects. With robust standard errors.

	Model 1b	Model 2b	Model 3b	Model 4b			Full model
				A	*B*	*C*	
Constant	1.02	0.99	1.24	1.20	1.19	1.21	1.15
Ethnicity / Gender (a)							
North African male	0.66***	0.67**	0.58***	0.58***	0.57***	0.57***	0.56**
	(0.07)	(0.09)	(0.07)	(0.07)	(0.07)	(0.07)	(0.10)
Belgian female	1.16*	1.19*	1.29	1.39	1.38	1.39	1.43*
	(0.15)	(0.18)	(0.26)	(0.27)	(0.26)	(0.27)	(0.34)
North African female	1.18	1.23	1.13	1.20	1.21	1.34	1.41
	(0.16)	(0.24)	(0.24)	(0.25)	(0.25)	(0.25)	(0.39)
Dwelling level							
Rent of dwelling	-	1.01	1.03	1.03	1.03	1.03	1.00
		(0.05)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Interaction:							
North African male	-	1.02	-	-	-	-	1.04
		(0.21)					
Belgian female	-	1.00	-	-	-	-	.98
		(0.02)					
North African female	-	1.09**	-	-	-	-	1.11*
		(0.03)					
Type of dwelling (b)							
Studio	-	0.85	0.90	0.89	0.87	0.89	0.89
		(0.21)	(0.19)	(0.20)	(0.20)	(0.20)	(0.32)
House	-	1.26	0.92	0.96	0.99	.86	1.08
		(0.25)	(0.19)	(0.21)	(0.22)	(0.21)	(0.41)
Interaction:							
Studio X NA male	-	1.08	-	-	-	-	1.19
		(0.38)					(0.53)
House X NA male	-	0.96	-	-	-	-	0.92
		(0.26)					(0.31)
Studio X B female	-	1.14	-	-	-	-	0.60
		(0.47)					(0.36)
House X B female	-	0.67	-	-	-	-	0.31
		(0.27)					(0.18)
Studio X NA female	-	1.30	-	-	-	-	0.86
		(0.60)					(0.57)
House X NA female		0.65	-	-	-	-	0.35
		(0.31)					(0.23)
Real estate company level							
Proportion of women in the company	-	-	1.22**	1.20**	1.20**	1.20**	1.23**
			(0.09)	(0.07)	(0.07)	(0.07)	(0.10)
Interaction:							
North African male	-	-	0.97	-	-	-	0.98
			(0.06)				(0.07)
Belgian female	-	-	1.01	-	-	-	0.96
			(0.13)				(0.16)
North African female	-	-	0.90	-	-	-	0.87
			(0.13)				(0.13)

Number of employees	-	-	1.12 (0.07)	1.12* (0.06)	1.12* (0.06)	1.11* (0.06)	1.13* (0.07)
Interaction:							
North African male	-	-	1.01 (0.06)	-	-	-	1.02 (0.06)
Belgian female	-	-	0.92 (0.13)	-	-	-	0.82 (0.12)
North African female	-	-	0.91 (0.14)	-	-	-	0.82 (0.13)
Neighbourhood level							
Percentage North-African migrants	-	-	-	0.89 (0.06)	-	-	0.84 (0.9)
Interaction:							
North African male	-	-	-	1.19* (0.09)	-	-	1.16 (0.14)
Belgian female	-	-	-	1.19 (0.12)	-	-	1.24 (0.21)
North African female	-	-	-	1.12 (0.12)	-	-	1.37 (0.26)
Percentage poor families	-	-	-	-	0.98 (0.02)	-	0.99 (0.29)
Interaction:	-	-	-	-	1.19* (0.02)	-	1.05 (0.3)
North African male							
Belgian female	-	-	-	-	1.08* (0.02)	-	1.16* (0.04)
North African female	-	-	-	-	1.02 (0.03)	-	1.05 (0.25)
Average market rent	-	-	-	-	-	1.12 (0.12)	0.93 (0.14)
Interaction:							
North African male	-	-	-	-	-	0.58 (0.09)	1.01 (0.16)
Belgian female	-	-	-	-	-	1.06 (0.18)	1.82* (0.45)
North African female	-	-	-	-	-	1.10 (0.21)	1.51* (0.40)
Test wave	0.90 (0.05)	0.83** (0.05)	0.90 (0.07)	0.86 (0.08)	0.86 (0.07)	0.87 (0.07)	0.81 (0.09)

*p < .05. **p < .01. ***p < .001.

Notes: N_{obs} = 2,014 $N_{agencies}$ = 493; $N_{neighborhoods}$ = 148. The table reports results, including interaction effects, from a binary logistic multilevel regression of invitation rates on dwelling- real estate company- and neighborhood characteristics. The reference group for ethnicity (a) is: Belgian male. The reference for type of dwelling (b) is: apartment. The reference category for test wave is 2017. The reported standard errors (in parentheses) are robust. Full model pseudo R-squared= 0.20

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