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# Reducing ethnic discrimination through formal warning: evidence from two combined field experiments

Sylvain Chareyron<sup>¶</sup>, Yannick L'Horty<sup>†</sup>, Souleymane Mbaye<sup>Δ</sup>, Pascale Petit<sup>‡</sup>

## Abstract

*This article evaluates the effect of a nationwide public policy designed to reduce discrimination in access to accommodation in the private rental housing market. We carried out a correspondence test with 3,260 real estate agencies to assess the likelihood of discrimination based on ethnic origin. This test allowed us to identify about 10% of agencies likely to exhibit discriminatory behavior. These agencies were randomly divided into two groups: one group received a formal letter warning them that they had been monitored and reminding them of the legal sanctions to which they were exposing themselves and the other group received no communication. We then re-tested all these real estate agencies for two years and compared their responses. The results indicate that the warning message has a substantial and long-lasting effect on discrimination: it decreases discrimination in the treated group by 80% for at least two years.*

**Keywords:** discrimination, real estate agency, correspondence test, RCT, public policy evaluation

**JEL Codes:** C9, J7, R2

Declarations of interest: none.

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## 1. INTRODUCTION

Correspondence tests, consisting of sending fictitious request emails, has emerged as the most common way to measure discrimination in the housing market (Bertrand and Duflo 2016). Through experimentation, it has provided multiple proofs of discrimination in access to housing, particularly for one of the most studied discrimination grounds: ethno-racial origin (Yinger 1998; Page 1995; Choi, Ondrich, and Yinger 2005; Hanson and Hawley 2011). In France, an applicant of North African origin is penalized by more than 20% in terms of positives responses to a request to visit an apartment when applying for accommodation, compared to an applicant of French origin (Acolin, Bostic, and Painter, 2016). While these articles are useful to clarify the nature and extent of the problem, they provide little information on possible solutions to effectively combat discrimination. On the one hand, public action to tackle discrimination has developed considerably since it was instituted in the 1990s (Calvès 2000; Fassin 2002) when public policies were reframed as efforts to combat discrimination rather than initiatives to facilitate the integration of immigrants. On the other hand, research evaluating all or part of the arsenal of anti-discrimination measures remains rare.

In this study, we evaluate the effect of a nationwide public policy designed to reduce discrimination in access to accommodation in the private rental housing market. The targeted grounds for discrimination is ethnic origin. We focus on the difference in reaction to two fictitious French applicants, one of whom is of North African origin as indicated by his first and last name. The public policy being evaluated is the sending of a single registered letter with acknowledgement of receipt from the *Défenseur Des Droits* (DDD)<sup>1</sup> to a real

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<sup>1</sup> This institution, which could be translated as Defender of Human Rights, is an independent administrative authority created in 2008 to defend the rights of citizens with special priority given to children's rights and the prevention of discrimination.

estate agency informing them that their activity has been monitored and that they are suspected of discrimination.<sup>2</sup> The letter also reminds the agency of the legal framework and the penalties that apply in the event of proven discriminatory behavior.

We evaluate the effect of the letter by crossing two experimental methods. We use the correspondence test method to identify discriminatory agencies and to monitor the level of discrimination in the treatment and control groups. Furthermore, we assign the treatment randomly to ensure comparability between the two groups.

Evaluations of threatening actions are rare in the literature on discrimination, even though these have proven to be effective in other fields, such as tax compliance (Kleven et al. 2011). Evaluations of this type also have the advantage of being affordable and easily deployed. Compared to two other studies that use a similar strategy to evaluate the effect of messages sent to housing suppliers (Murchie, Pang, and Schwegman 2021; Fang, Guess, and Humphreys 2019), our study has two main originalities.

First, it assesses the effect of a reminder of the law based on a suspicion of discrimination by the real estate agency. This and the institutional nature of the sender (i.e., the *Défenseur Des Droits*) make the message a clear threat, making it more likely to have a substantial and long-term effect on discrimination. The fact that the message is nominative and is sent by registered letter with acknowledgement of receipt also reinforces the official aspect of the notice.

Second, it evaluates the effect of the treatment from a long-term perspective. We monitor the level of discrimination over two years, which allows us to observe if any

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<sup>2</sup> According to the 2016 INSEE housing survey in France, 40% of households rent their apartment or house. The owners of rented housing in the private market are 94% individuals. More than a third of these landlords use the services of a real estate agency to rent their property. These agencies are in charge of creating and disseminating the housing offer, organizing the visit of the housing and selecting the applicants and collecting the rent. The precise delimitation of the powers entrusted to the agency by the owner is fixed by the signature of a *management mandate* between the two parties. In this study, we focus only on real estate agencies and not on landlords who manage their housing themselves.

reduction in discrimination is long lasting. Indeed, it is possible that the effect will diminish rapidly as the threat dissipates, since the message aims to reduce discrimination primarily by increasing the perceived cost of discrimination. We believe this point is particularly important because, although it is not expensive, the value of deploying this public policy would clearly be undermined if the effect were positive but temporary.

The results show that the sending of warning letters by the *Défenseur Des Droits* had a substantial impact on the behavior of real estate agencies suspected of discrimination. We were able to detect a significant decrease in the level of discrimination in the treated group compared to the control group: the gap of 9 percentage points in positive responses between the French and North African applicants observed in the control group is reduced by almost 7.5 percentage points in the treated group. This corresponds to a decrease of 80% in relative terms. In addition, the effect is long-lasting since it can be observed for two years after the treatment, with no significant reduction over time. The effect of the policy is confirmed by an analysis at the agency level. We find that there is a significant increase in the likelihood that the agency will respond to both applicants. This is accompanied by a decrease in the likelihood that it will respond only to the French applicant.

The exploratory analysis indicates that the letter is more effective, the lower the rent of the housing. The results also suggest that the letter is less effective in areas with a very low proportion of non-French nationals. This result may be explained, as Murchie, Pang, and Schwegman (2021) suggest, by lower responsiveness by landlords to this threat as they resist change in areas near the tipping point (Schelling 1971) of demographic change in the composition of the area.

The first section provides an overview of the literature on discrimination with an emphasis on those studies that focus on the evaluation of anti-discrimination actions. The

third section describes the public policy and the mechanism by which it potentially acts on discrimination. The fourth section describes the experimental protocol and sample characteristics. The results of the experiment are presented in section five and we conclude in the last section of the article.

## **2. LITERATURE**

### **2.1. Previous public policies aimed at reducing racial/ethnic discrimination in the housing market**

The two studies closest to ours in terms of the public policy studied and the methodology used are Murchie, Pang, and Schwegman (2021) and Fang, Guess, and Humphreys (2019). Both use correspondence/audit tests and randomized controlled trials to evaluate the effect of conveying messages to housing providers on the level of racial discrimination in access to accommodation.

Murchie, Pang, and Schwegman (2021) conducted a nationwide evaluation of the effect of sending an informative message on prohibited behaviors to landlords who have posted a housing ad. They find that the letter has only a very short-term effect on reducing discrimination. In contrast to this study, we evaluate the effect of a warning letter, rather than an informative one, based on a suspicion of real discrimination containing a clear and threat in the form of a reminder of the law. Also, the fact that the message is sent by an official body increases the power of the threat. We also study the effect of the letter over a much longer time scale, as their final follow-up test occurs one month after the treatment.

Fang, Guess, and Humphreys (2019) evaluate the effect of two different messages in a more localized context (i.e. the city of New York): a “monitoring” message that reminds people of the law and a punitive message that, in addition to acting as a reminder of the law,

highlights the penalty for discrimination. They find some evidence of effectiveness of the punitive message, sent by a city institution, in that discrimination is reduced significantly against Hispanics but not Blacks shortly after the treatment. The second message is called a punitive message because it reminds recipients of the sanctions for discrimination. However, unlike ours, it is not based on an *a priori* suspicion of discrimination and, therefore does not contain any accusatory element.

## **2.2. Insights from studies on other discrimination grounds and in other markets**

Our study also relates more generally to evaluations conducted on other discrimination grounds and in other markets. In general, few public policies have shown substantial and lasting effectiveness in reducing discrimination. In the United States, Agan and Starr (2017) estimated the effect on racial discrimination of forbidding employers from asking about applicants' criminal histories on job applications. This was found to have a detrimental effect on discrimination because it penalized those Black applicants who do not have a criminal record. From a theoretical perspective, Coate and Loury (1993) showed that affirmative action does not necessarily reduce stereotypes about minority workers. Kaas (2009)'s model shows that the effect of equal pay legislation on labor market inequality depends on the taste for discrimination and the level of competition. Regarding the effects of the policy of anonymizing CVs, the evaluation conducted in France by Behaghel, Crépon, and Le Barbanchon (2015) remains inconclusive. An evaluation conducted in Germany finds that this type of policy had a positive effect but the study suffers from a limitation in that the firms participating in the experiment are self-selected (Krause, Rinne, and Zimmermann 2012). Regarding residential discrimination, Chareyron et al. (2022) found that, in France, direct subsidies to employers had a moderate effect on reducing residential discrimination in employment. With regard to gender discrimination, Goldin and Rouse (2000) found that the

use of an opaque screen in symphony orchestra recruitment procedures produced positive effects. Júlio and Tavares (2017)'s model shows that gender quotas increase the overall quality of persons elected to public office.

Some lab-based experiments have identified actions that may be effective in decreasing discrimination or stereotyping, but they have rarely been evaluated in real-world conditions and generally only have short-term effects (Bertrand and Duflo 2016). For example, Kawakami et al. (2000) showed that training to negate stereotypes was able to reduce the stereotypical activation. Another example is the work of Dasgupta and Greenwald (2001) who reported that exposing people to admired Black celebrities or disliked White celebrities reduced automatic pro-White attitudes in the short term but had no effect on explicit racial attitudes.

### **3. INSTITUTIONAL CONTEXT AND DESCRIPTION OF THE PUBLIC POLICY**

#### **3.1 The *Défenseur des Droits***

The project consists of measuring the effect of a public policy designed to combat discrimination in access to accommodation. This public policy is carried out by the institution, *Défenseur Des Droits (DDD)*. It takes the form of a warning letter sent by the DDD to real estate agencies suspected of discriminatory behavior towards applicants in the renting of private-sector accommodation.

The *Défenseur Des Droits* is an independent institution of the state. It was created in 2011 and is inscribed in the constitution. It employs nearly 250 people at the institution's headquarters in Paris and 500 delegates are spread across the territory of metropolitan France and overseas to receive and guide the procedures of claimants.



It has been entrusted with two missions: to defend people whose rights are not being respected and to allow equal access to rights for all. Any natural person or any legal entity can contact it directly free of charge when they think they are being discriminated against, when they notice that a representative of the public order or a private agent has not respected the rules of good conduct or believes that the rights of a child are not being respected.

In addition to processing individual requests, the DDD carries out actions to promote equality, which consist of disseminating information about people's rights and ensuring that they are respected. It is within this framework that the action evaluated in this paper of controlling agencies and reminding them of the law is situated.

### **3.2 The treatment**

The treatment is a registered letter with acknowledgement of receipt sent by the *Défenseur des Droits* to agencies suspected of discrimination.<sup>3</sup> The letter is addressed by name to the person in the agency who was initially tested. The first paragraph explains the nature of the institution, *Défenseur des Droits*, and its constitutional status. The next three paragraphs inform the agency that it has been monitored and that its behavior has been considered potentially discriminatory. After a few details explaining the methodology of the correspondence test, the letter informs the agency that the elements obtained “may suggest the existence of discrimination”. The rest of the letter emphasizes that such behavior is “expressly prohibited” by law and reminds them of the sanctions for discriminatory conduct. Then, the last paragraph indicates that the “penal code carries a maximum penalty of three

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<sup>3</sup> We have not been allowed by the *Défenseur des Droits* to share the letter, probably in order not to give excessive publicity to this experimental approach and to avoid exposing the institution to a risk of litigation from representatives of real estate agencies.

years imprisonment and a fine of 45,000 €” when this act is committed by a natural person and a fine of up to 225,000 € when it is committed by legal entities.

A flyer is also attached to the letter informing the agency of how to raise awareness among employees of discrimination issues. This instructional flyer is part of the communication toolkit of the *Défenseur des Droits* and has been widely distributed through other channels to French real estate agencies. Therefore, it is not specific to this experiment. In consequence, we believe that this component cannot affect the level of discrimination differently in the control and treatment groups.

### **3.3 Expected effects**

The purpose of the letter is to warn the agency by sending a credible threat of sanction. The credibility of the threat is supported by informing the agency of the nature of the institution, which may not be widely known in France, and by explaining how the agency was detected as being potentially discriminatory. The fact that the letter is nominative and sent by registered mail with acknowledgement of receipt is also intended to reinforce the official and personal nature of the notification.

The mechanism by which this warning may affect the level of discrimination is twofold. The first explanation stems from a theory of criminal behaviors. As indicated by Becker (1968), the commission of a crime is influenced by the perceived probability of detection. In the case where the agency is fully aware of the discrimination being carried out, the increase in the perceived probability of sanction induced by the letter will decrease discrimination. The second explanation is that the discriminatory behavior of the agency is unconscious or unintentional (Banaji and Greenwald 1995; Bertrand, Dolly Chugh and Mullainathan 2005). Indeed, neuroscience studies have shown that different regions of the brain are activated in conscious versus unconscious processing, suggesting that unconscious processes are mental

activities that occur distinctly apart (Bertrand and Duflo 2016). Furthermore, implicit biases are more likely to influence behavior in the case of a heavy cognitive load or inattentiveness to the task. This reaction is reinforced even more by the fact that the level of attention allocated to the applicant can itself be determined by his or her ethnicity (Bartoš et al. 2016). In this case, by bringing the attention of the agency to the selection process, the warning letter should reduce unconscious biases and discrimination.

Therefore, the message is expected to have an effect on unconscious bias and endogenous allocation of attention, or on the perceived cost of discrimination but not on the traditional mechanisms explaining discrimination, namely taste-based discrimination (Becker 1957) or statistical discrimination (Arrow 1971). The advantage of this policy is that it may be effective in reducing the difference in response rates to applicants, even if the discrimination comes primarily from the landlord who, for reasons of taste or imperfect information, asks the agency to select applications on a discriminatory basis. In this situation, the agency, perceiving an increase in the cost of implementing the request, may refuse to make the selection after receiving the message.

#### **4. EXPERIMENTAL PROTOCOL**

##### **4.1 A three-step protocol**

Before sending the letter, we selected those agencies deemed likely to exhibit discriminatory behavior by conducting an initial correspondence test. Overall, the protocol consists of three successive steps: selection of agencies, sending of the letter, and the implementation of several follow-up tests. This three step protocol is represented in Figure 1.

[Here Figure 1]

## Phase 1 - Identification of agencies at risk of discriminatory behavior

We carried out a correspondence test that involves two profiles of applicants. For one, his first and last name implies French origin, while for a second applicant, North African origin is implied. To avoid detection, several different first and last names were used, chosen from among the most frequent in the census.<sup>4</sup> Common surnames clearly originating from a North African country were chosen. With the exception of the sound of their first and last names, the fictitious applicants were similar. They are French nationals, of comparable age and both are male. These fictitious applicants sent almost identical messages simultaneously in response to real estate ads throughout the country.<sup>5</sup> Below are some examples of emails sent by fictitious rental applicants to real estate agencies.<sup>6,7</sup> A total of 3,260 tests were conducted on different agencies between 2016 and 2017 for the whole of the French territory. Each agency was tested once. We consider an agency to be potentially discriminatory if it gave a positive answer to the applicant of French origin but did not answer or gave a negative answer to the applicant

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<sup>4</sup> French-sounding first names were used, for example, Sébastien, Guillaume, Thomas, Frédéric, etc. Examples of North African first names used are Mohamed, Karim, Ahmed and Mounir, etc. French-sounding last names used were Petit and Moreau, Rousseau, Durand, etc while North African last names used were Chettouh, Khalis, Mokraoui, Mbarek, etc.

<sup>5</sup> Ads were taken from the most widely consulted websites in France <https://www.leboncoin.fr/>, <https://www.seloger.com/>, <https://www.avendrealouer.fr/>. These websites contain a large part of the rental housing ads. Another important way to view ads is directly at the real estate agency, but the same ads are generally shown through both channels.

<sup>6</sup> The content of the emails is randomly switched between applicants for each real estate ad.

<sup>7</sup> The date of birth of the North African origin applicant is included in the message while it is not in the case of the French applicant. This is done to control for the age signal related to the applicant's first name. While a French-sounding first name will give most agencies an idea of the applicant's age range, a North African-sounding first name is less likely to do so. Because we use first names common among individuals of around 45 years old, we indicate a birth date for the applicant of North African origin of around 1975. The French nationality of the applicant of North African origin is indicated in the message to as to isolate an effect related purely to ethnicity and not to nationality.

of North African origin following receipt of the messages from the two applicants.<sup>8</sup>

Hello

This ad is a good match for what I am currently looking for in this area. How can I visit this apartment? What documents are required to rent it?

Thanking you for your support

Frédéric ROUX

06 44 05 92 57

fredrouxfred@gmail.com

Dear Sir or Madam,

The apartment you are offering in this ad is what I am looking for. Would it be possible to visit it? I would like to prepare the rental file, can you give me the list of the requested documents?

Thank you in advance,

Fouad Messaoui

Telephone: 06 56 71 71 10 52

Mail:messaouifouad2@outlook.fr

Date of birth: 18/08/1975

French nationality

The purpose of this first stage is to detect agencies that are potentially discriminating in order for the *Défenseur des Droits* to be able to send a personalized warning message.<sup>9</sup> As indicated in the message of the DDD it is only a suspicion based on the fact that the agency

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<sup>8</sup> The response could be an email or a phone call. We consider as positive responses all responses that are not negative. So, all responses are seen as positive, unless the message indicates that there will be no visit of the apartment. This is justified by the fact that we only look at the first response from the agency and some of these first responses are not an immediate invitation to visit the apartment but a request for additional information that will then lead to the visit.

<sup>9</sup> Unlike, for example, Kline, Rose, and Walters (2021) who conduct multiple tests for each firm to identify discriminatory firms with high confidence.

only responded to the applicant of French origin. In consequence, it is possible that some of these agencies do not actually behave in a discriminatory manner: some may have responded only to the French applicant for other reasons (e.g. because they received the email from the French applicant first<sup>10</sup>, because they missed the other message, etc.).

The results of this first stage are presented in Table 1. Of the 3,260 tests, the applicant of French origin obtained a positive response rate of 36.2% compared to a positive response rate of 28.8% for the applicant of North African origin. The difference of 7.4 percentage points between the two applicants is significant at the 5% level and corresponds to a 20% difference in relative terms. We thus detected 343 potentially discriminatory agencies, i.e. agencies that only responded to applicants of French origin. These are the agencies targeted for treatment in this experiment.

[Here Table 1]

## Phase 2 - Sending letters

From the sample of 343 agencies, we produced a list of 334 valid agency addresses. We were unable to find the addresses of 9 agencies, either because they had disappeared or for another reason. We then compiled two lists of 167 agencies (the treatment group and the control group) by random selection. Only the agencies in the treatment group were sent the warning letter from the DDD at the beginning of December 2017.

## Phase 3 - Follow-up tests after sending the letter

Each agency is then tested several times after receipt of the letter. To avoid detection, the tests are conducted over two years and spaced out over time: four waves of tests were

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<sup>10</sup> The order of sending is randomly permuted.

conducted over the period 2018-2019. Some agencies may have been tested less than four times for the following reasons: agency had closed; website problems; websites under maintenance; website not found; no ads on the site. 46 agencies were not tested at all for a variety of these reasons. However, this attrition appears to be equally distributed between the treatment and control groups and only affects the statistical power of the upcoming estimates. Indeed, the distribution of the number of tests conducted on each agency is similar across the two groups. Table A1 in Appendix shows that a test of independence does not reject the null hypothesis that the distribution of the number of tests by agency is independently distributed across the two groups.

Table 2 presents the characteristics of the two groups of real estate agencies after they have been tested at least once. It can be observed that the characteristics of the two groups are very similar which suggests that randomization was correctly achieved in the experiment. Secondly, we can observe that about 10% of the agencies are located in Paris, 4% in Marseille and 2% in Lyon. The majority of the agencies belong to a national network and have on average 10 employees.

[Here Table 2]

The follow-up tests were conducted using the same procedure as the initial correspondence tests to identify those agencies potentially exhibiting discriminatory behavior. Similar messages were sent simultaneously by two fictitious applicants, one of French origin and the other of North African origin, in response to real estate ads by these agencies. To avoid detection, the names used are different from the initial correspondence test and are changed with each new follow-up test.

With two groups of about 150 real estate agencies, two applicants per test and about four tests per agency, the sample is 1,200 observations for each group. Even

accounting for attrition, which produced two groups of about 1,000 observations, the experiment is able to detect a decrease in discrimination of 3.5 percentage points relative to the control group with a 10% probability of discrimination, at the usual statistical power.<sup>11</sup>

#### **4.2 Limitations of the study**

The study has two main limitations. Even though the warning letter was sent by a state institution competent in discrimination matters, which reinforces the credibility of the threat, the *Défenseur des Droits* had strong legal restrictions on the content of the message, thereby limiting the possibility of introducing variations in the letter.<sup>12</sup> Therefore, it was not possible to test the effect of different messages. Also, the institution of the *Défenseur des Droits* included a pedagogical flyer with the letter. This may raise doubts about whether the effect of the letter is due to the threat of sanction contained in it. Indeed, Devine et al. (2012) have shown that a training component on how to implement a variety of bias reduction strategies in daily life can be effective in increasing concern about discrimination (but does not change reported racial attitudes). Despite the lack of distinction made between these two elements, we believe that only the warning component in the letter is likely to influence discrimination. Indeed, this warning component is the key aspect of the letter. As indicated above, the pedagogical flyer is not specific to the experiment and had already been sent more generally to French real estate agencies by the *Défenseur des Droits*. Both groups are therefore exposed to pedagogical flyer. The pedagogical flyer may eventually interact with the

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<sup>11</sup> With two groups of 1,000 observations, a decrease in the probability of discrimination from 10% to 6.5% has an 81% of chance of being detected at the 5% risk level.

<sup>12</sup> The content of the letter was validated by legal experts from the institution of the *Défenseur des Droits*. Ethical considerations also influenced the content of the letter. For example, the letter mentioned that during the correspondence test to identify agencies suspected of discrimination, appointments were “later cancelled”. This is done so as not to waste agencies' time unnecessarily. In addition, the DDD did not have access to the individual data of the study and it was not planned to use the results of the testing for prosecution purposes.



warning component. Indeed, the threat of sanction may cause agencies to read the instructional flyer more carefully and therefore glean more information from it than might be case for agencies that do not receive the warning letter. In this case, there could be a positive interaction effect between the formal warning and the pedagogical component of the message.

The second limitation stems from the measurement of the level of discrimination. The level of discrimination is measured by a correspondence test, a method well-established for this purpose. This method makes it relatively easy to control the content of applications to avoid bias. However, it only measures the difference in access at the first stage of the housing access, i.e. the visit of the housing. This issue is thus common to most studies on discrimination, but it may be particularly pertinent in our context. Indeed, when the purpose of a study is only to measure discrimination, showing inequality of access at the first stage of the process seems sufficient since there is no reason why this initial inequality should not continue through to the final outcome. However, in our case, we may question whether a decrease in discrimination during the first stage of the process would carry over to the final outcome, i.e. the decision to rent to the applicant or not. It is possible to imagine that the initial reduction in discrimination is only a superficial reaction of the agency that shifts the final selection to a later, less detectable stage. This is a limitation of the study, which calls for confirmation through an audit test. In this respect, the study by Fang, Guess, and Humphreys (2019) is reassuring since they find a similar treatment effect on callback rates and on the final housing offer when they assess the effect of their treatment on discrimination using audit tests.

## 5. RESULTS

### 5.1 Graphical results

Figure 2 shows the positive response rates by ethnic origin and group type. It can be noted that even in the control group, a substantial proportion of agencies (about 35%) respond to the applicants of North African origin. Relatively, the level of discrimination is close to the one obtained in Phase 1 (i.e. around 20%). This level is also close to the results obtained in other studies on ethnic discrimination in the housing market in France such as those of Acolin, Bostic, and Painter (2016) and Challe et al. (2022). While this supports the external validity of our results, this may appear surprising since all of these agencies were considered potentially discriminatory.

We see three possible explanations for this phenomenon. The first correspondence test that identified the discriminatory agencies was conducted between 2016 and 2017, up to two years before the first follow-up test. During this period, some agencies may have changed their behavior. For example, as indicated above, information flyers had recently been sent to agencies in France to provide guidance on how to reduce discrimination. This may have contributed to reducing discrimination in some agencies. Second, as stated previously, an agency might have responded to the French applicant alone in the initial correspondence test for a non-discriminatory reason (e.g. the French application was received first). Third, real estate ads are not necessarily managed by the same employee and there may be employees who discriminate and others who do not in the same agency. This may lead to sampling variations. We think that the two last explanations are the most likely because the discrimination rate in the control group is not very different from that obtained in the test in Phase 1, suggesting little change in behavior over time.

Comparing the two groups, we can observe that the positive response rate to the North African applicant is much higher in the treatment group (about 45%). To a lesser extent, the positive response rate of the applicant of French origin also seems to increase slightly in the treatment group. We can also see that the difference between the positive response rates to the French and North African applicants is 9 percentage points and significant for the control group, while it is less than 3 percentage points and insignificant for the treatment group.<sup>13</sup>

[Here Figure 2]

As can be seen in Figure A1, the picture is also very similar when the sample is examined by year after the letter is sent, suggesting a stable treatment effect over the period. In addition, the overall positive response rate remains at 42% across the two years, which suggests that detection of the test by the agency was not the cause of a reduction in the positive response rate over time.

The absence of significant discrimination in the treatment group may, however, be due to sampling fluctuations and is therefore not definitive evidence of the effectiveness of the letter. To go further, it is important to test the significance of the discrimination differential between the treatment and control groups. In addition, we would like to verify that the results remain robust with the inclusion of control variables, even if the experimental methodology used allows us to suppose this. In an experimental setting, the inclusion of control variables can also improve the precision of the estimates.

## **5.2 Regression at the applicant level**

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<sup>13</sup> P-values of tests of equality of proportion are 0.004 in the control group and 0.403 in the treatment group.

We consider a model of the form:

$$Rep_{iat} = \alpha + \beta Letter_a + \gamma North\ African_{iat} + \lambda Letter_a \times North\ African_{iat} + \delta X_{iat} + \vartheta_t + \phi_a + \varepsilon_{iat} \quad (1)$$

With  $Rep_{iat}$  a dummy variable indicating whether applicant  $i$  receives a positive response or not from agency  $a$  at time  $t$ . The variable  $Letter_a$  indicates if the agency receives the message from the *Défenseur des Droits* or not. The variable  $North\ African_{iat}$  indicates the origin of applicant  $i$  applying to the agency  $a$  at time  $t$ . Control variables  $X_{iat}$ , time fixed effects  $\vartheta_t$  and agency fixed effects  $\phi_a$  are included in certain specifications.  $\lambda$  measures the difference in discrimination between the treatment group and the control group and therefore gives the effect of the *Défenseur des Droits's* letter on the level of discrimination.

Table 3 presents the OLS estimates of the linear probability models from Equation (1). We present results over the two years (Columns (1) to (4)), split by year to observe the evolution of the effect over time (Columns (5) and (6)). The models in Columns (1) to (4) differ by the inclusion of different sets of covariates as indicated in the bottom of the table. The results confirm the graphical impression: the letter significantly reduces the level of discrimination. The 9-percentage point difference between the level of positive responses to the applicant of French origin and to the applicant of North African origin is reduced by almost 7.5 percentage points by the letter of the *Défenseur des Droits* and almost disappears. This corresponds to an 80% reduction in discrimination, in relative terms. Furthermore, the effect of the letter appears to be long lasting and stable over time with almost same effect being found in the first and second year after the treatment. The effects are slightly less significant when the data is split by year but this is only due to less precision because of the smaller number of observations in each subgroup.

Compared with the studies by Murchie, Pang, and Schwegman (2021) and Fang, Guess, and Humphreys (2019) where the sending of informative and punitive messages resulted in a positive but short-term and sometimes localized effect of the messages, the effect of the warning sent in our study was more substantial and long-lasting. When compared with the informative message sent in the study by Murchie, Pang, and Schwegman (2021), it is likely that the threatening nature of the message sent in our case explains this greater impact, with the authority associated with the institutional sender also playing a role. Similarly to us, Fang, Guess, and Humphreys (2019) study the effect of a punitive message sent by a New York City institution. However, their message is not based on a prior suspicion of discrimination and therefore has a lower accusatory load. This suggests that the initial identification of potentially discriminatory agencies, which allows for a more accusatory message to be sent, is an important element in explaining the durability of the effect.<sup>14</sup>

[Here Table 3]

As a robustness check, we also estimate probit models. They give similar results (Table A2). Second, our estimates are based on all real estate ads, which is the most common way to proceed in the literature (Bertrand and Mullainathan 2004). However, it can be argued that the real estate ads for which neither of our applicants received a response (neither by e-mail nor by telephone) should not be taken into account in the estimations because they do not reveal information about discrimination (the agency may not have

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<sup>14</sup> Another difference between the interventions in the three studies is the delivery channel. Murchie, Pang, and Schwegman's (2021) message is sent by email, Fang, Guess, and Humphreys' (2019) messages are delivered by phone, and our message is delivered by registered letter with acknowledgement of receipt. Further work is needed to determine the influence of the delivery channel on the effect of the message.

received the applications, or may have already found a tenant at the time, etc.). In consequence, we carry out estimates on the subsample of real estate ads for which we have at least one positive response to one of the applicants. The results presented in Table A3 are similar: the DDD message significantly reduces discrimination. The magnitude of the effect is higher in absolute terms but similar in relative terms.

### **5.3 Heterogeneity of the effect**

A number of studies in the United States have shown that the level of discrimination in the housing market varies with the demographic composition of the housing area (Page 1995; Yinger 1986). In particular, discrimination tends to increase with the proportion of Whites in the housing area. This is because, due to customer prejudice, landlords may have a greater incentive to discriminate when a large part of their current customer base is White. Some studies have also shown that this phenomenon occurs in countries other than the United States (Chareyron et al. 2022). This phenomenon may also reduce the effect of the treatment in areas with a declining racial/ethnic majority population share (Murchie, Pang, and Schwegman 2021).

In consequence, we re-estimate our main specification corresponding to the one in column (4) of Table 3 but, this time, allowing the level of discrimination and the treatment effect to vary with the share of non-French nationals in the housing area, using data from the 2016 Census.<sup>15</sup> The results are presented in column (1) of table A4.

The relationship between discrimination and neighborhood demographic composition is generally found to be non-linear as landlords try to prevent the area from undergoing a racial transition and therefore tend to discriminate more around the "tipping

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<sup>15</sup> The area we consider is the IRIS, which is an infra-communal geographical unit defined for statistical purposes and corresponding to around 1,800 to 5,000 inhabitants. Following Hémet and Malgouyres (2018), we consider nationality as a proxy for ethnicity since in France the declaration of ethnicity is generally restricted and therefore this information is not available.

point" (Ondrich, Stricker, and Yinger 1999). To account for this, we also include the square of the proportion of non-French nationals in the area in interaction with treatment effect's and applicant's ethnicity (column (2)). In the United States, the tipping points found by Card, Mas, and Rothstein (2008) occur when minorities represent between 5% and 20% of the population of an area. In the geographical units in our study, the maximum proportion of non-French nationals is about 20%, so the two situations are not very comparable. Nevertheless, we explore a possible nonlinear relationship by estimating the main specification on subsamples of applications corresponding to housing in areas where non-French nationals account for above and below 5% of the population (columns (3) and (4)).

Similarly to Murchie, Pang, and Schwegman (2021), the treatment effect is smaller in magnitude and statistically indistinguishable from zero in neighborhoods with the lowest proportion of minorities/ non-French nationals <sup>16</sup>, but there is no significant linear or nonlinear relationship between the effect of the letter and the ethnic composition of the area at the conventional statistical level. This may suggest that landlords in census tracts at tipping point are less responsive to the treatment and are behaving in a manner consistent with the notion that they are trying to prevent the minority share from becoming too high.

We also explore the heterogeneity of the treatment effect by agency and housing characteristics. Some of these characteristics may influence the level of discrimination and potentially the effect of the letter. In the labor market, Kline, Rose, and Walters (2021) have shown that the level of racial discrimination may vary according to certain characteristics of the firm such as callback centralization and profitability. It is possible that the effect of the letter varies with agency size: larger agencies may have a more formalized process and may respond more strongly to the warning letter. Similarly, whether the real estate agency is a

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<sup>16</sup> The two estimated coefficients of the interaction Letter  $\times$  African origin are not significantly different at the 5% level.

branch of a national real estate company or belongs to a national network of agencies<sup>17</sup> may influence the level of discrimination and possibly the effect of the letter. For example, these national entities may conduct training on non-discriminatory processes that will increase the effect of the letter. Finally, regarding housing characteristics, the effect of the treatment may differ depending on the rent. As the stakes are higher with high rents, the agency may use all available evidence to make the selection and be less responsive to the treatment.

Table A5 present estimates of specifications similar to the main one but allowing the level of discrimination and the treatment effect to vary with these different variables. The results do not find any significant relationship between real estate agency or housing characteristics and the level of discrimination. There is also no significant variation in the treatment effect with these characteristics. The only significant interaction at the 10% level is with the amount of the rent. This suggests a decrease in the effect of the treatment as the rent increases.

#### **5.4 Regression at the real estate agency level**

It is possible to analyze the results at two levels: in terms of the positive response rate received by individuals but also in terms of the responses by each agency. An agency's response can be of four types: it can offer a visit to neither of the two applicants, only to the applicant of French origin, only to the applicant of North African origin or to both applicants. Two of the responses indicate equal treatment by the agencies (no response and responses to both) and two indicate unequal treatment (response to only one of the applicants). This

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<sup>17</sup> In France, real estate agencies can join different real estate agency networks. These networks generally offer a label (guaranteeing a certain level of professionalism and adherence to an ethics code), national visibility, legal assistance, regular commercial real estate news, business tools, ongoing training at preferential rates, the possibility of publishing housing ads on the network website, etc.



perspective is interesting because changes in agency behavior may be more visible at this level than at the applicant level. The multinomial logit model is:

$$\pi_m(x) = \frac{e^{\beta_m Letter_a + \delta_m X_{at} + \vartheta_t}}{1 + \sum_{m=1}^{M-1} e^{\beta_m Letter_a + \delta_m X_{at} + \vartheta_t}} \quad (2)$$

Where  $\pi_m(x)$  is the probability of obtaining one of the  $m = 1, \dots, 4$  types of response from the agency.  $Letter_a$  is the variable that indicates if the agency received the letter or not,  $X_{at}$  are controls and  $\vartheta_t$  are time fixed effects.

Table 4 presents the results of the estimation of the effect of the letter on the type of response given by agencies (Equation 2). Average marginal effects are presented. Column (1) shows the effect of the letter on the probability that an agency will not respond to either of the two applicants, Column (2) on the probability that only the French applicant will receive a positive response, Column (3) on the probability that only the North African applicant will receive a positive response and Column (4) on the probability that both applicants will receive a positive response. The sum of the marginal effects is necessarily zero across all outcomes: an increase in the probability of the occurrence of an outcome caused by the letter must be compensated for by a decrease in the probability of one of the other three outcomes.

There is a sharp and significant increase in the proportion of agencies that respond favorably to both applicants in the treatment group (column 4): receiving the message from the DDD increases the probability by 10 percentage points that an agency will respond favorably to both applicants. This is a clear indication of a positive effect of the letter on equal treatment. This increase is mainly compensated for by a decrease in the “response to the French only” outcome, but also, although not significantly, by a decrease in the “no response” outcome. The decrease in the “no response” outcome explains the increase in

positive response rates that we observed graphically for both applicants in the treatment group compared to the control group.

Although not significant, the decrease in the “no response” outcome could potentially be indicative of a form of superficial response to the letter by some agencies: it is possible that, as a precaution, agencies receiving the letter tend to respond to each request when they would not normally respond to anyone. However, this decrease in the “no response” outcome is not necessarily indicative of a superficial response. Agencies do not receive only the fictitious applications from our experiment. In consequence, what we observe as a “no response” is not necessarily true for all the applications that the agency receives. To avoid discrimination, agencies that previously respond to only some applicants may decide to respond to all applicants, leading us to observe a decrease in no response for our two applicants.

[Here Table 4]

## 6. CONCLUSION

Random assignment allows us to evaluate the effect of a public policy designed to reduce discrimination in access to accommodation in the private rental housing market. This public policy takes the form of a letter sent by the *Défenseur des Droits* to real estate agencies to inform them that they have been monitored for discrimination and to remind them of the legal framework and the monetary and criminal sanctions they face. Correspondence tests allow us to measure subsequent ethnic discrimination between two French applicants, of which one is of North African origin as indicated by his first and last name after receipt of the warning letter by the real estate agencies.

We find statistical evidence that the message is effective at both the applicant and agency level. The message has a significant effect on the difference in positive response rate to the two applicants: discrimination in the treated group decreases by 80% compared to the control group. Furthermore, the effect is long lasting since the estimated effect remains significant over two years. We further explain the effect by looking at the agencies' behavior. We show that receipt of the message tends to increase the probability that the agency will respond to both applicants, accompanied by a general decrease in the probability that they respond to the applicant of French origin only.

This article shows that the action of formal warning has a large and long lasting effect on the discriminatory behavior of real estate agencies. We believe that the consequences of this finding for public policy are important, first, because there are very few public policies that have been shown to be as effective in reducing discrimination and, second, because it is a relatively cost-free action that could be deployed easily. Discriminatory agencies are almost never sanctioned because it is difficult and costly to prove discrimination: a judicial audit test must be carried out for each discriminating company. An alternative approach could be to conduct massive correspondence test campaigns to detect potentially discriminatory agencies and send them formal warnings.

Because the letter potentially reduces discrimination essentially by pointing out the perceived cost of this behavior to the rental agencies, the question arises as to its effectiveness in the event of generalization. The threat of sanction was credible from the agency's perspective because it was a targeted one-off action. Generalizing the threat without implementing effective sanctions against discriminatory agencies will not necessarily produce the same effect. If generalized, additional investigation and legal action against the 20% of agencies that continue to discriminate after receiving the

warning message would likely be necessary. However, because the number of agencies in this situation is relatively small, the costs of implementation would be moderate in comparison with the benefits. Furthermore, it is also possible that the threat of sanctions has led some agencies to implement internal discrimination sensitization efforts which would have a long-term effect even if the threat of sanctions disappeared.

One limitation identified in this study is that the treatment is effective in reducing discrimination at the first stage of the rental process (i.e. the application to visit the apartment). However, discrimination may still exist after the visit, when deciding which applicant to rent to. This may be particularly the case if the discriminatory behavior comes from the landlord who has the final decision on whether to rent to the applicant. Therefore, it cannot be ruled out that part of the reduction in discrimination is superficial and is due to the discriminatory agency who received the warning deciding to respond to all applicants while continuing to discriminate subsequent to the visit of the housing. In this case, the benefit of the action is ambiguous: it might reduce the frustration of the discriminated applicants at not receiving a response, but could waste the time of both the applicant and the agency unnecessarily. However, we believe that even in this worst-case scenario where all discrimination comes from the landlord, by giving an equal chance to all to visit the housing, a first contact can be made with the landlord which could overcome the problems of stereotypes or imperfect information. Nevertheless, it would be interesting to replicate this type of work directly with landlords.

Finally, although our study provides evidence of the effect of a warning letter on reducing discrimination in the housing market, it was not possible to compare different message contents or distinguish between their effects. For example, it was not possible

to determine whether there is an interaction effect between a warning message and a pedagogical component. Nor was it possible to determine definitively which element of the threat makes the message most effective (i.e., institutional nature of the sender; message based on a suspicion of discrimination; reminder of the sanction incurred; etc.).

In any event, given the magnitude and durability of the effect, future studies of the effectiveness of public policies to reduce discrimination should investigate the effect of warning messages further. It is also worth noting that this type of public policy could potentially be used to reduce discrimination in other markets, such as the labor market, where evidence of the effectiveness of public policies to reduce discrimination is also scant.

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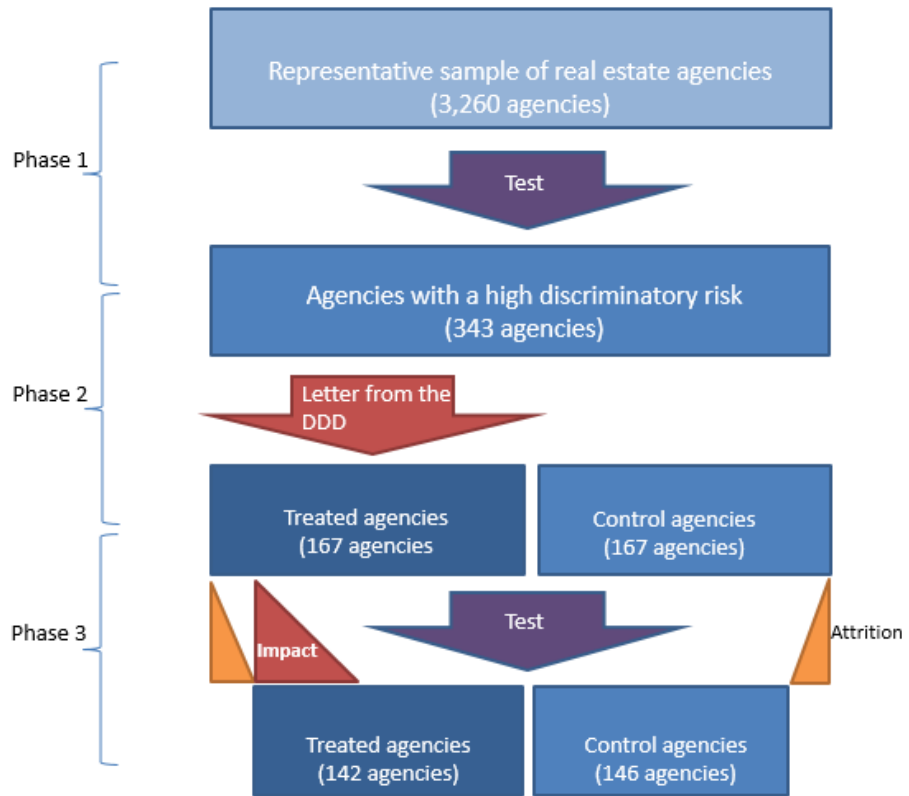
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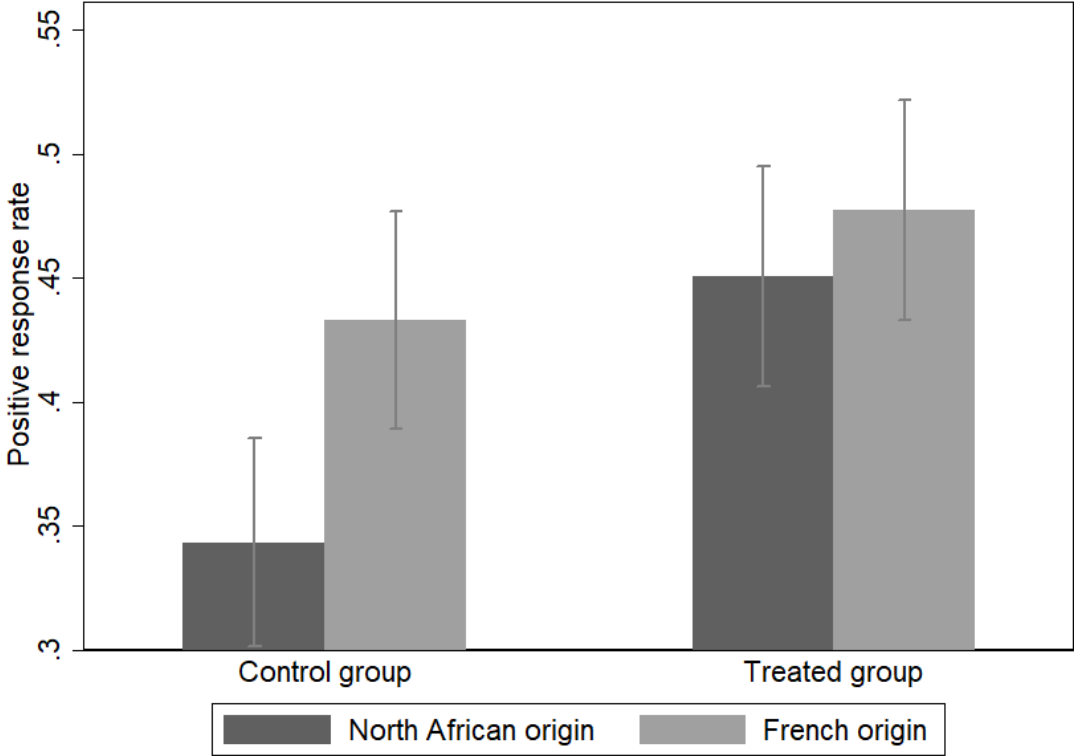
# FIGURES

Figure 1: Protocol of the experiment



*Notes: 9 agency addresses were not found for Phase 2, either because they had disappeared or for another reason. 46 agencies were not tested in Phase 3 because they had closed, had website problems, etc.*

Figure 2: Positive response rates by group and presumed ethnic origin



Notes: Bars indicate confidence intervals at the 95% threshold.  
Source: MICADO, DDD/TEPP-CNRS Testing

## TABLES

**Table 1: Detection of discriminatory agencies**

Number of agencies	Positive response rate (in %)		Difference	Eq. Test p-value
	French	North African		
3,260	36.2	28.8	7.4	<0.001

*Note: The last column shows the p-value of two-sample tests of equality of mean or proportion.*

**Table 2: Descriptive statistics**

	(1) Control group		(2) Treatment group		Eq. Test p-value
	Mean	S.D.	Mean	S.D.	
<b>Location :</b>					
Paris	0.11	0.31	0.09	0.29	0.612
Marseille	0.04	0.20	0.04	0.20	0.961
Lyon	0.02	0.14	0.01	0.12	0.676
Other	0.83	0.38	0.85	0.36	0.590
Belongs to a national network of agency	0.52	0.50	0.57	0.50	0.453
Number of employees	9.84	12.91	9.32	11.54	0.729
Branch of a company	0.39	0.49	0.40	0.49	0.868
Observations	146		142		

*Note: The last column shows the p-value of two-sample tests of equality of mean or proportion.*

**Table 3: Treatment effect on positive response rate**

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.089*** (0.022)	-0.089*** (0.022)	-0.091*** (0.022)	-0.091*** (0.022)	-0.099*** (0.031)	-0.082*** (0.028)
Letter	0.044 (0.036)		0.035 (0.037)			
Letter × North African	0.063** (0.029)	0.063** (0.029)	0.074** (0.030)	0.074** (0.030)	0.073* (0.039)	0.074* (0.041)
Controls	NO	NO	YES	YES	YES	YES
Time F.E.	NO	NO	YES	YES	YES	YES

Agency F.E.	NO	YES	NO	YES	YES	YES
Observations	1,956	1,956	1,952	1,952	1,098	854
R-squared	0.010	0.007	0.070	0.069	0.089	0.096

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The control variables are: sending rank, monthly rent including charges and housing surface area. Time fixed effects correspond to the application date.

Source: MICADO, DDD/TEPP-CNRS Test

**Table 4: Treatment effect on the agencies' behavior**

	(1) No response	(2) French only	(3) North African only	(4) Responses to both
Treatment Effect	-0.046 (0.037)	-0.060*** (0.021)	0.006 (0.019)	0.101*** (0.034)
AIC	2296.914	2296.914	2296.914	2296.914
Observations	976	976	976	976

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The average marginal effects of multinomial logit models are presented. The control variables are the application date, the sending rank, the location of the agency in Paris, Lyon or Marseille, the monthly rent including charges and the surface area of the accommodation.

Source: MICADO, DDD/TEPP-CNRS Testing

## Appendix

**Table A1: Distribution of the number of tests by agencies**

Number of tests	Control group	Treatment group	Total
1	15	11	26
2	8	8	16
3	31	33	64
4	92	90	182
Total	146	142	288
$\chi^2$	0.644 (p-value = 0.886)		

**Table A2: Treatment effect on discrimination (probit estimates)**

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.091*** (0.023)	-0.114*** (0.028)	-0.093*** (0.022)	-0.116*** (0.027)	-0.160** (0.048)	-0.151** (0.051)

Letter	0.044 (0.036)		0.032 (0.036)			
Letter × North African	0.065** (0.029)	0.080** (0.037)	0.076** (0.029)	0.092** (0.036)	0.112* (0.064)	0.134* (0.070)
Controls	NO	NO	YES	YES	YES	YES
Time F.E.	NO	NO	YES	YES	YES	YES
Agency F.E.	NO	YES	NO	YES	YES	YES
AIC	2655.944	1852.778	2638.872	1838.404	882.382	609.052
Observations	1956	1584	1952	1580	654	476

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The mean marginal effects of probit models are presented. The control variables are: sending rank, monthly rent including charges and housing surface area. Time fixed effects correspond to the application date.

Source: MICADO, DDD/TEPP-CNRS Testing

**Table A3: Treatment effect on discrimination. (Estimation on ads for which we have at least one positive response, linear probability models)**

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.162*** (0.040)	-0.162*** (0.040)	-0.159*** (0.040)	-0.159*** (0.040)	-0.179*** (0.056)	-0.130** (0.050)
Letter	-0.017 (0.034)		-0.011 (0.034)			
Letter × North African	0.119** (0.051)	0.119** (0.051)	0.130** (0.051)	0.129** (0.051)	0.138** (0.069)	0.113 (0.068)
Controls	NO	NO	YES	YES	YES	YES
Time F.E.	NO	NO	YES	YES	YES	YES
Agency F.E.	NO	YES	NO	YES	YES	YES
Observations	1,150	1,150	1,148	1,148	644	504
R-squared	0.019	0.022	0.080	0.103	0.131	0.139

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The control variables are: sending rank, monthly rent including charges and housing surface area. Time fixed effects correspond to the application date.

Source: MICADO, DDD/TEPP-CNRS Testing

**Table A4: Heterogeneity of the treatment effect by demographic characteristics of the location**

VARIABLES	(1)	(2)	(3)	(4)
			Share non-French	Share non-French

			national <5%	national ≥5%
North African	-0.149*** (0.048)	-0.129* (0.074)	-0.096** (0.043)	-0.095*** (0.027)
Letter × North African	0.098 (0.062)	0.101 (0.098)	0.060 (0.060)	0.083** (0.034)
Letter × North African × Share non-French national	-0.292 (0.673)	-0.371 (1.960)		
Letter × North African × Share non-French national ^2		0.231 (8.145)		
North African × Share non-French national	0.737 (0.537)	0.195 (1.474)		
North African × Share non-French national^2		2.898 (6.174)		
Controls	YES	YES	YES	YES
Time F.E.	YES	YES	YES	YES
Agency F.E.	YES	YES	YES	YES
Observations	1,920	1,920	650	1,270
R-squared	0.071	0.071	0.165	0.116

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The control variables are: sending rank, monthly rent including charges and housing surface area. Time fixed effects correspond to the application date.

Source: MICADO, DDD/TEPP-CNRS Testing. Census 2016.

**Table A5: Heterogeneity of the treatment effect by agencies' characteristics and real estate ads**

VARIABLES	(1)	(2)	(3)	(4)
North African	-0.084*** (0.026)	-0.093*** (0.028)	-0.077** (0.032)	-0.113*** (0.033)
Letter × North African	0.054 (0.035)	0.069* (0.038)	0.066 (0.042)	0.124*** (0.044)
Letter × North African × 2 employees or less	0.074 (0.062)			
North African × 2 employees or less	-0.034 (0.047)			
Letter × North African × Branch of a national agency		0.011 (0.061)		
North African × Branch of a national Agency		0.005 (0.046)		
Letter × North African × Belong to a national network			0.012 (0.060)	

North African × Belong to a national Network			-0.031	(0.045)
Letter × North African × Rent (€/m <sup>2</sup> )			-0.100*	(0.060)
North African × Rent (€/m <sup>2</sup> )			0.043	(0.046)

Observations	1,952	1,952	1,898	1,884
R-squared	0.070	0.070	0.074	0.080

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Standard errors clustered at the agency level in parentheses. The control variables common to all estimates are: sending rank, monthly rent including charges and housing surface area. Time fixed effects correspond to the application date. Column (1) includes a dummy variable indicating whether the agency has two employees or less, Column (2) includes a dummy variable indicating whether the agency is a branch of a national agency, Column (3) includes a dummy variable indicating whether the agency belongs to a national network and Column (4) includes the rent of the housing.  
Source: MICADO, DDD/TEPP-CNRS Testing.

Figure A1: Positive response rates by group and presumed ethnic origin for each year following the treatment

