



WORKING PAPER

N° 2022-3

**REDUCING ETHNIC DISCRIMINATION
THROUGH FORMAL WARNING: EVIDENCE
FROM TWO COMBINED FIELD EXPERIMENTS**

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www.tepp.eu

TEPP – Theory and Evaluation of Public Policies - FR CNRS 2042

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

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Abstract

This article evaluates the effect of a 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 on ethnic origin. This test allowed us to identify 343 agencies likely to have 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 the legal sanctions to which they are exposed and the other group received no communication. We then re-tested all these real estate agencies after they received the letter and compare their positive response rates. The results indicate that the warning message is a powerful tool to reduce discrimination.

Keywords: discrimination, real estate agent, correspondence test, public policy evaluation

JEL Codes: C9, J7, R2

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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 the most studied grounds for discrimination: ethno-racial origin (Yinger 1998; Page 1995; Choi, Ondrich, and Yinger 2005; Hanson and Hawley 2011). In France, an applicant of North African faces a penalty of more than 20% compared to an applicant of French origin when applying for accommodation (Acolin, Bostic, and Painter, 2016). While these articles are useful in clarifying the nature and extent of the problems, 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 very rare.

In this study, we evaluate the effect of a public policy designed to reduce discrimination in access to accommodation in the private rental housing market. The grounds for discrimination targeted is ethnic origin. We focus on the difference in reaction to two fictitious French applicants, one of whom is of North African origin as indicted by his first and last name. The action being evaluated is the sending of a single registered letter from the *Défenseur Des Droits* (DDD)¹ to a real estate agent informing him or her that their activity has been monitored and that he or she is suspected of discrimination. The letter also reminds the agent of the legal

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

framework and the potential penalties that apply in the event of proven discriminatory behavior. To our knowledge, this article is the first to adopt a randomized controlled trials approach in order to assess the effectiveness of an action to reduce ethnic discrimination in the housing market. It is also the first study to evaluate how a public policy in the shape of a formal warning might have an impact on discrimination. 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). They also have the advantage of being affordable and easily deployable.

A second innovative aspect of this study is that it conducts the evaluation by crossing two experimental methods. The first is correspondence test, the most frequently used method to establish a difference in treatment between two groups of individuals with similar characteristics in their access to a given resource offered on a market, in this case, the housing market. Secondly, it uses an experimental protocol for the evaluation of public policy, whereby individuals eligible for the action are randomly assigned to two groups: the treated group, the control group, and the outcome variables are compared after the treatment.

The sending of nominative letters by the *Défenseur Des Droits* had a substantial positive impact on the behavior of real estate agencies suspected of discrimination. We were able to detect a significant decrease in the difference in discrimination levels between the treated and control groups: the gap of 9 percentage points in positive responses between the French and North African applicants that appears in the control group is reduced by 7 percentage points and then disappears almost entirely in the treated group. In addition, the effect appears to be 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 candidates. This is accompanied by a decrease in the likelihood that it will respond only to the French candidate.

The first section provides a brief overview of the literature on discrimination with an emphasis on those studies that focus on the evaluation of anti-discrimination actions. The second section describes public policy on this topic and presents the experimental protocol and data collection. The third section describes the characteristics of the sample. The results of the experiment are presented in section four followed by a discussion in section five and conclusions are presented in the last section of the article.

2. LITERATURE

From multiple experiments, there is evidence of the presence of ethno-racial discrimination, the most commonly studied grounds for discrimination, in access to housing (Yinger 1998; Page 1995; Choi, Ondrich, and Yinger 2005; Hanson and Hawley 2011; Early, Carrillo, and Olsen 2019). This has also been observed in many European countries (Sweden: Ahmed and Hammarstedt (2008), Bengtsson, Iverman, and Hinnerich (2012), Carlsson and Eriksson (2014); Spain: Bosch, Carnero, and Farré (2010); Italy: Baldini and Federici (2011); Greece: Drydakis (2011); Norway: Beatty and Sommervoll (2012); Belgium: Van den Broeck and Heylen (2015); Germany: Auspurg, Hinz, and Schmid (2017)).

France is not an exception: Bonnet et al. (2015) and Acolin, Bostic, and Painter (2016) conclude that there is strong discrimination based on ethnic origin in access to housing. Bunel, L'Horty, and Petit (2017) studied the extent of discrimination in access to housing for candidates of North African origin in Paris using a testing campaign conducted in 2016. They conclude that discrimination against persons of North African origin is strong in the Parisian

housing market and that this is not linked to any presumption of financial fragility of these individuals. Adding a signal of professional and financial stability strongly increases the chances of a favorable response for the candidates of French origin only, suggesting strong taste based discrimination against the North African candidates. Le Gallo et al. (2019) also conclude that there is significant discrimination on the grounds of ethnic origin, evidenced by the penalties experienced by applicants with North African or African first and last names. This study found that a North African applicant, had a 26.7% lower chance of success in his attempt to access housing compared to the reference candidate of presumed French origin.

There is, today, ample evidence of this phenomenon of discrimination. However, public policies to reduce this problem are still very scarce, and public policies with proven effectiveness in reducing discrimination are even more scarce. Indeed, to our knowledge, no evaluation has been conducted of specific actions aimed at reducing ethnic discrimination in the housing market. Some evaluations have, however, been conducted on other grounds of discrimination and other markets. In the United States, Agan and Starr (2017) estimated the effect on ethnic discrimination of disallowing employers from asking about applicants' criminal histories on job applications. This was found to have a detrimental effect on ethnic discrimination because it penalizes 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. Another disappointing result is an evaluation of an anonymous CV, conducted in France by Behaghel, Crépon, and Le Barbanchon (2015), which remains inconclusive about the effects of the policy which consists to anonymize CV. The results are, however, more encouraging in Germany even though the study suffers from

the same limitation related to the fact that the firms participating in the experiment are self-selected (Krause, Rinne, and Zimmermann 2012). Regarding residential discrimination, Chareyron et al. (2021) found, in France, that direct subsidies to employers had a moderate effect on residential discrimination in employment. With regard to gender discrimination, Goldin and Rouse (2000) found that the use of 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-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 have only short-term effects (Bertrand and Duflo 2016). For example, Kawakami et al. (2000) showed that training in negating 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.

Our paper also refers to the general literature on sanction threats, which are applied, for example, in the areas of tax enforcement and tax compliance. Our methodology and treatment are indeed very close to those of Kleven et al. (2011) and Fellner, Sausgruber, and Traxler (2013) who sent warning messages to potential tax evaders. They found that the warning letters significantly increased compliance.

3. INSTITUTIONAL CONTEXT AND DESCRIPTION OF THE ACTION

3.1 The *Défenseur des Droits*

The project consists of measuring the effect of an action designed to combat discrimination in access to housing. This action is carried out by the *Défenseur Des Droits's* institution. It took the form of a warning letter sent by the DDD to real estate agencies suspected of discriminatory behavior towards candidates in the renting of private-sector accommodation.

The *Défenseur Des Droits* is an independent state institution. 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 respected and to allow equal access to rights for all. Any natural person or any legal entity can contact it directly and free of charge when he/she thinks he/she is discriminated against, when he/she notices 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 respected.

In addition to processing individual requests, the DDD carries out actions to promote equality, which consist in making people's rights better known and better applied. It is in this framework that the action of control of agencies and reminder of the law evaluated in this article is situated.

3.2 The action

The letter sent by the *Défenseur des Droits* to suspect agencies has four main components.² The first component indicates the nature of the institution, *Défenseur des Droits*, and its constitutional status. The second component indicates to the agency that it has been monitored and that its behavior has been considered to be potentially discriminatory.

² We have not been allowed by the *Défenseur des Droits* to share the letter.

The third component recalls the legal framework and the sanctions to which discriminatory action is exposed. This is a reminder of the law without detailing the legal content. The fourth and last component is a flyer attached to the letter which informs on how to raise awareness among employees on discrimination issues.

The first component only contains information about the nature of the institution, which may not be known by everyone in France. This component has no expected effect on discrimination. The second and third components can affect discrimination through the same mechanisms and can be considered as forming a warning component. The mechanism by which this warning affect the level of discrimination can be twofold. The first explanation relates to theory of criminal behaviors. As indicated by Lochner (2007) the commission of crime is related to the perceived probability of arrest. In case where the discrimination is carried out in full awareness by the agent, the increase in the perception of sanction leads by the letter will decrease discrimination. The second explanation is that the discriminatory behavior of the agent 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 distinct mental activities (Bertrand and Duflo 2016). Furthermore, implicit biases are more likely to drive behaviors under cognitive loads or inattentiveness to the task. In this case, the warning letter by increasing the attention of the agent on the selection process may reduce unconscious biases and reduce discrimination.

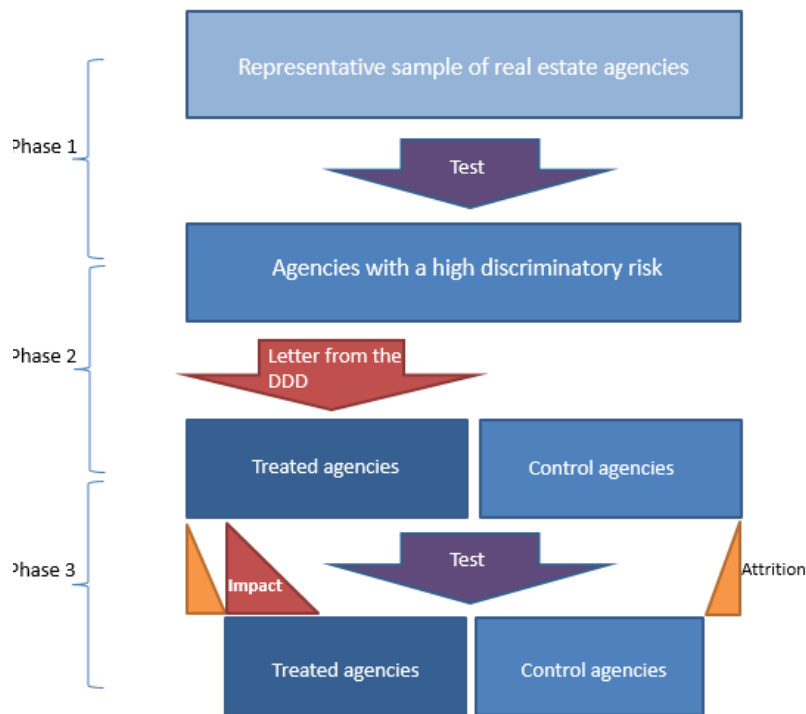
We believe that the letter may influence discrimination only through the warning component of the letter. While it was not possible to introduce variation in the content of the letter to distinguish different mechanisms, the warning component of the letter is the essential one. While Devine et al. (2012) have shown that a training component describing

how to apply a variety of bias reduction strategies in daily life can be effective in increasing concern about discrimination (but not reported racial attitudes), the fourth component of the letter (i.e. the pedagogical flyer) has been widely distributed through other channels and is not specific to the treatment. In consequence, we believe that this component cannot affect the level of discrimination differently in the control and treated groups. However, it may eventually interact with the warning component. Indeed, the threat of sanction may cause agencies to read pedagogical flyers more carefully and therefore glean more information from it than agencies that receive the flyer but are not included in the experiment. In this case, there would be a positive interaction effect between the formal warning and the pedagogical component of the message.

4. EXPERIMENTAL PROTOCOL

Before sending this letter, we selected 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 then several follow-up tests. This three step protocol is represented in Figure 1.

Figure 1: Protocol of the experiment



Phase 1 - Identification of agencies at risk of discriminatory behavior

We carried out a correspondence test that involves two profiles of applicants. One applicant implied French origin through his first and last name, while a second applicant implied a North African origin. To avoid detection, several different first and last names were used chosen from among the most frequent in the census.³ Widespread surnames have been chosen that clearly indicate an origin from a North African country. With the exception of the sound of their first and last names, the fictitious candidates were similar. They were French nationals, of comparable ages and both applicant are male. These fictitious candidates sent almost identical messages simultaneously in response to real estate ads throughout the country.⁴ Below are some examples of emails sent by our rental

³ French sounding first names were, for example, Sébastien, Guillaume, Thomas, Frédéric, etc. Example of North African first names are Mohamed, Karim, Ahmed and Mounir, etc. French sounding last names were Petit and Moreau, Rousseau, Durand, etc while North African last names were Chettouh, Khalis, Mokraoui, Mbarek, etc.

⁴ Adds come from the reference sites <https://www.leboncoin.fr/>, <https://www.seloger.com/>, <https://www.avendrealouer.fr/>.

applicants.⁵⁶ A total of 3,260 tests were conducted between 2016 and 2017 for the whole of the French territory. We consider an agency to be potentially discriminatory if it gave a positive answer to the candidate of French origin and did not answer or gave a negative answer to the candidate of North African origin following the sending of the two consecutive messages.⁷

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

⁵ The content of the emails is randomly switched between applicants for each new offer.

⁶ The date of birth of the North African origin applicant is included in the message while it is not the case for the French applicant. This is done to control the age signal related to the applicant's first name. While a French-sounding first name may 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 frequently worn by individuals around 45 years of age, we indicate for the applicant of North African a birth date around 1975.

⁷ The response could be an email or a phone call. We consider as positive responses all responses that are not negative. This means that we consider all responses as positive, unless the message indicates that there will be no visit of the apartment.

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 and threatening message. However, as indicated in the message of the DDD it is only a suspicion based on the fact that on agency respond only to the applicant of French origin. 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 first⁸, because they may have missed the other message, etc). The purpose of this first contact was not to identify clear discriminatory behavior by the agency, rather, it was to establish sufficient suspicion of discriminatory behavior to justify sending a targeted coercive message.

The results of this first stage are presented in Table 1. The difference in positive response rate between the applicant of French origin and the applicant of North African origin is of about 7 percentage points. We thus detected 343 potentially discriminatory

⁸ The order of sending is randomly permuted.

agencies. These are these agencies that will be used in the experiment.

Table 1: Detection of discriminatory agencies

Number of agencies	Positive response rate (in %)		Difference	Eq. Test p-value
	French	North African		
3260	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.

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 treated group and the control group) by random selection. Only the agencies in the treated 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 the sending of the letter. To avoid detection, the tests are spaced over time during two years: 4 waves of tests have been conducted during the years 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. 36 agencies were not tested at all for any of these reasons. However, this attrition appears to be equally distributed between the treated and control groups and only affects the statistical power of the upcoming estimates. Indeed, the distribution of the number of tests conducted by 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 that have been tested at least once. It is first possible to observe that the characteristics are very close across the two groups, which suggests that correct randomization in the experiment was achieved. 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 belongs to a national network and they have on average 10 employees.

Table 2: Descriptive statistics

	(1)		(2)		Eq. Test p-value
	Control group Mean	S.D.	Treated group Mean	S.D.	
Location :					
Paris	0.10	0.31	0.09	0.29	0.693
Marseille	0.04	0.19	0.04	0.20	0.906
Lyon	0.02	0.14	0.01	0.12	0.708
Other	0.84	0.37	0.85	0.35	0.695
Belongs to a national network of agency	0.53	0.50	0.57	0.50	0.512
Number of employees	10.32	13.47	9.23	11.48	0.470
Branch of a company	0.39	0.49	0.39	0.49	0.936
Observations	154		144		

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

The follow-up tests were conducted using the same procedure as the initial correspondence tests to identify the agencies exhibiting potentially 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.

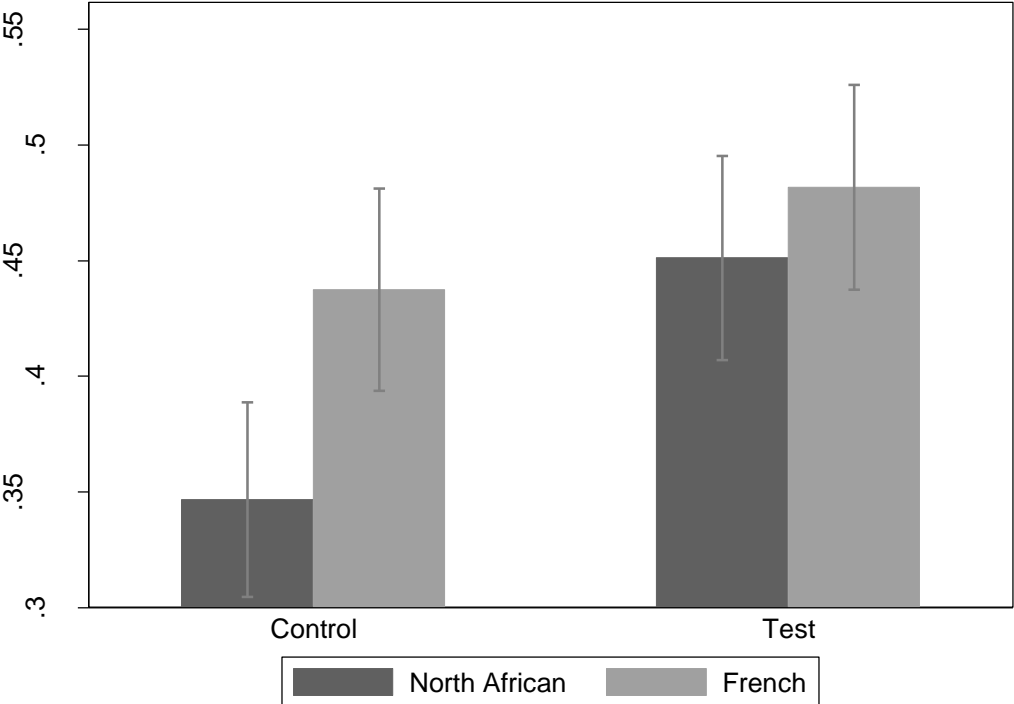
5. RESULTS

5.1 Graphical results

Figure 2 shows the positive response rates received by ethnic origin and group type. We included confidence intervals to allow statistically significant differences to be visualized. We can first notice that even in the control group, a substantial proportion of agencies (about 35%) respond to the applicants of North African origin. This may appear surprising since all these agencies were considered to be 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 have been sent to agencies in recent periods to provide guidance on how to reduce discrimination. This may have contributed to reducing discrimination for some agencies. Second, as stated previously, an agency might have responded to the French applicant alone on the initial correspondence test for a non-discriminatory reason (e.g. the French application was received first). Third, offers are not necessarily managed by the same employee and there may be employees who discriminate and others who do not, in the same agency. We think that the two last explanations are the most relevant because the discrimination rate in the control group is not very different from what we obtained in the test in Phase 1.

Comparing the two groups, we can observe that the positive response rate of the North African applicant is much higher in the treated group (about 45%). We can also see that the difference in positive response rate between the French and North African applicant, that is significant and of almost 10 percentage points in the control group, is of 3 percentage points and insignificant in the treated group.

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

The absence of significant discrimination in the treated group may, however, be due to sampling fluctuations and is therefore not formal evidence of the effectiveness of the letter. To go further, it is important to test the significance of the discrimination differential between the treated 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 accuracy of the results.

5.2 Regression at the applicant level

We consider model of the form:

$$Rep_i = \alpha + \beta Mailing_i + \gamma North\ African_i + \lambda Mailing_i \times North\ African_i + \delta X_i + \varepsilon_i$$

With Rep_i a dummy variable indicating whether the applicant receives a positive response or not. The variable $Mailing_i$ indicates if the individual was in the treated or in the control group. The variable $North\ African_i$ indicates the origin of the applicant and X_i are control variables. λ measures the difference in discrimination between the treated group and the control group and therefore gives the effect of the *Défenseur des Droits's* mailing on the level of discrimination. Table 3 presents the estimates of the linear probability models. We present results over the two years (Columns (1) to (4)) and split by year (Columns (5) and (6)).

The results confirm the graphical impression: the mailing reduces significantly the level of discrimination. The 9-percentage points difference in the level of positive response between the applicant of French origin and the applicant of North African origin is reduced by 7 percentage points by the letter of the *Défenseur des Droits* and almost disappear. Furthermore, the effect of the mailing appears to be long lasting and very stable over time with almost same estimated effects on the first year and the second year after the treatment. The effects are slightly less significant when the data is split by year but this is only due to a reduced precision related to the lower number of observations in each subgroup.

Table 3: Treatment effect on positive response rate

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.091*** (0.022)	-0.091*** (0.024)	-0.093*** (0.022)	-0.093*** (0.024)	-0.098*** (0.032)	-0.085*** (0.029)
Mailing	0.044 (0.036)	-0.120 (0.193)	0.031 (0.035)	-0.260 (0.209)	0.040 (0.041)	0.018 (0.054)
Mailing × North African	0.060** (0.029)	0.060* (0.032)	0.070** (0.030)	0.070** (0.032)	0.069* (0.040)	0.071* (0.042)
Constant	0.438***	0.135	0.639***	0.564***	0.831***	0.447**

	(0.026)	(0.193)	(0.119)	(0.215)	(0.209)	(0.211)
Controls	NO	NO	YES	YES	YES	YES
Agency F.E.	NO	YES	NO	YES	YES	YES
Observations	1,976	1,976	1,972	1,972	1,110	862
R-squared	0.010	0.342	0.153	0.385	0.206	0.171

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard deviations grouped at the agency level in parentheses. The control variables are: application date, sending rank, municipality of belonging to the agency, monthly rent including charges and housing surface area.

Source: MICADO, DDD/TEPP-CNRS Testing

As a robustness check we also estimate probit models. They give similar results (Table A2). Second, our estimates are based on all offers, which is the most common way to proceed in the literature (Bertrand and Mullainathan 2004). However it is also possible to argue that the offers for which we have not received any response for either of the applicants (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 received the applications, or may have already found a tenant at the time, etc). In consequence, we carry out estimates on the subsample of offers for which we have at least one response. The results presented in Table A3 are similar: the DDD action significantly reduces discrimination. The magnitude of the effect is higher in absolute term but similar in relative term.

5.3 Regression at the 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 made by each agency. An agency's response can be of four types: it can respond positively to neither of the two candidates, only to the candidate of French origin, only to the candidate of North African origin or to both candidates. 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 perspective is interesting because changes in agency behavior may be more visible at this level than at the individual response rate. The multinomial logit model is:

$$\pi_m(x) = \frac{e^{\beta_m \text{Mailing}_i + \delta_m X_i}}{1 + \sum_{m=1}^{M-1} e^{\beta_m \text{Mailing}_i + \delta_m X_i}}$$

Where $\pi_m(x)$ is the probability to obtain one of the $m = 1, \dots, 4$ types of response from the agency. Mailing_i is the variable that indicate if the agency receives the mailing or not and X_i are the characteristics of the agency.

Table 4 presents the results of the estimation of the effect of the letter on the type of response given by agencies. 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 candidates, column (2) on the probability that only the French candidate will receive a positive response, column (3) on the probability that only the North African candidate will receive a positive response and column (4) on the probability that both candidates will receive a positive response. The sum of the marginal effects necessarily sum to zero across all outcomes: an increase in the probability of occurrence of an outcome caused by the letter must be compensated 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 treated group (column 4): receiving the message from the DDD increases the probability by 10 percentage points that an agency will respond favorably to both candidates. This is a clear indication of the positive effect of the letter on equal treatment. This increase is mainly compensated by a decrease in the “response to the French only” outcome, but also, although not significantly, by a decrease in the “no response” outcome. This decrease in the probability of an equal treatment outcome (“no response”) tends to attenuate the estimated effect of the action on discrimination that we have found in

Table 3. It may also be indicative of a form of superficial response to the letter by 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. In any case, it explains, the increase in positive response rates that we observed graphically for both applicants in the treated group compared to the control.

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 (0.031)	-0.057*** (0.020)	0.005 (0.018)	0.099*** (0.030)
AIC	2322.950	2322.950	2322.950	2322.950
N. Obs.	986	986	986	986

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ Standard deviations robust to heteroskedasticity 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

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 action is a nominative 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 candidates, one of North African origin as indicated by his first and last name after the receipt of the warning letter by the real estate agencies.

We find statistical evidence of the effect of the message at both the applicant and agency level. The message has a significant effect on the difference in positive response rate

between the two applicants: discrimination in the treated group decreases by about 7 percentage points compared to the control group. Furthermore, the effect appears to be long lasting since the estimated effect does not decrease over time. 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 respond to both applicants which is accompanied by a general decrease in the probability that they respond to the French only.

This article shows that an action of formal warning has a massive and long lasting effect on the discriminatory behavior of real estate agents. We believe the consequences of this finding for public policy are important, first, because it provides the first evidence of the effectiveness of a threatening action on reducing discrimination and, second, because it is a relatively cost-free action that could be easily deployed. 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 discriminatory company. An alternative approach could be to conduct massive correspondence test campaigns to detect potentially discriminatory agencies and send them formal warnings. Of course, it is not certain that the action would still be effective if widely extended. The mailing probably reduces discrimination by increasing the perceived cost of this behavior by the rental agencies. In this study, it was a targeted one-off action and we are not sure that generalizing it without implementing effective sanctions against discriminatory agencies will produce the same effect. Another word of caution: this study shows that this action is effective in reducing discrimination at the first stage of the rental process (i.e. request to visit the apartment) but discrimination may still exist after the visit in the selection of application forms. It cannot be ruled out that part of the reduction in discrimination is superficial and is due to discriminatory agent that receiving the warning, decides to

respond to everyone, but still discriminates after the visit of the dwelling. However, even superficial reductions of this kind could become actual by creating a personal contact between people that may reduce stereotypes.

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Appendix

Table A1: Distribution of the number of tests by agencies

Number of tests	Control group	Treated group	Total
1	15	11	26
2	8	8	16
3	35	34	69
4	96	91	187
Total	154	144	298
χ^2	0.428 (p-value = 0.934)		

Table A2: Treatment effect on discrimination (probit estimates)

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.092*** (0.022)	-0.116*** (0.028)	-0.094*** (0.022)	-0.119*** (0.027)	-0.098** (0.031)	-0.086** (0.029)
Mailing	0.043 (0.035)	-0.135 (0.199)	0.030 (0.033)	-0.338 (0.242)	0.040 (0.037)	0.021 (0.050)
Mailing × North African	0.062** (0.029)	0.078** (0.037)	0.071** (0.029)	0.090** (0.036)	0.069* (0.039)	0.069* (0.041)
Controls	NO	NO	YES	YES	YES	YES
Agency F.E.	NO	YES	NO	YES	YES	YES
AIC	2686.860	1871.017	2572.205	1988.411	1426.820	1159.027
Observations	1976	1598	1956	1594	1102	832

*Notes: Standard deviations grouped at the agency level in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The mean marginal effects of probit models are presented. The control variables are: application date, sending rank, municipality of belonging to the agency, monthly rent including charges and housing surface area.*

Source: MICADO, DDD/TEPP-CNRS Testing

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

	Whole sample				First year	Second year
	(1)	(2)	(3)	(4)	(5)	(6)
North African	-0.163*** (0.039)	-0.163*** (0.044)	-0.161*** (0.040)	-0.161*** (0.045)	-0.178*** (0.058)	-0.135** (0.052)

Mailing	-0.017 (0.033)	-0.116 (0.188)	-0.001 (0.036)	-0.361 (0.250)	0.012 (0.049)	-0.001 (0.057)
Mailing × North African	0.114** (0.050)	0.114** (0.057)	0.124** (0.052)	0.124** (0.057)	0.132* (0.071)	0.108 (0.072)
Constant	-0.163*** (0.039)	-0.163*** (0.044)	-0.161*** (0.040)	-0.161*** (0.045)	-0.178*** (0.058)	-0.135** (0.052)
Controls	NO	NO	YES	YES	YES	YES
Agency F.E.	NO	YES	NO	YES	YES	YES
Observations	1,168	1,168	1,166	1,166	654	512
R-squared	0.019	0.256	0.134	0.316	0.178	0.182

Notes: Standard deviations grouped at the agency level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The mean marginal effects of probit models are presented. The control variables are: application date, sending rank, municipality of belonging to the agency, monthly rent including charges and housing surface area.

Source: MICADO, DDD/TEPP-CNRS Testing

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- Le **Groupe d'Analyse des Itinéraires et des Niveaux Salariaux** (Group on Analysis of Wage Levels and Trajectories), **GAINS**, University of Le Mans
- Le **Centre de Recherches en Economie et en Management**, (Research centre in Economics and Management), **CREM**, University of Rennes 1 et University of Caen Basse-Normandie
- Le **Groupe de Recherche Angevin en Économie et Management** (Angevin Research Group in Economics and Management), **GRANEM**, University of Angers
- Le **Centre de Recherche en Economie et Droit** (Research centre in Economics and Law) **CRED**, University of Paris II Panthéon-Assas
- Le **Laboratoire d'Economie et de Management Nantes-Atlantique** (Laboratory of Economics and Management of Nantes-Atlantique) **LEMNA**, University of Nantes
- Le **Laboratoire interdisciplinaire d'étude du politique Hannah Arendt** – Paris Est, **LIPHA-PE**
- Le **Centre d'Economie et de Management de l'Océan Indien**, **CEMOI**, University of La Réunion

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