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### **Gender Biases: Evidence from a Natural Experiment in French Local Elections**

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# Gender Biases: Evidence from a Natural Experiment in French Local Elections

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## Abstract

Women are under-represented in politics. In this paper, we test one of the potential explanations for this situation: gender biases from voters. We use a natural experiment during French local elections in 2015: for the first time in this country, candidates had to run by pairs, which had to be gender-balanced. We argue that this reform confused some voters, who might have assumed that the first name on the ballot represented the "main" candidate. Since the order of the candidates on the ballot was determined by alphabetical order, the order of appearance of male and female candidates was as-good-as-random, and this setting allows us to isolate gender biases from selection effects. Our main result is that there exists a negative gender bias affecting right-wing candidates, whose vote shares were lower by 1.5 percentage points when the female candidate appeared first on the ballot. The missing votes prevented some pairs of candidates from going to the second round. Using data on newspaper circulation and additional institutional features of the election - namely the fact that candidates can (but do not have to) report additional information about themselves on the ballot - we show that higher levels of information decrease discrimination. We argue that the discrimination we identify is therefore likely to be statistical.

**Keywords:** Political Economy; Gender Discrimination; Voting Behavior

**JEL Classifications:** P16; J16; D72

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# 1 Introduction

Are women discriminated against in politics? While decades of research have investigated the reasons behind the under-representation of women in politics, uncovering discriminatory behaviors of voters proved being a difficult task, because of the numerous selection effects which affect the observed and unobserved characteristics of women present in the political arena.

In this paper, we provide causal evidence of discrimination against women in politics. To do so, we use a unique feature of the French *Départementales*<sup>1</sup> elections of 2015, which allows us to unambiguously disentangle selection effects from preferences over female candidates in a real-world setting. For the first time in the history of French elections, candidates ran by pairs, which necessarily had to be gender-balanced. Therefore, each pair of candidates included a man and a woman (each with a substitute of the same gender). Both candidates running in the same pair had the same party label. Upon casting their ballot, voters could only opt for one of the different pairs of candidates: in each pair, both male and female candidates received exactly the same number of votes. If a pair was elected, both candidates were appointed to the same seat in the *Conseil Départemental* (the *Département* assembly where the elected candidates are seating), so that their fates were completely tied.

Crucially, within each pair, the order of appearance of the candidates on the ballot was determined by alphabetical order. We show that such a setting yields an as-good-as-random allocation of the order of gender on the ballot. We exploit this institutional feature to explore whether pairs where the woman appeared first on the ballot had different electoral outcomes than pairs where the man appeared first. In this setting, finding any differential electoral outcomes between pairs with male or female candidates first would imply two things. Firstly, that some voters misunderstood the rules of the election, leading them to believe that the first name on the ballot corresponds to the "main" candidate. Second, that some voters discriminated against women.

On the first point, as both candidates within the pair had exactly the same prerogatives, observing any difference of vote shares based on the gender of the first candidate necessarily implies that some voters misunderstood the electoral process. The prevalence of such a misunderstanding

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<sup>1</sup>The *Département* is a French territorial unit gathering numerous competences in terms of schooling, public infrastructures, culture, sports.

ing has been documented by polling studies before the elections: according to [IFOP \(2015\)](#) the high abstention rate<sup>2</sup> can largely be explained by the fact that "the introduction of pairs of candidates unsettled long-established benchmarks". Furthermore, according to the same study, 25% of voters "did not know the prerogatives of department councillors".

On the second point, the identification of discrimination comes from several specific features of our setting. First, the number of male and female candidates were exactly identical - in order to enforce strict parity in local councils. Secondly, while the characteristics of male and female candidates were on average different, candidates' characteristics do not predict whether the male or the female candidate appeared first on the ballot. The effect we measure is therefore unlikely to be affected by selection biases, since it consists in comparing whether pairs that were identical on average performed differently when the male or the female candidate appeared first on the ballot. Furthermore, our identification strategy is strengthened by the fact that parties did not seem to strategically match male and female candidates based on their surname in order, for example, to place the male candidate at the top of the ballot: indeed, the distributions of the first letter of male and female surnames are identical.

Comparing treated and untreated pairs of candidates of identical political affiliations across precincts, we show that right-wing pairs where the female candidate appeared first lost about 1.5 percentage points in vote shares during the first round, while on average this was not the case for pairs of candidates from other partisan affiliations. These effects impacted the outcome of the election. Indeed, the disadvantaged pairs were 4 percentage points less likely to go to the second round or to win the election in the first round. Our results also suggest, even though the results are less robust, that it induced a lower probability of being eventually elected. Finding gender discrimination specifically among right-wing voters is unsurprising as, compared to other parties, right-wing parties have for long been fielding disproportionately more male than female candidates in local elections.

Turning to the interpretation of our results, we show that information available to voters matters. First, using data on newspaper circulation per inhabitant in 2015 taken from [Pons and Tricaud \(2018\)](#), we show that discrimination in places with higher newspaper circulation per inhabitant

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<sup>2</sup>The abstention rate in the first (second) round reached 49% (50%) compared to 36% (38%) in the previous 2014 municipal elections and 20% (21%) in the 2012 presidential elections.

was significantly lower. As shown by earlier research, newspaper circulation is likely to be a good proxy of the knowledge that voters have about candidates (Snyder Jr and Strömberg (2010)), but in our setting, one cannot rule out that it also improves voters' knowledge about the electoral process. Therefore, the lower estimated discriminatory effect in areas with higher newspaper circulation could derive from both a better knowledge of candidates and a better understanding of the electoral rules.

In order to further understand the role of information, we then focus on the role of knowledge *about candidates*. Indeed, according to IFOP (2015), 31% of potential abstentionists explained their choice by the fact that "they did not know the candidates". First of all, and surprisingly, while we would expect incumbents to be less discriminated against (as they are likely to be better known from voters), this is not what we observe: interacting the treatment with the incumbency status of candidates does not dampen discriminatory effects. Such a result is likely to reflect the poor knowledge that voters had about candidates, even about those likely to be the most well-known. In order to further assess the role of information about candidates, we therefore need to pin down more accurately the heterogeneity of information available to voters. To do so, we use an additional feature of the French electoral law, namely the fact that candidates can report additional information about themselves on the ballot - such as their political experience, age, occupation, or a picture of themselves.

Based on a subsample of observed ballots collected notably from the CEVIPOF archives, and representing 12.6% of candidates, we compare treatment effects between ballots with reported information about any of the candidates and ballots without any information about any of the candidate (where information can be either past political experience, socioprofessional category or a picture of themselves). We show that, for right-wing pairs, discrimination disappeared when information about the candidates was displayed. This effect is driven by the presence of information regarding past political experience. More importantly, controlling for the presence of information on the ballot, we show that the incumbency status did not affect discrimination significantly. This leads us to believe that right-wing female candidates face a discrimination that is of statistical nature (i.e. that it is based on gender stereotypes that are likely to be weakened when information is provided).

In terms of vote transfers, we show that these missing votes did not reflect differential abstention, and did not translate into blank and null votes. Instead, they translated into higher shares of votes for the competing candidates. Identifying precisely the patterns of vote transfers proves particularly challenging in our setting. However our results suggest that partisan proximity might have played a role. Using an alternative definition of right-wing parties excluding centrist candidates, we indeed show that centrist candidates were those that benefited the most from the discrimination of right-wing candidates.

Our contribution to the literature is threefold. First, we contribute to the debate about the reasons why women are underrepresented in politics. Many studies analyzed the selection processes faced by women upon entering in politics. Women might select themselves less into politics because of a lack of self-confidence (Hayes and Lawless (2016)) or differential returns from politics (Júlio and Tavares (2017)). More generally, women face tradeoffs between family balance and competitive professional environments (Bertrand et al. (2010)). Conditional on entering politics, the evidence are mixed about the hurdles faced by women: while some studies suggest that parties might fail at promoting women to high positions and at fielding them in winnable races, thus undermining the quality of elected politicians (Baltrunaite et al. (2014), Besley et al. (2017), Sanbonmatsu (2010), Thomas and Bodet (2013), Esteve-Volart and Bagues (2012), Casas-Arce and Saiz (2015)), other studies mitigate these findings (Campa et al. (2017), Bagues and Campa (2017), Lippmann (2018), Fréchette et al. (2008)). Similarly, evidence on the last hurdle potentially faced by women in politics (namely, discrimination from voters) are mixed: they appear to depend on the features of the electoral system (Gonzalez-Eiras and Sanz (2018), Baltrunaite et al. (2017)) and on the prevalence of discrimination in other social and economic settings such as the labor market (Le Barbanchon and Sauvagnat (2018)).<sup>3</sup> Our paper contributes to this literature by showing that some of the under-representation of women is the result of discriminatory behaviors from voters.

Secondly, our study is among a small group of studies causally identifying discrimination in politics in a real-world setting. Most of the studies on gender biases in politics rely primarily on aggregate data, surveys or laboratory experiments, which are problematic for several reasons.

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<sup>3</sup>Le Barbanchon and Sauvagnat (2018) is close to our paper since it also studies voter biases in a context of quota in France, with a focus on legislative elections and party reaction to voter biases. While the authors find that female candidates are more discriminated against in areas with higher gender earnings gaps, they do not find that this effect is stronger when candidates are from the right wing.

Raw comparisons of aggregate data are unlikely to fully control for the selection process leading to the observed political competition. This is especially true if male and female candidates are likely to differ in unobserved characteristics which might drive both their probabilities of running as a candidate and of winning the election. Respondents' answers in surveys might be affected by characteristics of the interviewer through the gender of the interviewer (Benstead (2013)), her religion (Blaydes and Gillum (2013)) or language (Lee and Pérez (2014)). Finally, while laboratory experiments help disentangling more accurately the mechanisms leading to potential gender biases, they are unlikely to be representative of real-world election settings. By overcoming these issues, natural experiments are particularly appealing. However, field experiments are hardly applicable in the political arena - in particular since the secrecy of the vote prevents from fully understanding voters' motives - and natural experiments remain rare. Nevertheless, several studies managed to exploit natural experiments, often in a context of quota to causally identify discrimination from voters (Bhavnani (2009), Beaman et al. (2009) or De Paola et al. (2010)).<sup>4</sup> Compared to these papers, we also focus on a context of quota but exploit a particular feature of the election, namely the design of the ballot. In this respect, we also contribute to the literature studying the effects of ballots' design on electoral outcomes (Augenblick and Nicholson (2015), Shue and Luttmer (2009), Ho and Imai (2006), Ho and Imai (2008), Cervellati et al. (2021)).

Finally, we contribute to a stream of literature studying the role of information in electoral processes. Assessing the effects of information on electoral outcomes is a long-standing issue. Numerous studies have shown that the access to information provided by the TV (Gentzkow (2006), DellaVigna and Kaplan (2007)), the radio (Adena et al. (2015)), newspapers (Gentzkow et al. (2011), Chiang and Knight (2011)), or the internet (Falck et al. (2014), Campante et al. (2018)) shape voters' political preferences. Recent studies have shown that information received at the time of the campaign has an effect on decision making at the time of voting (Le Pennec and Pons (2019), Kendall et al. (2015)). We contribute to this literature by showing that information conveyed both by newspapers and by ballots about political experience of the candidates dampen discriminatory effects.

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<sup>4</sup>Another recent study identifies discrimination in electoral setting, (Broockman and Soltas (2017)), but their results are on racial discrimination in Republican primary elections in the United States.

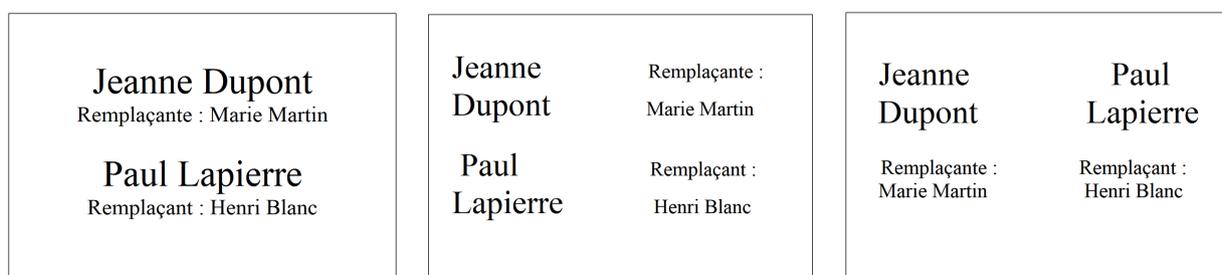
The remainder of the paper is structured as follows. Section 2 describes the institutional setting and the data we use. We provide descriptive statistics and various balance-checks showing that the treatment is likely to be as-good-as-random. Section 3 describes our estimation strategy. Section 4 presents our main empirical results. Section 5 investigates the role of information in dampening discrimination. Section 6 presents evidence on vote transfers. Section 7 concludes.

## 2 Institutional framework and data

### 2.1 Institutional framework

This study relies on data from the 2015 French departmental elections, which took place on March 22nd and March 29th. Departmental councillors were elected in 2,054 *cantons* (subdivisions of the *départements*). In each of these precincts, lists ran by pairs which necessarily had to be gender-balanced. Each candidate of a pair had to have a substitute of the same gender. Both candidates running in the same pair had the same party label. Overall, 9,097 pairs of candidates ran for office.

Figure 1: Examples of valid ballots



Within each list, the order of the candidates on the ballot was determined by alphabetical order. Such a requirement is imposed by the article L.191 of the French electoral legislation. The rules for printing electoral ballots are also stringent: a ballot must be printed in only one color, on a blank sheet of format 105x148 mm, weigh between 60 and 80 grams per square meter and be in landscape format. For each candidate, the name of its substitute must be written right after its name, using a smaller font. According to the articles L.66, L.191, R.66-2, R.110 and R.111 of the electoral code, any ballot not respecting these requirement is considered as null. Figure 1 shows examples of compliant ballots, as communicated by the Ministry of Interior. The ballots on the

day of the election are the only ones to be subject to these requirements, which do not affect campaign advertisement leaflets or electoral posters.

## 2.2 Data and descriptive statistics

For this analysis, we retrieved information about all the pairs of candidates from the Ministry of Interior. Our database includes information on age, gender, incumbency status, political affiliation and socioprofessional categories of each of these candidates. We matched these information with the *Répertoire National des Elus*, to know whether the candidates also had other political experience at the municipal, regional or parliamentary level at the time of 2015 *Départementales* elections. In the rest of the paper, we define as incumbent a candidate who, at the time of the election, was elected either (i) at the *canton* level (meaning he or she was elected at the previous *cantonales* elections); (ii) within a municipality of the *canton* where he or she is running (either as a municipal councillor or as a mayor); (iii) in a regional council, the National Assembly or the Senate. Finally, we also matched these data with sociodemographic data at the precinct-level, retrieved from the 2013 Census.

In order to carry out our analysis, we classified candidates into different partisan groups. We classified as extreme-left the lists labeled as *Communists*, *Extreme-Left*, *Front de Gauche* and *Parti de Gauche*. We classified as left-wing the lists labeled as *Parti Socialiste*, *Union de la Gauche*, *Radicaux de Gauche* and *Divers Gauche*. We classified as right-wing the lists labeled as *MoDem*, *Union du Centre*, *Union des Démocrates et des Indépendants*, *Debout La France*, *Divers-Droite*, *Union des Droites*, *UMP*. Finally we classified as extreme-right the lists labeled as *Front National* and *Extreme Droite*.<sup>5</sup>

We first begin by documenting the differences between candidates of different partisan groups in Table 1. Overall 28% of candidates belonged to a left-wing party, a number which is comparable to the share of right-wing candidates (29%). 14% of candidates were classified as extreme-left, while 21% were classified as extreme-right.

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<sup>5</sup>By an abuse of language, we hereafter call "parties" the broad categorizations of *extreme-left*, *left-wing*, *right-wing* and *extreme-right* candidates, described above. This choice of classification implies that candidates from green parties and non-affiliated candidates are not part of the four main partisan groups we define. However, in the section describing the main results of the paper, we run a set of robustness checks, providing alternative definitions for left-wing parties (including *Front de Gauche*, *Parti Gauche* and *Extreme-Left*) and for right-wing parties (excluding centrist parties like *Union du Centre*, *MoDem* and *Union des Démocrates et des Indépendants*, as well as candidates from the more *Debout la France*), and showing estimates for candidates of green parties and non-affiliated candidates.

Table 1: Characteristics of male and female candidates by partisan affiliation

	All		Extreme Left		Left		Right		Extreme Right	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Incumbent (W)	0.344	0.475	0.194	0.395	0.462	0.499	0.526	0.499	0.094	0.292
Incumbent (M)	0.470	0.499	0.293	0.455	0.631	0.483	0.685	0.465	0.153	0.361
Age (W)	51.410	12.061	53.273	11.714	51.651	10.789	51.528	10.878	50.739	14.750
Age (M)	52.533	12.927	53.718	12.774	54.022	11.602	53.226	12.128	49.741	15.260
Farmer (W)	0.019	0.136	0.015	0.122	0.012	0.107	0.032	0.177	0.009	0.096
Intermediary Profession (W)	0.057	0.233	0.016	0.126	0.028	0.164	0.085	0.279	0.086	0.281
Private Sector Employee (W)	0.279	0.449	0.226	0.418	0.253	0.435	0.286	0.452	0.347	0.476
Liberal Occupation (W)	0.068	0.252	0.038	0.192	0.073	0.260	0.091	0.288	0.035	0.183
Education Occupation (W)	0.115	0.319	0.147	0.354	0.154	0.361	0.095	0.294	0.052	0.222
Civil Servant(W)	0.117	0.321	0.162	0.368	0.163	0.370	0.106	0.308	0.047	0.212
Public Firm Worker (W)	0.039	0.194	0.063	0.243	0.045	0.207	0.035	0.183	0.021	0.143
Other Occupation(W)	0.099	0.299	0.050	0.219	0.077	0.266	0.108	0.311	0.152	0.359
Retired (W)	0.206	0.404	0.282	0.450	0.196	0.397	0.161	0.367	0.250	0.433
Farmer (M)	0.034	0.181	0.014	0.116	0.028	0.164	0.059	0.236	0.022	0.146
Intermediary Profession (M)	0.096	0.294	0.017	0.129	0.056	0.229	0.135	0.342	0.143	0.350
Private Sector Employee (M)	0.235	0.424	0.232	0.422	0.188	0.391	0.214	0.410	0.316	0.465
Liberal Occupation (M)	0.079	0.269	0.030	0.170	0.072	0.259	0.127	0.333	0.046	0.209
Education Occupation (M)	0.104	0.306	0.147	0.355	0.133	0.339	0.070	0.255	0.069	0.254
Civil Servant(M)	0.101	0.301	0.118	0.322	0.147	0.354	0.082	0.274	0.056	0.231
Public Firm Worker (M)	0.039	0.194	0.063	0.244	0.052	0.221	0.034	0.181	0.015	0.120
Other Occupation(M)	0.054	0.226	0.044	0.205	0.046	0.209	0.055	0.229	0.061	0.239
Retired (M)	0.259	0.438	0.335	0.472	0.280	0.449	0.224	0.417	0.271	0.445
Woman First	0.506	0.500	0.502	0.500	0.496	0.500	0.524	0.500	0.502	0.500
Observations	9097		1250		2507		2714		1929	

Descriptive Statistics. Mean and standard deviation of the characteristics of the candidates. Columns (1) and (2) report information for the full population of candidates, while the remaining columns report the information by party.

For all parties, the share of male incumbents is greater than the share of female incumbents. Incumbents were slightly more numerous among right-wing candidates (69% of men and 53% of women) than among left-wing candidates (63% of men and 46% of women). Only 29% of men and 19% of women were incumbents among extreme-left candidates. These proportions shrink to respectively 15% and 9% among extreme right candidates. Except for extreme-right candidates, the candidates of all parties were on average between 52 and 54 years old, and male candidates were older than female candidates. Extreme-right candidates were younger (around 50 years old), and among them, female candidates were older than male candidates. Finally, a majority of male and female candidates came from the private sector or were retired. Civil servants and teachers were over-represented among left-wing and extreme-left candidates, while intermediary professions were over-represented among the right-wing candidates. Finally, within each party, half of the pairs of candidates had the female candidate listed first.

### 2.2.1 Balance checks

In this section, we test the as-good-as-random nature of the order of appearance of female candidates on the ballots. Namely, we check whether pairs where the female candidate is listed first differ on observable characteristics compared to pairs where the male candidate is listed first. We focus both on the full population of candidates and on the subsamples that we will use later in our analysis.

In order to identify causal effects of the treatment, our estimation needs to satisfy the *Stable Unit Treatment Value Assumption* (SUTVA), which states that the potential outcomes of a unit are not affected by the treatment status of another unit. In our setting, the unit of observation is a pair of candidates from a given party. Therefore, if several candidates from a given party run in a given precinct, the SUTVA is more likely to be violated than if only one pair from such party runs. Indeed, let us assume that the treatment negatively impacts a pair of candidates from a given party. One can hypothesize that the votes they lost positively affects the votes received from another pair of candidates from the same party in the same precinct. Treatment effects for a given party are therefore likely to be less easily identifiable if several candidates of the same party run in the precinct.

In our main analysis, we therefore focus on pairs of candidates being the sole pair to represent their party in their precinct. Such subsamples are more likely to meet the *SUTVA* assumption: while it is possible that these candidates are affected by the treatment status of candidates of other parties, by construction they cannot be affected by the treatment status of other units of the same party in the sample. Of course, such restrictions imply that the results are more dependent on the definition of parties that we choose: broader definitions of parties will imply smaller sample sizes if we focus on pairs which are the sole pairs of their party running in the precinct. In our analysis, we show that our results are robust to several definitions of parties, and we document that they also hold without restricting the number of candidates from a given party running in the considered precincts. Overall, out of 9,097 candidates, 1,188 were extreme left candidates who were the only extreme left candidates running in their precinct, 1,341 were left-wing candidates who were the only left-wing candidates running in their precinct, 1,391 were right-wing candidates who were the only right-wing candidates in their precinct, and 1,893 were

extreme right candidates who were the only extreme right wing candidates in their precinct. This implies that, in our analysis of restricted samples, we focus on 95% of extreme left candidates, 53% of left wing candidates, 51% of right-wing candidates and 98% of extreme right candidates (63% of candidates overall).<sup>6</sup>

In Table 2, we systematically test for imbalances, both on the whole population of candidates and on the subsamples of interest. To do so, using a multivariate logistic model, we regress the dummy variable indicating whether the female candidate is listed first on the whole set of individual characteristics. Overall, even if a few variables appear to have a significant effect, the characteristics of the candidates explain very few (if any) of the variance of the treatment variable, and they are not jointly significant. This result is verified both for the full population of candidates and the restricted subsamples. No imbalances are found for extreme left and right-wing candidates candidates. Among left-wing pairs, women are more likely to be listed first on the ballot if they work in intermediary professions or are retired. Finally, among extreme right candidates, younger female candidates are more likely to be on the top of the ballot. So are female candidates who are retired or working in a liberal occupation. Extreme right women paired with male candidates working in intermediary professions and in the education sector are less likely to be at the top of the ballot. Yet, overall, the absence of joint significance suggests that if any selection into the treatment based on the characteristics of the candidates exists, it is of low magnitude. This is also the case when we control for local characteristics (Table 14 in Appendix).

Nevertheless, one might worry that testing for joint imbalances might underestimate the impact of individual characteristics, given the potential correlations existing between them. In Table ?? in Appendix, we present results of balance checks where each independent variable is tested separately. Given that potential selection into treatment is likely to be a multifactorial phenomenon, a univariate test is likely to be less informative than a test controlling jointly for all candidates' characteristics. However, it yields results that are consistent with our main test. Indeed, we find that all regressions involve a null pseudo  $R^2$ , and that while a small number

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<sup>6</sup>Comparatively, 62 extreme left candidates ran in a precinct where there was one additional extreme left candidate, 1,166 left wing candidates ran in a precinct where there was at least one additional left wing candidate, 1,323 right wing candidates ran in a precinct where there was at least one additional right wing candidate, and 36 extreme right candidates ran in a precinct where there was at least one additional extreme right candidate. The largest sample size after applying the restriction is for extreme right candidates, which reflects that most precincts had only one extreme right candidate running.

of characteristics play significantly, controlling for multiple testing in this setting would yield insignificant estimates for all tested variables.<sup>7</sup>

### 2.3 Manipulation of the treatment

A related question is whether parties selected male and female candidates in order to have male candidates at the top of the ballot. In this case, we should observe different distributions of first letters of surnames across gender. In Figure 2, we plot the frequency of the first letter of surnames for male and female candidates, both on the total population of candidates and on our subsamples of interest: in all cases, the distributions are strikingly similar. In Appendix (Table 16), we formalize this graphical intuition by performing different tests of equal distributions. Namely, we perform the tests of Kolmogorov-Smirnov, of equality of medians, and of Mann-Whitney-Wilcoxon. Overall, we cannot reject the null hypothesis that the distributions are identical irrespective of the sample that we focus on. The only exception is for the restricted subsample of left-wing candidates, where the distributions seem slightly different: the Kolmogorov Test and the Mann-Whitney-Wilcoxon test reject the hypothesis of equal distributions at the 10% level. But as Figure 2c shows, this difference seems mainly driven by an over-representation of women with names beginning by the letter B, and it is unlikely to represent a more general manipulation of the treatment. This suggests that parties did not strategically choose to match candidates based on their surnames. Finally, to further confirm the absence of manipulation of the treatment, we also report in Appendix (Figures 3 and 4) the vote shares received by candidates in the first round depending on the first letter of the candidates' surnames: we find that, for each first letter of the candidates' surnames, the vote shares is very close to the sample average.

### 2.4 Data on ballot layout

An important feature of the French electoral law is that candidates are allowed to display additional information about themselves on the ballot, so long as it does not confuse the voter

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<sup>7</sup>A potential worry could be that, for right-wing candidates, the incumbency status of male candidates decreases slightly the probability that a female candidate is listed first. This result is only significant at the 10% level, but to make sure that it does not drive our result, we also present estimates for separate samples depending on the incumbency status of both male and female candidates, and find that our main results hold in all cases (Table 24 in Appendix).

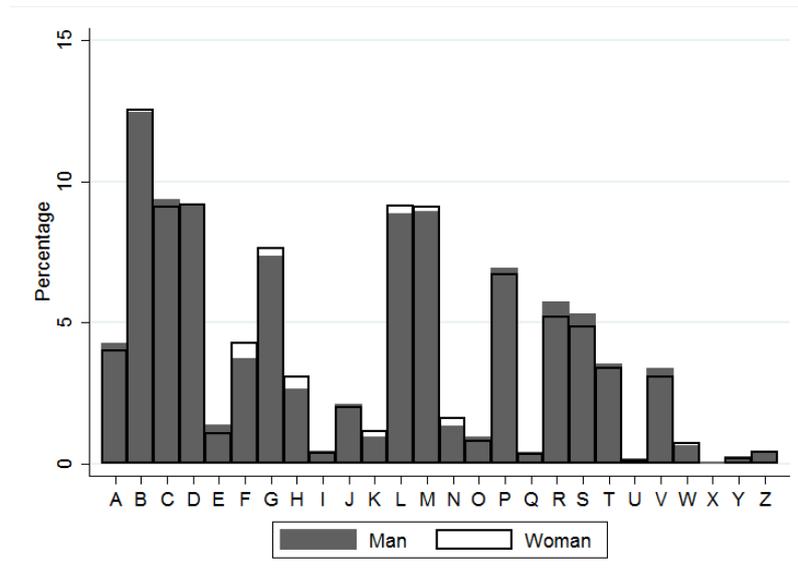
Table 2: Determinants of the treatment

Woman First	Restricted Samples				
	All	Extreme Left	Left	Right	Extreme Right
Incumbent (W)	0.078 (0.121)	0.070 (0.643)	0.019 (0.870)	0.102 (0.385)	0.134 (0.433)
Incumbent (M)	-0.016 (0.751)	0.120 (0.367)	0.044 (0.736)	-0.228 (0.108)	-0.197 (0.146)
Age (W)	-0.001 (0.714)	-0.004 (0.542)	-0.005 (0.441)	0.004 (0.477)	-0.009** (0.032)
Age (M)	-0.001 (0.536)	0.007 (0.268)	0.001 (0.869)	-0.008 (0.159)	-0.001 (0.791)
Intermediary Profession (W)	0.260** (0.013)	-0.040 (0.936)	0.712* (0.077)	0.381 (0.109)	0.319 (0.108)
Private Sector Employee (W)	0.148** (0.040)	0.173 (0.501)	0.335 (0.139)	0.155 (0.390)	0.184 (0.190)
Liberal Occupation (W)	0.369*** (0.000)	0.187 (0.616)	0.458 (0.112)	0.370 (0.103)	0.670** (0.019)
Education Occupation (W)	0.103 (0.240)	0.112 (0.681)	0.377 (0.118)	-0.059 (0.811)	0.100 (0.681)
Civil Servant(W)	0.103 (0.244)	0.058 (0.831)	0.319 (0.183)	-0.030 (0.893)	0.389 (0.111)
Public Firm Worker (W)	0.098 (0.420)	0.200 (0.543)	0.274 (0.420)	0.053 (0.870)	-0.304 (0.383)
Retired (W)	0.076 (0.375)	-0.228 (0.401)	0.486* (0.058)	-0.064 (0.765)	0.531*** (0.003)
Intermediary Profession (M)	0.019 (0.851)	0.379 (0.493)	0.681** (0.037)	0.055 (0.808)	-0.390* (0.059)
Private Sector Employee (M)	0.045 (0.594)	0.209 (0.450)	0.106 (0.659)	0.042 (0.830)	-0.292 (0.115)
Liberal Occupation (M)	0.057 (0.581)	0.136 (0.748)	0.290 (0.319)	-0.036 (0.866)	-0.088 (0.750)
Education Occupation (M)	-0.036 (0.719)	0.046 (0.875)	0.398 (0.113)	-0.157 (0.545)	-0.432* (0.084)
Civil Servant(M)	-0.077 (0.439)	-0.174 (0.563)	0.259 (0.291)	-0.199 (0.420)	-0.317 (0.217)
Public Firm Worker (M)	-0.043 (0.738)	-0.195 (0.569)	0.202 (0.523)	-0.249 (0.453)	-0.553 (0.199)
Retired (M)	0.028 (0.757)	-0.098 (0.733)	0.207 (0.389)	0.187 (0.368)	-0.264 (0.201)
XLeft	0.089 (0.346)				
Left	0.035 (0.693)				
Right	0.119 (0.182)				
XRight	0.060 (0.508)				
Observations	9,081	1,187	1,341	1,389	1,883
Pseudo R2	0.002	0.011	0.007	0.009	0.008
Chi2	29.35	18.43	11.83	16.72	22.13

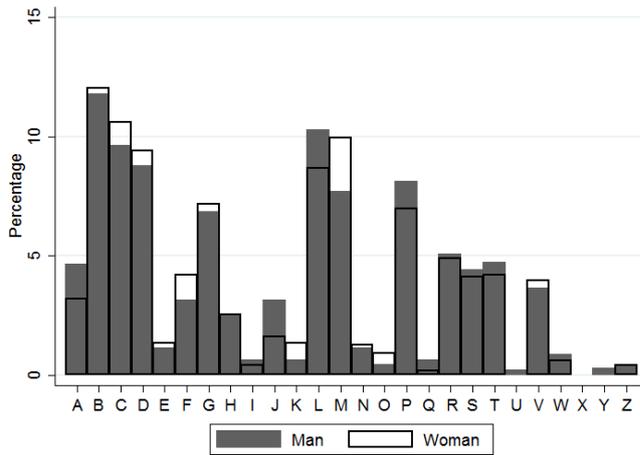
Multivariate logistic regressions. Column (1) considers all candidates. In columns (2) to (5) each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome is a variable equal to one if the female candidate is first on the ballot and zero otherwise. The coefficients on male and female candidates' occupations are expressed considering farmers and other occupations as the reference modality. Standard errors are clustered at the precinct level in column (1), and robust in columns (2) to (5). p-value are in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

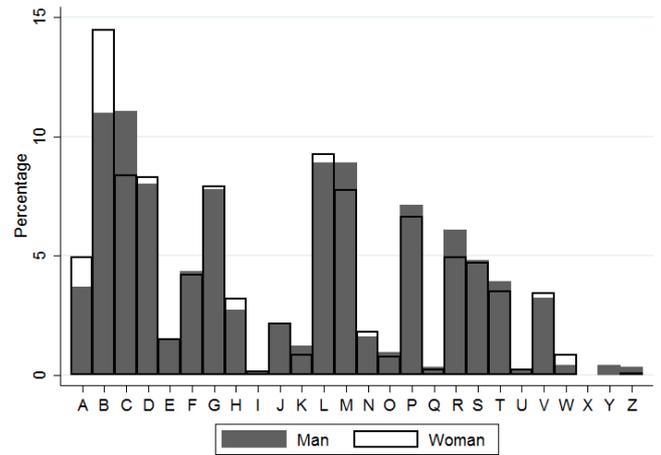
Figure 2: Distribution of surname initials across gender and parties



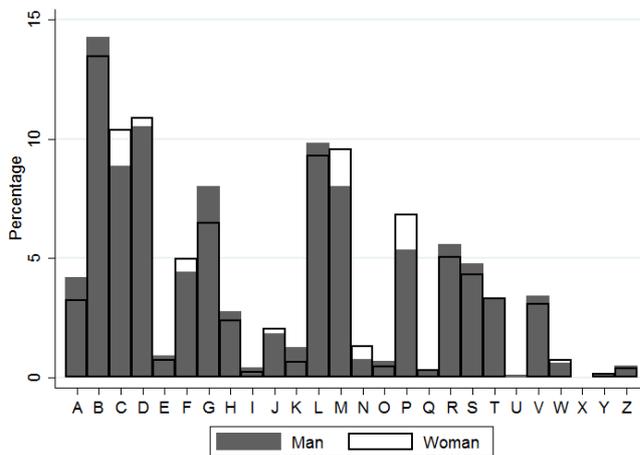
(a) Total population of candidates



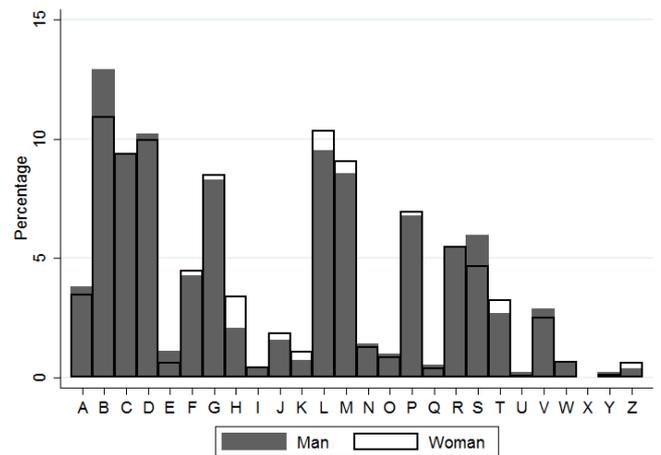
(b) Restricted Sample: Extreme Left



(c) Restricted Sample: Left



(d) Restricted Sample: Right



(e) Restricted Sample: Extreme Right

about their identity. In order to account for this specificity, we manually collected data on the electoral ballots that were used for these elections. Despite the fact that there does not exist a systematic recording of electoral ballots for the local elections in France, we could access a sample of ballots corresponding to 12.6% of the electoral ballots of the 2015 *Départementales* elections (1,150 ballots). To do so, we collected three types of data. First, the Centre for Political Research of SciencesPo (CEVIPOF) provided 68% of observed ballots. Secondly, exploiting the fact that some departments recorded a numeric version of the ballots (namely the departments of Allier, Aude, Ille-et-Villaine, Loire-Atlantique and Savoie), we systematically contacted the administrative centers in charge of the election. 15% of observed ballots came from the *Loire-Atlantique* department. Finally, we systematically looked up for pictures of ballots on the Internet, using Google, Twitter and Facebook keywords.<sup>8</sup> 17% of our observed ballots were recovered through this methodology. Out of the 1,150 ballots observed, 340 (30%) were from right wing candidates, 341 (30%) from left wing candidates, 226 (20%) were from extreme right candidates and 144 (13%) were from extreme left candidates.

To the best of our knowledge, this represents the first effort to collect and analyze ballot layouts in France in a systematic way. Yet, because our dataset is not complete, it might be subject to biases. In particular, because the data collected by the Centre for Political Research of Sciences Po are based on voluntary contributions of voters, it tends to over represent precincts located in urban areas. Secondly, online data might over-represent famous candidates, who might be more likely to campaign online. On the other hand, it might also allow candidates without a strong visibility to get a wider audience. To document the potential biases existing in our data, in Table 26, in Appendix we regress the availability of the ballot on the main characteristics of the candidates for each of the subsamples of interest, using a multivariate logistic model.

Overall, we find differences in terms of age and socio-professional categories. The ballots we analyze are indeed those of slightly younger candidates, especially among left-wing candidates. We observe more ballots when the female candidate has a liberal occupation, and when the male candidate is working in the private sector or in an intermediary profession (especially among extreme right candidates). Among right-wing candidates, ballots are more likely to be observed if the female candidate is working in the private sector or as a civil servant, or is retired. Finally,

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<sup>8</sup>Using in particular requests such as "Bulletins de vote élections départementales 2015".

among extreme-right candidates, imbalances are found on most of male occupations (except for public firm workers). Nevertheless, three important comments need to be made. First, the position of the female candidate is not predictive of the availability of the ballot. Second, while some differences are significant, they explain a small share of ballot availability, and we cannot reject the null hypothesis of joint nullity of the estimates for the restricted samples of right-wing and extreme right candidates. Finally, no party seems to be over-represented in the sample.

In Table 3, we provide evidence that the treatment status is uncorrelated with the reporting decision and the kind of information reported. We categorized reported information into three types: declared past or present political experience,<sup>9</sup> age and occupation. Moreover, since it is possible to put a picture of the candidates on the ballot, we identified the pairs of candidates that did so. We observe, that out of 1,150 ballots available, 36% have at least one information reported for at least one candidate: 35% of the ballots report information related to the male candidate and 33% report information related to the female candidate. 26% of the ballots report information related to the political experience of the male candidate and 22% report information related to the political experience of the female candidate. 5% of observed male candidates report their occupations, while it is the case of 7% of observed female candidates. Less than 1% of male and female candidates report their age. Finally, about 9% of the candidates put their picture on the ballot. We also observe that the decision to report any information is very correlated between male and female candidates: among all of the ballots which display at least one information about at least one candidate, 88% report information for both candidates. Importantly, none of these reporting decisions are correlated to the treatment.

### 3 Estimation strategy

Our main estimation strategy aims at analyzing whether candidates lose or gain from having the female candidate listed first on the ballot. These ballot order effects and the role that they

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<sup>9</sup>This measure of political experience therefore goes beyond electoral mandates held at the time of the election, and can be broader than the measure of incumbency that we used before based on administrative data.

Table 3: Balance check on reported information: all candidates

	Man First	N	Woman First	N	Diff	T-Stat
At least one information	0.361	576	0.364	574	-0.003	-0.106
At least one information (M)	0.347	576	0.354	574	-0.006	-0.228
At least one information (W)	0.326	576	0.341	574	-0.015	-0.541
Information: Political Experience (M)	0.267	576	0.258	574	0.009	0.366
Information: Political Experience (W)	0.220	576	0.221	574	-0.001	-0.031
Information: Occupation (M)	0.050	576	0.060	574	-0.011	-0.786
Information: Occupation (W)	0.066	576	0.071	574	-0.005	-0.365
Information: Age (M)	0.009	576	0.005	574	0.003	0.704
Information: Age (W)	0.009	576	0.005	574	0.003	0.704
Photo	0.090	576	0.090	574	-0.000	-0.018

Descriptive Statistics. T-Tests of difference of information reporting across treatment status for the full sample of available ballots.

play in explaining voters misunderstanding have extensively documented by the literature<sup>10</sup>. In our context we use it to study the existence of gender discrimination.

In an initial specification, we test whether, on average, the electoral performances of pairs where the female candidate is listed first on the ballot are different from those where the male candidate is listed first. Identification takes place within the potential outcomes framework from the Rubin Causal Model, where we assume two potential outcomes for each unit  $i$  -  $Y_i(0)$  and  $Y_i(1)$  - and the causal effect of the program on the unit  $i$  is defined as  $\tau_i = Y_i(1) - Y_i(0)$ . The actual observed outcome is defined as such:

$$Y_i^{obs} = \begin{cases} Y_i(0) & \text{if } T_i = 0 \\ Y_i(1) & \text{if } T_i = 1 \end{cases}$$

In this framework, the Average Treatment Effect is defined as  $ATE = \mathbb{E}[Y_i(1) - Y_i(0)]$ . A naive estimate of this quantity is given by  $\overline{Y_1^{obs}} - \overline{Y_0^{obs}}$ . In general, such a quantity is unbiased under the *Stable Unit Treatment Value Assumption* (SUTVA) and the *complete randomization assumption*.

<sup>10</sup>This misunderstanding could be due to several factors. It can be due to limited attention: attention being a scarce resource, voters might focus on a "focal point" which, in our setting, we assume to be the name of the candidate listed first on the ballot. As summarized by [Cervellati et al. \(2021\)](#), several studies showed that when decisions are made in a complex environment and in a short period of time, resorting to focal points might be a rational decision (in order to minimize the risk of mistakes). Even well-informed voters in simple settings can resort to such a heuristic. This misunderstanding can also be due to salience: gender-biased voters might notice more easily that the seat will be shared with another candidate if their preferred gender appears second on the ballot. This can also be due to imperfect information about the electoral rules. The results we find on information suggest that the latter factor is likely to play a role, but as argued by [DellaVigna \(2009\)](#), all those phenomena are intertwined and disentangling them precisely is beyond the scope of this paper.

As argued above, we restrict our analysis to a sample of candidates who are the only ones to represent their party in the precinct, as, in this setting, the *SUTVA* is less likely to be violated.

The second assumption states that both the potential outcomes and the covariates are independent from the treatment. Formally, the condition writes as such:

$$T_i \perp (Y_i(0), Y_i(1), X_i)$$

In our setting, the treatment-assignment is based on a procedure which is supposedly as-good-as-random, since the order of the candidates (and hence the place of the female candidate) on the ballot is determined by alphabetical order. However, as demonstrated in the previous section, while the treatment assignment is hardly affected by candidates' characteristics, the covariates are not systematically perfectly balanced across treatment status. In our setting, it therefore seems more plausible to assume the milder assumption of *unconfoundedness*, which states that the potential outcomes and the treatment are independent after controlling for covariates potentially affecting them. Formally, this assumption writes:

$$T_i \perp (Y_i(0), Y_i(1)) | X_i$$

Our baseline OLS specification is therefore the following:

$$Y_i = \alpha + \beta T_i + \delta X_i + \epsilon_i$$

where  $Y_i$  is an outcome variable indicating the electoral performance of pair  $i$ ,  $T_i$  is the treatment variable, which is equal to 1 if the female candidate in pair  $i$  is listed first on the ballot and 0 otherwise,  $X_i$  is a set of candidates characteristics, and  $\epsilon_i$  is an error term.

While our main specification does not model how the electoral performance of a pair of candidates depends on the characteristics of the other candidates, in additional specifications we control for the average characteristics of the opponents of the considered pair.

## 4 Results

### 4.1 Why do we expect stronger effects for right-wing candidates ?

Our *ex ante* expectation is that, if any discriminatory effects were to be found, they would first and foremost be observed among right-wing candidates.

First, right-wing parties have for long been fielding disproportionately more male than female candidates. In the 2012 legislative elections, the main right-wing party (UMP) was by far the party that fielded the smallest share of female candidates (25% against a national average of 43%), despite the prospect of financial sanctions. As a matter of comparison, the Socialist Party fielded 43% of women, the *Front National* fielded 49% of women and the Communist Party fielded 49% of women. As a consequence, during the 14<sup>th</sup> legislature, started with the 2012 legislative elections, the financial withholding on endowments from the State that the UMP faced for not abiding by the parity rule represented 65% of total national withholdings.

Similarly, in the *cantonales* local elections, which were held until 2011, we observe that between 2001 and 2011, 14% of right-wing candidates were women. This share was of 18% for left-wing candidates (31% for candidates of the green parties), and 28% for extreme-left and extreme-right candidates. In the 2014 municipal elections, among municipalities of more than 1,000 inhabitants, only 17% of heads of lists were women, a proportion that stagnated compared to the previous 2008 election. The share of female candidates was below the average for right-wing candidates (15%), while it was equal to 17% for left-wing parties, 19% for extreme right parties, 30% for extreme left parties, and up to 34% for green parties. In the European elections, right-wing parties (including extreme-right parties, which fielded very few candidates) fielded on average 27% of women, against 46% for left wing in 2009 (the proportions were respectively 31% and 44% in 2014).

On top of a lower representation of female candidates, the electoral outcome of right-wing female candidates appears to be lower than the one of non-right-wing female candidates. In the *cantonales* elections, a simple regression analysis of the vote shares received in the first round shows that right-wing female candidates were disadvantaged both compared to right-wing

male candidates, and to women of other parties (Table 29 in Appendix).<sup>11</sup> On average, right-wing female candidates received 3.9 pp lower vote shares than right-wing male candidates. As a comparison, in other parties, the vote shares of women were 1.7 pp lower than those of men.

Regarding municipal elections, the analysis is made more difficult by the fact that, since 2001, lists are gender-balanced by construction through a zipped system (for municipalities above a certain threshold). However, according to the *Haut conseil à l'égalité entre les femmes et les hommes*, since 2001, the share of female municipal councillors tended to be lower among left-wing councillors than among right-wing councillors. For instance, in 2001, the share of female councillors was 55% among *Divers Gauche* municipal councillors and 37% among *Socialist* municipal councillors, while it was 52% among *Divers Droite* councillors and 32% among *RPR* councillors. In 2014, these shares remained slightly higher for left-wing councillors than for right-wing councillors (50% for *Divers Gauche* and 42% for *Socialist*, against 49% for *Divers Droite* and 41% for *UMP*).

Overall, right-wing candidates were less exposed to female candidates, and also seemed to vote less often for them. As argued by Beaman et al. (2009) or Baltrunaite et al. (2014), lower exposure to female candidacies is likely to give rise to statistical discrimination. We therefore hypothesize that if any discriminatory gender bias were to be found in our analysis, it would first and foremost be visible among right-wing voters.

## 4.2 Main estimation

In Table 4, we test whether the order of appearance of the male and female candidates has an effect on their electoral performance. We focus on the four main parties and test several specifications. Panel (A) reports results without any controls except the number of candidates in the precinct (which varies across precincts). Panel (B) reports results when we also control for individual characteristics. Panel (C) involves the same control variables, but interacts the characteristics of male and female candidates. Panel (D) is similar to Panel (C), but also controls for precinct characteristics (including the average age of the population, the share of voters in

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<sup>11</sup>This analysis cannot be interpreted as causal because of the selection effects mentioned in the introduction of the paper.

rural areas, the share of voters with at least an undergraduate degree, and the unemployment rate, all as of 2013), and for the first letter of the female's surname.<sup>12</sup>

Even though, as argued above, our expectation is that discriminatory effects are expected to be visible primarily for candidates of right-wing parties, one cannot exclude that multiple testing affects our results (since we run several regressions on four different subsamples, which raises the probability of finding a falsely significant treatment effect). In order to discard that our results are driven by multiple testing, we not only provide robust p-values, but also p-values adjusting for multiple testing. In the first correction, we apply the Bonferroni adjustment, multiplying each p-value by the number of subsamples over which our specification is tested (namely 4). In the second correction, we apply [Anderson \(2008\)](#)'s methodology to compute a sharpened false discovery rate.

Overall, the results suggest that the performances of extreme-left, left-wing and extreme-right pairs are not affected by the order of appearance of the candidates. However, right-wing pairs lose a sizable share of votes if the female candidate is first. Estimates of the loss range between 1.4 and 1.9 percentage points, representing between 4 and 5.4 percents of the average vote share. Importantly, the magnitude of the coefficient is very similar across the specifications, and especially stable in all the specifications including covariates, suggesting that the inclusion of covariates hardly affects the general pattern. Importantly, correcting for multiple testing does not affect the significance of our results: in the first three panels, our estimates remain significant at the 1% level, while in the last panel, the significance level decreases from 5% to 10% (however, the corrected p-values remain close to 5%, as they reach 7%).

In [Table 5](#), we show that gender discrimination prevented some right-wing pairs of candidates from winning the election. More specifically we regress a dummy variable indicating whether the considered pair reached the second round or won the election during the first round. Panel (A) includes no control except the number of competing candidates. Panel (B) includes the broadest set of controls - namely, interacted individual characteristics from the candidates, number of competing candidates, precinct characteristics and the first letter of the woman's surname. We find that right-wing candidates were between 3.9 and 4.9 percentage points less likely to

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<sup>12</sup>In Appendix (see [Table 20](#)) we extend Panel (D) controlling for the share of votes received by Nicolas Sarkozy in the first round of the 2012 presidential election.

Table 4: Effect of the treatment on vote shares in the first round

(A)	XLeft	Left	Right	XRight
Woman First	0.381 (0.337) [1] {1}	-0.291 (0.587) [1] {1}	-1.878*** (0.000) [0.002] {0.002}	0.0346 (0.921) [1] {1}
Observations	1,188	1,341	1,391	1,893
R-squared	0.147	0.144	0.277	0.086
Indiv. Controls	N	N	N	N
Precinct characteristics	N	N	N	N
First letter of the woman's surname	N	N	N	N
Number of candidates	Y	Y	Y	Y
(B)	XLeft	Left	Right	XRight
Woman First	0.0837 (0.811) [1] {1}	-0.206 (0.668) [1] {1}	-1.589*** (0.001) [0.006] {0.006}	0.0662 (0.840) [1] {1}
Observations	1,187	1,341	1,389	1,883
R-squared	0.348	0.318	0.398	0.218
Indiv. Controls	Y	Y	Y	Y
Precinct characteristics	N	N	N	N
First letter of the woman's surname	N	N	N	N
Number of candidates	Y	Y	Y	Y
(C)	XLeft	Left	Right	XRight
Woman First	0.123 (0.735) [1] {1}	-0.149 (0.763) [1] {1}	-1.583*** (0.002) [0.008] {0.008}	0.122 (0.715) [1] {1}
Observations	1,187	1,341	1,389	1,883
R-squared	0.389	0.366	0.432	0.247
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N	N
First letter of the woman's surname	N	N	N	N
Number of candidates	Y	Y	Y	Y
(D)	XLeft	Left	Right	XRight
Woman First	-0.0708 (0.866) [1] {1}	-0.206 (0.726) [1] {1}	-1.397** (0.016) [0.066] {0.071}	0.427 (0.259) [1] {1}
Observations	1,187	1,334	1,389	1,882
R-squared	0.434	0.410	0.491	0.382
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
First letter of the woman's surname	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y
<b>Mean of Outcome Variable</b>	10.66	28.44	34.91	25.79

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for age, socioprofessional categories and political experience of male and female candidates. Panel (C) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Panel (D) adds to these controls the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values in parentheses, Bonferroni adjusted p-value in brackets, [Anderson \(2008\)](#)'s sharpened p-value in curly braces.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 5: Effect on probability of getting to the second round or of winning the election in the first round

<b>(A)</b>	XLeft	Left	Right	XRight
Woman First	1.468 (0.276)	0.182 (0.945)	-4.866** (0.014)	-0.440 (0.847)
Observations	1,188	1,341	1,391	1,893
R-squared	0.015	0.008	0.034	0.009
Indiv. Controls	N	N	N	N
Precinct characteristics	N	N	N	N
First letter of the woman's surname	N	N	N	N
Number of candidates	Y	Y	Y	Y
<b>(B)</b>	XLeft	Left	Right	XRight
Woman First	1.020 (0.504)	1.329 (0.662)	-3.889* (0.080)	0.217 (0.934)
Observations	1,187	1,334	1,389	1,882
R-squared	0.261	0.257	0.255	0.216
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
First letter of the woman's surname	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y
<b>Mean of the Outcome Variable</b>	5.808	64.131	83.178	58.109

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is a dummy variable indicating whether the pair of candidates went to the second round of the election or was elected in the first round. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for interacted age of man and woman, interacted socioprofessional categories of man and woman, interacted political experience of man and woman, the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values between parentheses. Coefficients are multiplied by 100.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

reach the second round or win the election in the first round, corresponding to a lower probability ranging between 4.7 and 5.9 percents.

This gender bias seems to have affected the final result of the election. In Table 25 in Appendix, we regress a dummy indicating whether the considered pair won the election on the treatment status. Controls are defined in the same way as in Table 5. Overall, we find that, because of gender discrimination, right-wing pairs of candidates were between 4 and 4.5 percentage points less likely to win the election. The magnitude of the estimates is exactly the same as that of the estimates in Table 5, suggesting that the overall effect is channeled through the probability of reaching the second round. However, the results are much less significant (and even not significant in the most stringent specification), which is likely to reflect unobserved heterogeneity in the second round that we do not account for.

### 4.3 Robustness checks

In Appendix, we provide evidence that the results are robust to other estimation strategies or definitions of parties.

On the estimation strategy, we start by running the same baseline model on the full population of candidates. While in such a setting the SUTVA is more likely to be violated, it allows to directly test the effect of the treatment on the whole sample. In Table 17, we show that when we interact the treatment with a dummy indicating that the pair of candidates is from the right-wing, we find a strongly negative interaction term, of the same magnitude than the one found in the main specification (i.e. between -1.4 and -1.5 percentage points). In Table 18, we run the analysis on the full population of right-wing candidates, without restricting the sample to candidates who are the only right-wing candidates running in the precinct: the effect is still significant for most specifications, but smaller in magnitude (between -0.5 and -0.9 percentage points), suggesting that the effects is less accurately identified in cases when several right-wing candidates run.

An important concern could be that our results vary with the structure of local political competition. On this point, we start by showing that our estimates are not affected by the characteristics of the political opponents faced by a given pair of candidates. In Table 19, we run the most stringent specification of the main regression - including interacted individual characteristics,

the first letter of the female's surname and the characteristics of the precinct - and add to the controls the average of age, political experience and occupations among opponents, as well as the share of opponents with a female candidate listed first. We still find a statistically significant effect on the restricted sample of right-wing candidates, even though the effect is smaller and drops down to 1 percentage point.

Finally, to ensure that our results are not driven by different fielding strategies in more or less winnable precincts, we show in Table 14 that the vote shares received by Nicolas Sarkozy in the 2012 presidential election does not predict the treatment and in Table 14 that the treatment effect is robust to controlling for these vote shares. The point estimate slightly decreases compared to the main specifications but stays significant at the 10% level.

Regarding the definition of parties, we run the baseline model varying the definition of right-wing and left-wing parties. The results are gathered in Table 21. Overall, the main results hold irrespective of the definition of parties. More specifically, we do not find any evidence of treatment effect on the left when considering an extensive definition of left including the Communists (before considered as Extreme Left), the Greens or the union of Left. On the contrary, the effect is still significant for the right and is of the same magnitude than the one found in the main specification (i.e. between -1.7 and -2.0 percentage points) when we remove the centrist parties from the definition of the right or when we add *Debout la France*. Finally, we do not find significant effects for center-right and non-classified candidates.

An additional question is whether we observe the effects among right-wing candidates because right-wing voters have a lower switching cost to other candidates. We explore more deeply this question in section 6, investigating the patterns of vote transfers observed in the data, and we find that votes lost by discriminated right-wing pairs were more likely to be transferred to ideologically close candidates (namely center-right candidates). However, evidence from alternative sample definitions suggests that lower switching costs from right-wing voters are unlikely to be the main driver of discrimination. First, in Table 21, and as a matter of comparison, we find that among left-wing candidates who also faced extreme left opponents (suggesting a potentially lower switching cost for left-wing voters than in the general setting), no significant discrimination effects emerge. Furthermore, in Table 22, focusing on the alternative definition of right-wing candidates excluding centrist candidates, we do not observe sizably different effects when we

focus on candidates who do not face centrist opponents or extreme right opponents (a situation in which the switching cost for right-wing voters is arguably lower).<sup>13</sup>

Additionally, given the slight imbalances of the treatment status regarding the incumbency status of the male candidate in the univariate balance check, we check that the main results are not driven solely by the presence or absence of incumbents. In Table 24 in Appendix, we run the analysis for different subsamples, depending on the presence and absence of male and female incumbents (both considered separately and simultaneously). In all subsamples, the effect of the treatment is negative and significant, ranging between -1.3 and -3.1 percentage points depending on the specifications.

Finally, in our baseline regression, we do not weight observations by the size of the precinct. We choose to do so because we want to eventually focus on the effect of discrimination on candidates' electoral outcomes rather than on the extent of discrimination within the population of voters.<sup>14</sup> However, one worry might be that the heterogeneity of the size of precincts drives our results: in Table 23 in Appendix we report results for the right-wing candidates, weighting the observations by the size of the precinct and find that estimates are virtually unchanged compared to our baseline specification.

## 5 The role of information in dampening discrimination

Results from the previous section show that female candidates from right-wing parties tended to be discriminated against in the 2015 *départementales* elections. As mentioned above, these elections were characterized by a very high abstention rate of 49% in the first round (while it was equal to 36% in the previous 2014 municipal elections, and about 20% in presidential elections) and low interest from voters. It is therefore likely that the amount of information available to voters plays a key mediating role in our results. Our hypothesis is that the lack of information in this election favored a form of statistical discrimination: right-wing voters discriminated against

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<sup>13</sup>In the case where right-wing candidates do not face an extreme right opponent, the estimates are quite imprecise, given the very small number of races in the sample.

<sup>14</sup>It is important to note that the discriminatory effect we are identifying is not an estimate of average gender biases in the population. Since the identified effect depends on the presence of discrimination and on a misunderstanding of the electoral rules, it is difficult to draw any conclusion about discrimination in the whole population. Indeed, our identification is based on voters who misunderstood the rules of the election (and whose number is unobserved). It is likely that this effect is a lower bound of a more global effect.

Table 6: Impact of newspaper circulation on the gender discrimination of right-wing candidates

Share of votes in the first round	(1)	(2)	(3)	(4)
Woman First	-2.253*** (8.23e-05)	-1.967*** (0.000)	-2.049*** (0.000)	-1.768*** (0.004)
Top Decile Newspaper Circulation	-0.270 (0.818)	-1.028 (0.360)	-0.890 (0.431)	-1.938* (0.0717)
Woman First # Top Decile Newspaper Circulation	3.622** (0.026)	3.671** (0.012)	4.623*** (0.002)	3.810*** (0.008)
Observations	1,391	1,389	1,389	1,389
R-squared	0.281	0.400	0.436	0.493
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the right-wing candidates who are the only ones of their party in the precinct where they run. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. The treatment variable "Woman First" is interacted with a dummy indicating whether newspaper circulation at the department level per inhabitant in 2015 is in the top decile. Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

women essentially because they had few information about the candidates and because they were previously less exposed to female candidates than other voters. In this section, we test this hypothesis using two different measures of information: newspaper circulation and information about candidates available on the ballots.

## 5.1 The effect of newspaper circulation

Newspaper circulation has been shown to increase the knowledge that voters have of the candidates (Snyder Jr and Strömberg (2010)), and evidence from polling studies before the 2015 *Départementales* elections highlighted the lack of knowledge about candidates was particularly high among voters reading less often newspapers.<sup>15</sup> Moreover, newspaper circulation is likely to be a good proxy of the general understanding of the election in the population. Indeed, the literature highlighted that greater newspaper circulation increases political participation (Gentzkow et al. (2011)).

<sup>15</sup>IFOP (2015) highlighted that "the lack of knowledge of candidates was more frequent among people younger than 35 (38%), who read less often newspapers, notably regional newspapers, than among older populations (20% among people aged between 50-64 and 23% among people older than 65)".

In this section, we use a measure of newspaper circulation at the *département* level for year 2015, taken from Pons and Tricaud (2018), and divide it by the administrative population in 2015 according to the French Census. In Table 6 we interact the treatment with a dummy indicating whether newspaper circulation per inhabitant in 2015 is in the top decile, focusing only on right-wing candidates. We find that, while in departments with newspaper circulation below the top decile discriminatory effects are significant, these effects disappear for departments in the top decile of newspaper circulation. This result holds true irrespective of the chosen specification. It suggests that conditionally on the characteristics of the candidates, higher newspaper circulation dampens discrimination.

In our setting, this result could be explained by two, not exclusive, channels. A first explanation could be that the higher newspaper circulation induces a better knowledge of candidates among voters, leading the latter to stop discriminating against women. Another explanation could also be that higher newspaper circulation improves voters' understanding of the rules of the election. In our context, it would mean that the additional information received by voters have led them to realise that candidates play a similar role irrespective of their position on the ballot.

At this stage, aggregate media information does not allow us to isolate a specific channel. To refine our analysis, and in order to test whether discrimination is of statistical nature, we now turn to a more specific type of information, namely information about candidates.

## 5.2 The effect of information about candidates

In a context where voters' knowledge about candidates appears limited, a first attempt at testing the role of information about candidate is to focus on their incumbency, as incumbents are likely to be better known from voters.

In Table 7, we test whether incumbents are less discriminated against. We focus on three types of incumbency: in column (1), incumbents are defined using our baseline definition; in column (2) incumbents are defined as candidates who also are mayors or municipal councillors in the *canton* at the time of the election; in column (3), incumbents are defined as candidates who previously were *departmental* councillors.<sup>16</sup> In Panel (A), we focus on the experience of the female

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<sup>16</sup>Regional councillors and members of parliament are not numerous enough to carry out meaningful heterogeneity analysis.

candidate. In panel (B), we focus on the experience of the male candidate. In Panel (C), we test the hypothesis that what matters is the fact that both candidates are incumbents. In Panel (D), we test the hypothesis that what matters is the fact that none of the candidates are incumbents.

The results indicate insignificant effects of incumbency, irrespective of the definition we consider. Such results are surprising, in particular if we consider that incumbency is a large predictor of vote shares. One potential explanation might relate to the poor general knowledge of candidates in the population. Assuming that (i) a substantial share of voters are uninformed about candidates (and therefore do not know their incumbency status upon voting) and (ii) the incumbency advantage is strong in the population of voters that know the candidates (and relatively stronger than potential gender biases against women), one can simultaneously observe a significant incumbency advantage (driven by the large premium they get among the population of informed voters), and a discrimination against incumbent women (driven by the bias of those that are uninformed, who discriminate against women irrespective of their incumbency status). As it is likely that a large fraction of voters do not know the incumbents, one needs to go beyond the incumbency status and find a variable that better captures the actual heterogeneity of knowledge that voters have about candidates. This is what we do in the next paragraphs, using information reported on the ballots.

In Table 8, we test whether, among the set of right-wing candidates for which we observed the ballots, discrimination is affected by the presence of reported information about the candidates. To do so, we interact the treatment variable with a dummy indicating whether any type of information is available on the ballot.<sup>17 18</sup> In this case, we observe that, for right-wing candidates, discrimination disappears when information is displayed on the ballot: while, on ballots with no information, discrimination seems to be particularly high - with about 5 to 6 points less of received votes when the female candidate is listed first - this effect is totally cancelled out when

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<sup>17</sup>It is important to acknowledge that in this exercise, the sample size shrinks significantly compared to the main analysis as we restrict the analysis not only to right-wing candidates for whom we observe a ballot (340), but also to those who are the only right-wing candidates to run in the precinct. We therefore end up with 166 observations in our analysis.

<sup>18</sup>In Table 27 in Appendix, we show that, for the whole set of candidates whose ballot was observed, reporting information on these ballots matters. We find that, conditional on observed characteristics, the ballots which report at least one type of information for at least one candidate receive between 2.4 and 2.6 percentage points more than their counterparts. This advantage seems to be coming from reported information about political experience: if at least one of the candidates mentions such experience on the ballot, the pair gains between 3 and 3.2 percentage points more. Conversely, mentioning an occupation or printing a picture does not yield any electoral advantage. However, these effects cannot be interpreted as causal.

Table 7: Effect of incumbency

(A)	(1)	(2)	(3)
Woman First	-1.395*	-1.143	-1.533***
	(0.083)	(0.149)	(0.005)
Woman Incumbent	4.107***	2.933***	6.595***
	(4.72e-08)	(7.68e-05)	(2.13e-09)
Woman First * Woman Incumbent	-0.309	-0.728	0.988
	(0.761)	(0.480)	(0.546)
Observations	1,389	1,389	1,389
R-squared	0.431	0.419	0.435
(B)	(1)	(2)	(3)
Woman First	-1.941*	-2.016**	-1.400**
	(0.088)	(0.048)	(0.015)
Man Incumbent	5.036***	0.737	9.219***
	(6.90e-08)	(0.381)	(0.000)
Woman First * Man Incumbent	0.451	0.410	0.165
	(0.722)	(0.731)	(0.870)
Observations	1,389	1,389	1,389
R-squared	0.431	0.405	0.504
(C)	(1)	(2)	(3)
Woman First	-1.457***	-1.374**	-1.461*
	(0.010)	(0.018)	(0.058)
No Incumbent	-7.636***	-3.128***	-10.72***
	(0.000)	(0.003)	(0.000)
Woman First * No Incumbent	-0.834	-1.410	0.481
	(0.563)	(0.328)	(0.624)
Observations	1,389	1,389	1,389
R-squared	0.412	0.378	0.502
(D)	(1)	(2)	(3)
Woman First	-1.617**	-1.213	-1.819***
	(0.041)	(0.106)	(0.000)
Both Incumbents	5.574***	3.820***	7.083***
	(0.000)	(4.60e-07)	(3.47e-05)
Woman First * Both Incumbents	-0.159	-1.003	1.986
	(0.878)	(0.346)	(0.361)
Observations	1,389	1,389	1,389
R-squared	0.411	0.381	0.379
Incumbency definition	All	Mayor or muni. council.	Dep. Council.
Indiv. Controls	Y	Y	Y
Precinct characteristics	N	N	N
First letter of the woman's surname	N	N	N
Number of candidates	Y	Y	Y

OLS Regressions. Each column considers the right-wing candidates who are the only ones of their party in the precinct where they run. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. The treatment variable "Woman First" is interacted with different definitions of incumbency. Column (1) defines an incumbent as someone who, at the time of the election is either mayor, municipal councillor, departmental councillor, regional councillor or member of parliament. Column (2) defines an incumbent as someone who is either mayor or municipal councillor in the precinct. Column (3) defines an incumbent as someone who is departmental councillor. Panel (A) interacts the treatment with female incumbency status; panel (B) interacts the treatment with mal incumbency status; panel (C) interacts the treatment with a dummy equal to one if none of the candidates is an incumbent; panel (D) interacts the treatment with a dummy equal to one if both candidates are incumbents. All regressions control for the number of candidates, age of man and woman, socioprofessional categories of man and woman, political experience of man and woman. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 8: Effect of any information displayed on the ballot on discrimination against right-wing female candidates

Share of votes in the first round	(1)	(2)	(3)	(4)
Woman First	-4.788*	-6.014***	-6.098***	-5.404***
	(0.050)	(0.003)	(0.003)	(0.003)
Any Info. Ballot	-0.0484	-2.449	-2.611	-2.856
	(0.981)	(0.169)	(0.170)	(0.101)
Woman First # Any Info. Ballot	5.139*	7.870***	7.944***	7.102***
	(0.080)	(0.003)	(0.004)	(0.006)
Observations	166	166	166	166
R-squared	0.183	0.422	0.423	0.540
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of right-wing pairs of candidates for which we could observe the ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. The treatment variable "Woman First" is interacted with a variable indicating whether any information about any of the candidate is displayed on the ballot. Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

at least one information about the candidates is displayed. This result holds for all the specifications even after controlling for individual and locals characteristics.

In Tables 9 and 10 we analyse which type of information matters. Table 9 proposes the same type of analysis as in Table 8, but instead of interacting the treatment with a dummy indicating whether any of the candidates displays *any* information on the ballot, we interact it with three separate variables. In Panel (A), we interact the treatment with a dummy variable indicating whether any of the candidates displays information about its political experience. In Panel (B), the interaction variable is a dummy indicating whether any of the candidates displays any information about their occupation. In Panel (C), the interaction variable is a dummy indicating whether any of the candidates displays any picture of them. The results of these regressions show that the interaction is significant only in Panel (A): in other terms, the only type of information that appears to dampen discrimination is information about political experience of the candidates. To the contrary, information about the occupation of candidates or pictures of them do not significantly affect the magnitude of discrimination. Importantly, except for column 1, all estimates control for the actual incumbency status of candidates: our interpretation is therefore

that what matters is the public displaying of an information that is otherwise likely to be only partially known from the public. As a matter of comparison, the same regression on the same sample interacting the treatment with the actual incumbency status (rather than with the information displayed about political experience) and controlling for reported political experience on the ballot yields no significant interaction effect (Table 28 in Appendix).

Going forward, we analyse in Table 10 whether it is the information displayed by the male or the female candidates that dampen discrimination. This analysis is much more tentative as, as indicated above, information displayed by male and female candidates tends to be pooled: when one of the two candidates displays information, the probability that another candidate displays information is high. In the case of displayed political experience, as highlighted in Table 3, about 27% of observed ballots display information for male candidates and about 22% display information for female candidates. In Panel (A), we estimate the impact of displaying political experience of male candidates, while in Panel (B), we estimate the impact of displaying political experience of female candidates. In both cases the interaction effect is positive and significant, and it appears slightly higher for female candidates than for male candidates. In Panel (C), we interact the treatment simultaneously with displayed political experience of male and female candidates: in such a setting, the interaction coefficients are not significant at conventional levels (which is unsurprising as separate effects on male and female are identified for a small number of observations), but the magnitude and significance of interaction coefficients for displayed female political experience is higher than that of interaction coefficients for displayed male political experience.

In a nutshell, we have shown in this section that information matters through different channels. First, departements with higher newspaper circulation per inhabitant tend to display lower levels of discrimination. Second, pairs of candidates that display information about them on the ballot tend to suffer from a lower gender discrimination, especially when they display information on political experience. Discrimination thus tends to be lower where information about candidates is higher (and especially information about their political experience). Such results therefore suggest that discrimination is likely to be of statistical nature.

Table 9: Effect of different types of information displayed on the ballot on discrimination against right-wing female candidates

<b>(A) Information=Political Experience</b>	(1)	(2)	(3)	(4)
Woman First	-3.593 (0.119)	-5.060*** (0.008)	-5.093*** (0.008)	-4.756*** (0.007)
Political Exp. Info.	1.588 (0.439)	-1.642 (0.369)	-1.706 (0.368)	-2.345 (0.191)
Woman First # Political Exp. Info.	3.773 (0.188)	7.029** (0.0111)	7.061** (0.0118)	6.702*** (0.010)
Observations	166	166	166	166
R-squared	0.190	0.418	0.419	0.538
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(B) Information=Occupation</b>	(1)	(2)	(3)	(4)
Woman First	-2.367 (0.119)	-1.965 (0.144)	-1.984 (0.145)	-1.902 (0.136)
Occupation Info.	-7.131* (0.066)	-6.266 (0.154)	-6.271 (0.154)	-8.005** (0.027)
Woman First # Occupation Info.	0.996 (0.815)	4.786 (0.443)	4.713 (0.456)	6.653 (0.221)
Observations	166	166	166	166
R-squared	0.186	0.406	0.406	0.542
<b>(C) Information=Picture</b>	(1)	(2)	(3)	(4)
Woman First	-2.156 (0.168)	-1.098 (0.450)	-1.131 (0.444)	-0.896 (0.511)
Picture Info.	-3.727 (0.281)	1.094 (0.758)	1.062 (0.770)	0.741 (0.819)
Woman First # Picture Info.	2.935 (0.478)	-1.690 (0.703)	-1.564 (0.731)	-1.690 (0.701)
Observations	166	166	166	166
R-squared	0.161	0.390	0.390	0.516
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of right-wing pairs of candidates for which we could observe the ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). In Panel (A), it is interacted with a dummy indicating whether any of the candidates displays any information about its political experience. In Panel (B), it is interacted with a dummy indicating whether any of the candidates displays any information about their occupation. In Panel (C), it is interacted with a dummy indicating whether the ballot contains a picture of the candidates. Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values in parentheses. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 10: Effect of information on political experience on discrimination against right-wing candidates - Differential effect between male and female candidates

<b>(A) Political Exp. Info = Man</b>	(1)	(2)	(3)	(4)
Woman First	-3.544	-4.960***	-5.018***	-4.676***
	(0.115)	(0.008)	(0.008)	(0.008)
Political Exp. Info. (Man)	-1.947	-3.237	-3.565	-5.448**
	(0.396)	(0.205)	(0.199)	(0.017)
Woman First # Political Exp. Info. (Man)	3.966	6.992**	7.057**	6.658**
	(0.169)	(0.0134)	(0.0138)	(0.0124)
Observations	166	166	166	166
R-squared	0.200	0.416	0.417	0.541
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(B) Political Exp. Info = Woman</b>	(1)	(2)	(3)	(4)
Woman First	-3.830*	-4.795***	-4.845***	-4.426***
	(0.057)	(0.005)	(0.006)	(0.005)
Political Exp. Info. (Woman)	1.521	-2.456	-2.249	-0.519
	(0.504)	(0.363)	(0.420)	(0.819)
Woman First # Political Exp. Info. (Woman)	5.133*	7.554***	7.609***	6.957***
	(0.063)	(0.006)	(0.006)	(0.007)
Observations	166	166	166	166
R-squared	0.207	0.422	0.422	0.545
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(C) Political Exp. Info = Man and Woman</b>	(1)	(2)	(3)	(4)
Woman First	-3.767*	-5.253***	-5.314***	-4.928***
	(0.099)	(0.006)	(0.006)	(0.005)
Political Exp. Info. (Man)	0.197	-0.903	-1.232	-3.367
	(0.937)	(0.774)	(0.709)	(0.194)
Political Exp. Info. (Woman)	1.392	-1.491	-1.252	0.528
	(0.578)	(0.650)	(0.710)	(0.835)
Woman First # Political Exp. Info. (Man)	-0.337	2.481	2.532	2.685
	(0.925)	(0.540)	(0.540)	(0.458)
Woman First # Political Exp. Info. (Woman)	5.392	5.700	5.719	4.971
	(0.112)	(0.152)	(0.159)	(0.155)
Observations	166	166	166	166
R-squared	0.207	0.423	0.424	0.546
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of right-wing pairs of candidates for which we could observe the ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. "Woman first" represents treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). In Panel (A), it is interacted with a dummy indicating whether the male candidate displays information about his political experience. In Panel (B), it is interacted with a dummy indicating whether the female candidate displays information her political experience. In Panel (C), it is interacted with two dummies indicating respectively whether male and female candidates display political experience. Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 11: Effect of having a right-wing female candidate first on the ballot on abstention, blank votes and null votes

<b>(A) - Abstention Rate</b>	(1)	(2)	(3)	(4)
RW Woman First	0.00237 (0.436)	0.00301 (0.325)	0.00331 (0.293)	-0.000510 (0.828)
Observations	1,391	1,389	1,389	1,389
R-squared	0.105	0.153	0.210	0.634
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(B) - Blank and Null Votes</b>	(1)	(2)	(3)	(4)
RW Woman First	-0.00107 (0.193)	-0.00119 (0.145)	-0.00117 (0.174)	-0.000663 (0.451)
Observations	1,391	1,389	1,389	1,389
R-squared	0.415	0.448	0.470	0.552
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of precincts with only one right-wing candidate. In Panel (A), the outcome variable is the abstention rate in the precinct. In Panel (B), the outcome variable is the share of blank and null votes in the precinct. "RW Woman First" is a dummy equal to one if the right-wing female candidate is first on the ballot. Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates among the right-wing pair. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman within the right-wing pair. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 6 Where did the missing votes go?

In the previous sections, we have shown that right-wing pairs of candidates received less votes when the female candidate was listed first on the ballot. A related question is to understand where these lost votes went. A first hypothesis is that discriminatory voters eventually did not go to vote, leading to a differential abstention. This hypothesis cannot be ruled out, since each voter receives the ballots and electoral programs of the candidates at home. A second hypothesis is that voters who might have voted for the right-wing pair, had the male candidate been listed first, eventually cast blank or invalid ballots. Finally, discriminatory voters might instead have cast their ballot for another pair of candidates: in this case, we would expect an increase in the vote shares received by competing candidates.

Table 12: Effect of having a right-wing female candidate first on the vote shares of other candidates

<b>(A) - Votes over expressed votes</b>	(1)	(2)	(3)	(4)
RW Woman First	0.508*** (0.009)	0.360* (0.054)	0.402** (0.034)	0.334* (0.072)
Observations	4,333	4,321	4,321	4,321
R-squared	0.440	0.569	0.576	0.580
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(B) - Votes over registered voters</b>	(1)	(2)	(3)	(4)
RW Woman First	0.227** (0.046)	0.145 (0.175)	0.170 (0.114)	0.188* (0.066)
Observations	4,333	4,321	4,321	4,321
R-squared	0.442	0.565	0.572	0.585
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the opponents of the right-wing pair within the restricted sample of precincts including only one right-wing pair. The outcome variable is the share of votes received by the considered competing pair in the first round of the election. "RW Woman First" is a dummy equal to one if the right-wing female candidate is first on the ballot. In Panel (A) vote shares are expressed relatively to the total of expressed votes. In Panel (B), vote shares are expressed relatively to the total of registered voters. Column (1) controls only for the number of candidates in the precinct and the party of the considered competing pair. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates within the considered pair. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts level in parentheses. Standard errors are clustered at the *canton* level in parentheses. p-values in parentheses.  
\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

We test these hypotheses in Tables 11 and 12, focusing on precincts where only one right-wing candidate ran. Here again, we present results for different types of specifications. The results in Table 11 show that there exists no differential abstention between the precincts where the female right-wing candidate was listed first and those where she was listed second. Similarly, we do not find that the position of the right-wing female candidate on the ballot affects the share of blank or null votes. In both cases, this absence of effect holds irrespective of the specification.

In Table 12, we check whether the opponents of the right-wing candidate in these precincts received a higher share of votes in the first round when the right-wing female candidate was listed first on the ballot. In Panel (A), we regress the score of each competing pair of candidates on the treatment status of the right-wing pair. We find that when the right-wing female candidate was listed first on the ballot, the competing pairs had on average between 0.33 and 0.51 percentage

points higher vote shares. The effect is constantly significant at least at the 10% level. In panel (B), we reproduce the same specification, this time using the share of votes relative to the number of registered voters rather than to the number of expressed votes. Here also, we find that when a right-wing female candidate was listed first on the ballot, the other pairs of candidates had on average higher vote shares, by 0.14 to 0.23 percentage points. The large decrease in the value of the coefficients compared to Panel (A) reflects the low participation: the same number of votes is divided by a larger denominator, thus reducing the value of the coefficients. The latter are slightly less than in Panel (A), but remain significant or close to significant at the 10%.

Investigating further the patterns of vote transfers in such a setting is particularly challenging as the determinants of votes transfer are likely to be multiple and to be based both on the partisan affiliation of competing pairs and their perceived quality by voters. While in our setting the partisan affiliation of candidates is clearly observed, the perceived quality of competing candidates is likely to reflect a complex mix, involving both the order of appearance of candidates and their level of political experience. Even taking into account all of these factors, the vote transfers that we could expect would be hard to predict theoretically and difficult to estimate empirically, as it would imply interacting a large number of variables (both about the discriminated pairs and their opponents). These difficulties are further reinforced by the fact that we work on pairs of candidates rather than on a single candidate, which reinforces the risk of mixed unobserved components.

However, one hypothesis that can reasonably be tested is that partisan proximity is a driver of vote transfer. In particular, we would expect that, controlling for all the characteristics of pairs of candidates, those that benefit the most from the lost votes of discriminated right-wing pairs are those that are ideologically the closest from the latter. In Table 13, we analyze the dynamics of vote transfers by decomposing the effect across the different parties. In Panel (A), we consider the increase in votes obtained when a pair of candidates faces right-wing opponents with a woman listed first. Using the classification of political parties defined in Section 2.2, we do not find significant votes transfers at conventional level. Such a result is challenging to interpret. Indeed, one interpretation could be that voters that discriminate against right-wing candidates transfer their votes indifferently to any of the other parties. However, even though local elections are traditionally less polarized than national ones, this interpretation appears

Table 13: Vote transfers by party

<b>(A) - Baseline definition of right-wing</b>	XLeft	Left	XRight	
RW Woman First	0.0823 (0.843)	0.378 (0.370)	0.562 (0.147)	
Observations	865	1,697	1,317	
R-squared	0.359	0.389	0.219	
Indiv. Controls	Y	Y	Y	Y
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y
<b>(B) Alt. definition of right-wing (excl. Center)</b>	XLeft	Left	XRight	Center
RW Woman First	0.294 (0.476)	0.226 (0.586)	0.383 (0.307)	3.461** (0.048)
Observations	903	1,759	1,375	120
R-squared	0.348	0.390	0.230	0.549
Indiv. Controls	Y	Y	Y	Y
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the opponents of the right-wing pair within the restricted sample of precincts including only one right-wing pair. The outcome variable is the share of votes received by the considered competing pair in the first round of the election. "RW Woman First" is a dummy equal to one if the right-wing female candidate is first on the ballot. In Panel (A), right-wing candidates are defined according to the baseline definition. In Panel (B), the definition of right-wing candidates exclude candidates from center-right parties. All regressions control for the number of candidates, age of man and woman, socioprofessional categories of man and woman, political experience of man and woman. Standard errors are clustered at the *canton* level in parentheses. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

improbable as it would assume that voters value the presumed gender of the candidate over any partisan preferences. Another interpretation, which is likely to be more reasonable, is that the classification that we use to analyze such vote transfers implies groups of parties that are too distant from right-wing candidates to be predictive of a meaningful partisan transfer.

A clearer test consists in focusing on right-wing candidates that are not members of center-right parties, and to estimate whether center-right candidates received the votes lost by such right-wing candidates. Doing so, in Panel (B), we find a positive and significant vote transfer towards center-right candidates. The results overall suggest that when close substitutes to right-wing candidates were running, the transfer of votes benefited to them. In the light of the discussion above, we would ideally further interact this partisan vote transfer with the characteristics of the candidates. Nevertheless, as the effect is already identified on a small number of candidates cannot reasonably be implemented.

Overall, this section shows that the missing votes of right-wing candidates did not translate into an increase in abstention or an increase in the number of blank and null votes. To the contrary, it seems that voters turned to other pairs running on the day of the election, and more particularly to candidates whose partisan affiliation was close to theirs. However, while in our setting discrimination can be accurately estimated, vote transfers mechanisms are unlikely to be clearly identified: such an analysis reaches the limits of the mechanisms that our setting allows us to explore.

## 7 Conclusion

Among the numerous reasons which might explain why women are under-represented in politics, gender biases of voters are frequently considered as a potential candidate. While several pieces of research argue that gender-biases are unlikely to play a role, isolating such effects using actual electoral data can prove complicated, due to the presence of selection effects.

In this paper, we isolate gender-biases from selection effects using a natural experiment in France. Using the fact that the candidates of the *Départementales* elections of 2015 had to run for the first time by gender-balanced pairs, and considering that the order of the candidates on the ballot was determined by alphabetical order, we show that the gender of the first candidate

on the ballot is as good-as-random. This framework therefore allows us to disentangle selection effects and gender-biases, since we compare pairs of candidates which are on average similar, but which differ only in the order of male and female candidates on the ballot.

We detect a sizable gender bias affecting right-wing female candidates, due to voters who simultaneously misunderstood the electoral rules and discriminated against women. Overall, the right-wing pairs where the female candidate was listed first on the ballot saw their vote shares in the first round decrease by about 1.5 percentage points, and their probability of going to the second round or of winning the election in the first round decrease by 4 percentage points. The absence of evidence concerning the candidates of other parties does not necessarily imply that they are not affected by gender biases. Indeed, not detecting evidence of discrimination among other parties can be either explained by the fact that their voters had a better understanding of the electoral rules, or by the fact that they discriminated less. However, the presence of a discriminatory effect among right-wing candidates does not come as a surprise, given that right-wing parties have for long been fielding disproportionately more male than female candidates.

Our framework allows us to show that information plays a role in dampening discrimination. Using measures of access to information, both at the aggregate level (newspaper circulation) and at the ballot level (additional printed information), we show that discrimination is reduced when voters have access to more information, notably regarding the political experience of candidates, which suggests that the discrimination suffered by right-wing candidates is of statistical nature.

Finally, we show that the missing votes of right-wing candidates did not translate into an increase in abstention or an increase in the number of blank and null votes. Instead, the voters turned to the other candidates running on the day of the election, and more particularly to candidates that had a close partisan affiliation.

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## 8 Annex

### 8.1 Additional evidence on exogeneity of treatment

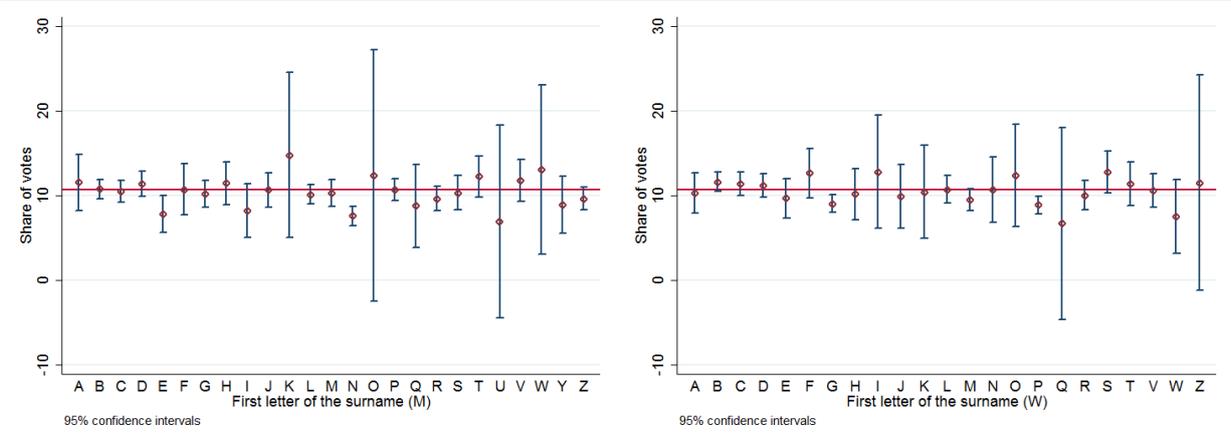
Table 14: Determinants of the treatment - local and individuals characteristics

Woman First	All	Restricted Samples			
		Extreme Left	Left	Right	Extreme Right
Incumbent (W)	0.0779 (0.121)	0.0522 (0.735)	0.0142 (0.903)	0.127 (0.283)	0.179 (0.302)
Incumbent (M)	-0.0157 (0.760)	0.109 (0.424)	0.0467 (0.728)	-0.197 (0.171)	-0.172 (0.213)
Age (W)	-0.000678 (0.764)	-0.00349 (0.596)	-0.00639 (0.338)	0.00573 (0.378)	-0.00932** (0.034)
Age (M)	-0.00138 (0.527)	0.00836 (0.182)	0.000668 (0.918)	-0.00699 (0.248)	-0.00115 (0.787)
Intermediary Profession (W)	0.264** (0.013)	-0.0453 (0.928)	0.699* (0.086)	0.362 (0.130)	0.327* (0.099)
Private Sector Employee (W)	0.150** (0.038)	0.159 (0.541)	0.389* (0.0905)	0.135 (0.456)	0.164 (0.246)
Liberal Occupation (W)	0.368*** (0.000)	0.192 (0.609)	0.464 (0.110)	0.343 (0.133)	0.663** (0.021)
Education Occupation (W)	0.0950 (0.285)	0.0864 (0.755)	0.405* (0.098)	-0.0720 (0.769)	0.0751 (0.759)
Civil Servant(W)	0.104 (0.240)	0.0148 (0.957)	0.385 (0.114)	-0.0465 (0.837)	0.398 (0.102)
Public Firm Worker (W)	0.0966 (0.429)	0.191 (0.560)	0.325 (0.344)	0.0193 (0.953)	-0.294 (0.406)
Retired (W)	0.0776 (0.367)	-0.251 (0.356)	0.530** (0.041)	-0.0917 (0.674)	0.520*** (0.003)
Intermediary Profession (M)	0.0197 (0.845)	0.378 (0.492)	0.681** (0.039)	0.0332 (0.884)	-0.415** (0.045)
Private Sector Employee (M)	0.0377 (0.660)	0.189 (0.494)	0.131 (0.592)	0.00580 (0.977)	-0.322* (0.082)
Liberal Occupation (M)	0.0589 (0.573)	0.105 (0.802)	0.286 (0.334)	-0.0840 (0.700)	-0.0941 (0.735)
Education Occupation (M)	-0.0424 (0.672)	0.0408 (0.890)	0.407 (0.110)	-0.198 (0.454)	-0.452* (0.072)
Civil Servant(M)	-0.0720 (0.474)	-0.197 (0.515)	0.281 (0.258)	-0.236 (0.340)	-0.339 (0.186)
Public Firm Worker (M)	-0.0641 (0.621)	-0.220 (0.521)	0.211 (0.511)	-0.301 (0.372)	-0.588 (0.175)
Retired (M)	0.0350 (0.704)	-0.122 (0.671)	0.219 (0.370)	0.136 (0.518)	-0.279 (0.174)
Unemployment rate in 2013	0.557 (0.301)	-0.780 (0.675)	0.840 (0.619)	1.348 (0.442)	-1.382 (0.351)
Average age of population	-0.0138 (0.138)	-0.0516* (0.065)	0.0362 (0.158)	-0.0105 (0.680)	-0.0121 (0.574)
Share of graduate diplomas	-0.150 (0.690)	-0.152 (0.887)	-0.0897 (0.935)	-0.231 (0.829)	0.329 (0.705)
Share of voters in rural areas	0.0714 (0.459)	0.341 (0.219)	-0.197 (0.428)	0.0166 (0.946)	0.0886 (0.681)
Share of Sarkozy votes in 2012	0.00152 (0.728)	-0.00451 (0.729)	0.00347 (0.786)	-0.0117 (0.343)	0.00585 (0.560)
XLeft	0.0911 (0.342)				
Left	0.0366 (0.683)				
Right	0.114 (0.206)				
XRight	0.0573 (0.532)				
Observations	9,018	1,187	1,334	1,389	1,882
Pseudo R2	0.00259	0.0146	0.00844	0.0107	0.0101
Chi2	33.81	23.33	14.87	19.81	25.88

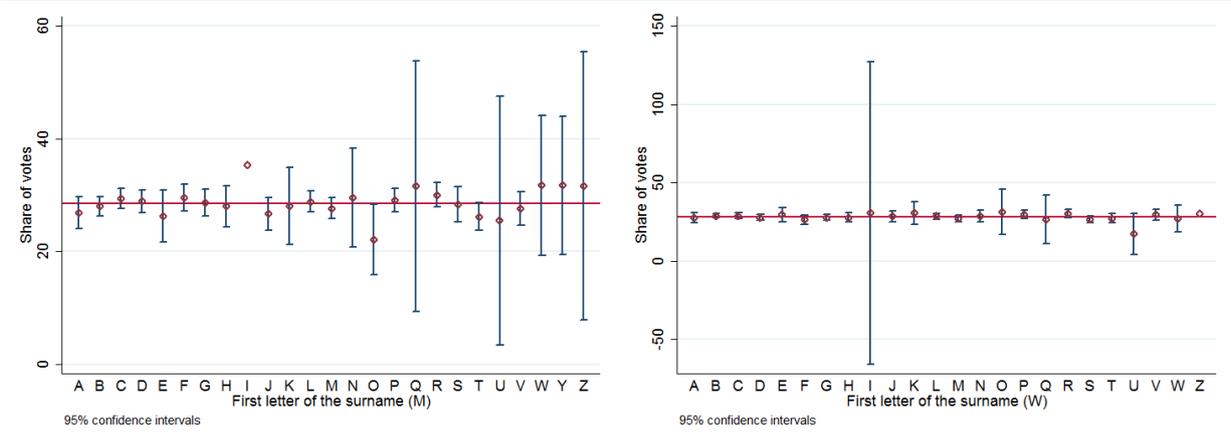
Multivariate logistic regressions. Column (1) considers all candidates. In Columns (2) to (5) each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome is a variable equal to one if the female candidate is first on the ballot and zero otherwise. The coefficients on male and female candidates' occupations are expressed considering farmers and other occupations as the reference modality. Standard errors are clustered at the precinct level in Column (1), and robust in Columns (2) to (5). p-value are in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Figure 3: Distribution of vote shares in the first round across first letter of candidates' surname (Restricted samples, Extreme-Left and Left)



(a) Extreme Left, First letter of the man's surname (b) Extreme Left, First letter of the woman's surname



(c) Left, First letter of the man's surname (d) Left, First letter of the man's surname

Figure 4: Distribution of vote shares in the first round across first letter of candidates' surname (Restricted samples, Right and Extreme-Right)

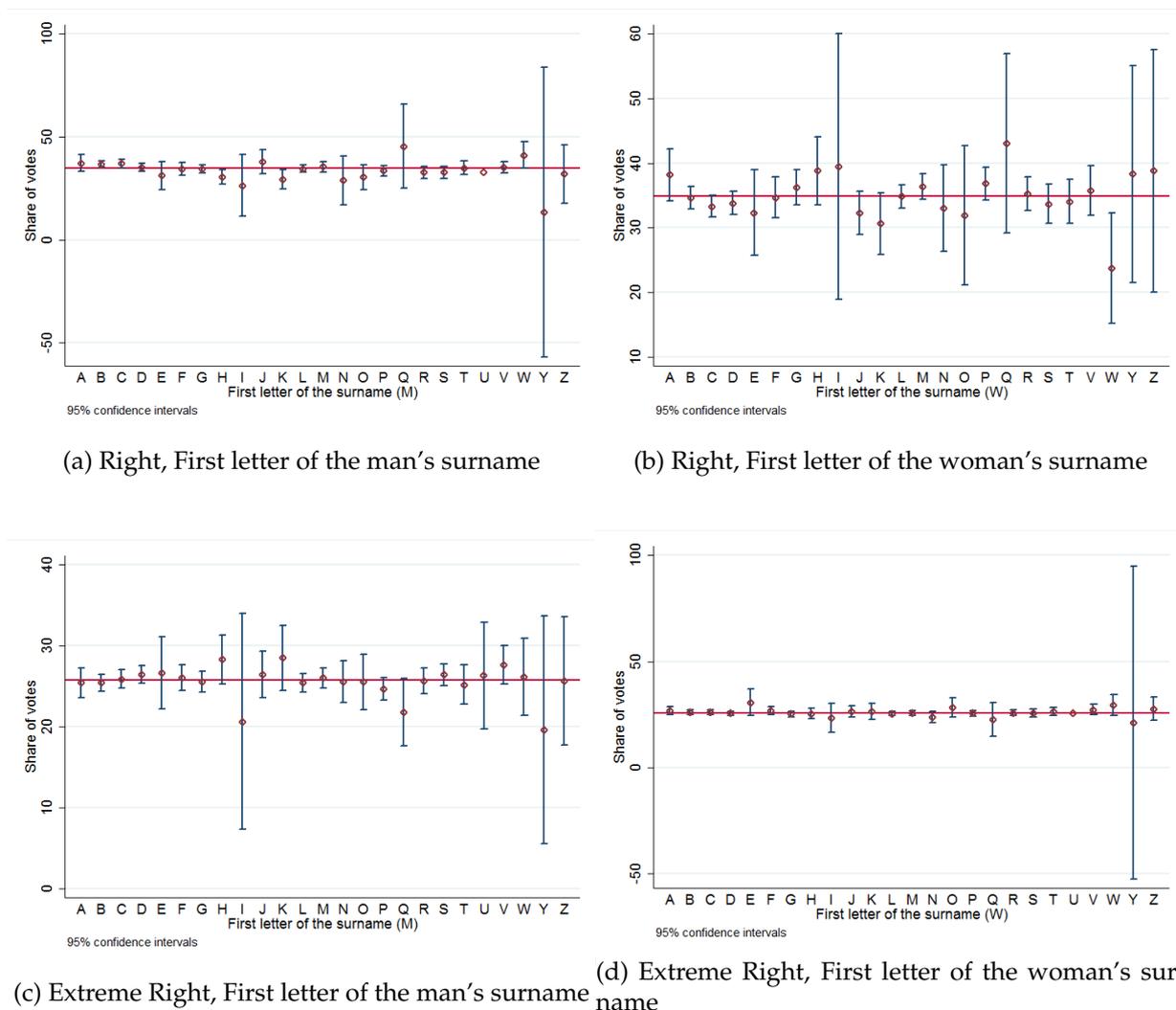


Table 16: Tests of equal distributions of surnames initials

P-Value	Restricted samples				
	All	Extreme-Left	Left	Right	Extreme-Right
KS	0.211	0.782	0.094*	0.855	0.377
Median	0.320	0.774	0.132	0.622	0.474
MWW	0.385	0.652	0.0546*	0.583	0.372

Test of equality of distributions. p-values of three tests of equal distributions: Kolmogorov-Smirnov (KS), non-parametric test of equality of medians (Median), and Mann-Whitney-Wilcoxon rank-sum test (MWW). The null hypothesis is that the distributions of first letters in the surnames is the same across male and female candidates. Column (1) considers all candidates. In Columns (2) to (5), each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 8.2 Robustness analysis

### 8.2.1 Robustness to specification

Table 17: OLS estimation on Full Sample

<b>(A) - No interaction</b>	(1)	(2)	(3)	(4)
Woman First	-0.117 (0.578)	-0.191 (0.303)	-0.172 (0.356)	-0.185 (0.413)
Observations	9,097	9,081	9,081	9,018
R-squared	0.399	0.538	0.543	0.549
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
First letter of the woman's surname	N	N	N	Y
Number of candidates	Y	Y	Y	Y
<b>(B) - Interaction with party</b>	(1)	(2)	(3)	(4)
Woman First	0.445 (0.365)	0.489 (0.322)	0.443 (0.377)	0.432 (0.393)
XLeft	-1.286*** (0.004)	-1.070** (0.015)	-1.041** (0.019)	-0.911** (0.038)
Left	12.08*** (0.000)	8.007*** (0.000)	7.988*** (0.000)	7.972*** (0.000)
Right	15.98*** (0.000)	11.04*** (0.000)	11.06*** (0.000)	11.08*** (0.000)
XRight	12.70*** (0.000)	14.88*** (0.000)	14.85*** (0.000)	14.99*** (0.000)
Woman First # XLeft	0.0483 (0.939)	-0.383 (0.530)	-0.351 (0.569)	-0.331 (0.586)
Woman First # Left	-0.143 (0.825)	-0.452 (0.465)	-0.388 (0.535)	-0.426 (0.490)
Woman First # Right	-1.510** (0.030)	-1.464** (0.025)	-1.389** (0.035)	-1.418** (0.028)
Woman First # XRight	-0.378 (0.548)	-0.313 (0.608)	-0.214 (0.730)	-0.158 (0.797)
Observations	9,097	9,081	9,081	9,018
R-squared	0.400	0.539	0.543	0.550
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
First letter of the woman's surname	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. All columns consider the full population of candidates. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Panel (A) presents the treatment effect on the full population. Panel (B) interacts the treatment with the party of the candidates (the reference candidates are therefore those who are neither affiliated to Extreme Left, Left, Right or Extreme Right party). Column (1) controls only for the number of candidates in the precinct and the party of each candidate. Column (2) also controls for age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Standard errors are clustered at the precinct level in parentheses. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 18: OLS estimation on the full population of right-wing candidates

<b>Share of votes in the first round</b>	(1)	(2)	(3)	(4)
Woman First	-0.863* (0.066)	-0.822** (0.044)	-0.767* (0.064)	-0.510 (0.300)
Observations	2,714	2,712	2,712	2,679
R-squared	0.319	0.492	0.506	0.530
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
First letter of the woman's surname	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. All columns consider the full population of right-wing candidates. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Panel (A) presents the treatment effect on the full population. Panel (B) interacts the treatment with the party of the candidates (the reference candidates are therefore those who are neither affiliated to Extreme Left, Left, Right or Extreme Right party). Column (1) controls only for the number of candidates in the precinct and the party of each candidate. Column (2) also controls for age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Standard errors are clustered at the precinct level in parentheses. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 19: Effect on votes in the first round, controlling for average characteristics of opponents

<b>Share of votes in the first round</b>	XLeft	Left	Right	XRight
Woman First	0.0908 (0.821)	0.216 (0.689)	-1.083** (0.034)	0.418 (0.265)
Observations	1,187	1,333	1,387	1,882
R-squared	0.474	0.525	0.594	0.400
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
First letter of the woman's surname	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y
Mean of opponents' characteristics	Y	Y	Y	Y

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Each regression controls for the number of candidates in the precinct, the interacted age of man and woman, interacted socioprofessional categories of man and woman, interacted political experience of man and woman, the first letter of the woman's surname, and the average of each of these variables among the competing candidates in the precinct. It also controls for the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 20: Effect on share of votes in the first round controlling for Sarkozy's vote shares in 2012

	XLeft	Left	Right	XRight
Woman First	-0.102 (0.801)	-0.200 (0.702)	-0.967* (0.052)	0.363 (0.324)
Observations	1,187	1,334	1,389	1,882
R-squared	0.486	0.527	0.616	0.416
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
First letter of the woman's surname	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y
Share Sarkozy 2012	Y	Y	Y	Y
<b>Mean of Outcome Variable</b>	<b>10.66</b>	<b>28.44</b>	<b>34.91</b>	<b>25.79</b>

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). This Table extends Table 4 adding the share of votes received by Nicolas Sarkozy in the first round of the 2012 presidential election to the controls of Panel (D). Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 8.2.2 Robustness to definition of parties

Table 21: Alternative definitions of parties

(A)	Left Alt 1	Left Alt 2	Left Alt 3	Left Alt 4	Right Alt 1	Right Alt 2	Center-Right	Non-class.
Woman First	0.265 (0.796)	-0.0208 (0.973)	0.709 (0.532)	-0.716 (0.240)	-2.049*** (0.000)	-1.726*** (0.001)	-1.091 (0.522)	1.076 (0.259)
Observations	524	1,082	438	911	1,453	1,568	208	232
R-squared	0.168	0.147	0.140	0.195	0.291	0.280	0.368	0.549
Indiv. Controls	N	N	N	N	N	N	N	N
Precinct characteristics	N	N	N	N	N	N	N	N
First letter of the woman's surname	N	N	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y
(B)	Left Alt 1	Left Alt 2	Left Alt 3	Left Alt 4	Right Alt 1	Right Alt 2	Center-Right	Non-class.
Woman First	-0.174 (0.842)	-0.198 (0.720)	-0.0604 (0.951)	-0.452 (0.403)	-1.666*** (0.001)	-1.395*** (0.003)	-0.429 (0.796)	1.216 (0.152)
Observations	524	1,082	438	911	1,451	1,566	208	232
R-squared	0.427	0.325	0.382	0.371	0.413	0.408	0.543	0.702
Indiv. Controls	Y	Y	Y	Y	Y	Y	Y	Y
Precinct characteristics	N	N	N	N	N	N	N	N
First letter of the woman's surname	N	N	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y
(C)	Left Alt 1	Left Alt 2	Left Alt 3	Left Alt 4	Right Alt 1	Right Alt 2	Center-Right	Non-class.
Woman First	-0.469 (0.609)	-0.238 (0.674)	-0.883 (0.405)	-0.419 (0.458)	-1.525*** (0.003)	-1.256** (0.010)	-0.964 (0.650)	1.587* (0.094)
Observations	524	1,082	438	911	1,451	1,566	208	232
R-squared	0.495	0.392	0.473	0.437	0.443	0.434	0.620	0.796
Indiv. Controls	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N	N	N	N	N	N
First letter of the woman's surname	N	N	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Left Alt 1 adds the Communist, Front de Gauche and Parti de Gauche candidates to the baseline definition of Left Parties. Left Alt 2 adds the Green candidates to the baseline definition of the Left Parties. Left Alt 3 is the union of Left Alt 1 and Left Alt 2. In Left Alt 4, we consider baseline Left candidates which face at least one Extreme Left Candidates (defining Extreme Left in this case as Communist, Front de Gauche or Parti de Gauche). Right Alt 1 removes the centrist parties from the baseline definitions of the Right parties. Right Alt 2 further removes to Right Alt 1 candidates from Debout la France. Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for age, socioprofessional categories and political experience of male and female candidates. Panel (C) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 22: Sample restrictions on right-wing

(A)	RW excl. Center	RW excl. Center & no Center opp.	RW excl. Center & no XR opp.
Woman First	-2.049*** (0.000)	-1.948*** (0.000)	-2.909 (0.337)
Observations	1,453	1,334	80
R-squared	0.291	0.277	0.605
Indiv. Controls	N	N	N
Precinct characteristics	N	N	N
First letter of the woman's surname	N	N	N
Number of candidates	Y	Y	Y
(B)	RW excl. Center	RW excl. Center & no Center opp.	RW excl. Center & no XR opp.
Woman First	-1.666*** (0.000)	-1.641*** (0.001)	-6.416** (0.047)
Observations	1,451	1,332	79
R-squared	0.413	0.399	0.725
Indiv. Controls	Y	Y	Y
Precinct characteristics	N	N	N
First letter of the woman's surname	N	N	N
Number of candidates	Y	Y	Y
(C)	RW excl. Center	RW excl. Center & no Center opp.	RW excl. Center & no XR opp.
Woman First	-1.525*** (0.003)	-1.581*** (0.002)	-6.721 (0.238)
Observations	1,451	1,332	79
R-squared	0.443	0.434	0.828
Indiv. Controls	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N
First letter of the woman's surname	N	N	N
Number of candidates	Y	Y	Y

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). In Column (1), we consider right-wing candidates excluding center-right candidates (i.e. this estimate is the same as the Right Alt 1 estimate in Table 21. Column (2) considers the same candidates as in Column (1) but excluding those that do not face a center-right opponent. Column (3) considers the same candidates as in Column (1) but excluding those that do not face an extreme-right candidate. Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for age, socioprofessional categories and political experience of male and female candidates. Panel (C) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 23: Weighted regressions on right-wing candidates

	(1)	(2)	(3)	(4)
Woman First	-1.989*** (0.002)	-1.481*** (0.008)	-1.501*** (0.007)	-1.056* (0.078)
Observations	1,391	1,389	1,389	1,389
R-squared	0.208	0.357	0.400	0.493
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
First letter of the woman's surname	N	N	N	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions weighted by the number of registered voters in the precinct. Each subsample considers only the right-wing candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is the share of votes received by each pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Column (4) adds to these controls the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values between parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

### 8.2.3 Robustness to incumbency status of male and female candidates

Table 24: Separate samples of incumbency

(A)	$Inc_F = 0$	$Inc_M = 0$	$Inc_F = 1$	$Inc_M = 1$	$Inc_F = 0 \& Inc_M = 0$	$Inc_F = 1 \& Inc_M = 1$
Woman First	-2.104** (0.015)	-2.550** (0.025)	-1.828*** (0.005)	-1.368** (0.017)	-3.265** (0.014)	-1.759*** (0.009)
Observations	535	293	856	1,098	193	756
R-squared	0.313	0.135	0.265	0.302	0.107	0.280
Indiv. Controls	N	N	N	N	N	N
Precinct characteristics	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y
(B)	$Inc_F = 0$	$Inc_M = 0$	$Inc_F = 1$	$Inc_M = 1$	$Inc_F = 0 \& Inc_M = 0$	$Inc_F = 1 \& Inc_M = 1$
Woman First	-1.342* (0.099)	-2.477** (0.026)	-1.644*** (0.009)	-1.370** (0.014)	-3.130** (0.023)	-1.715** (0.010)
Observations	533	292	856	1,097	192	756
R-squared	0.429	0.259	0.324	0.368	0.249	0.331
Indiv. Controls	Y	Y	Y	Y	Y	Y
Precinct characteristics	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y
(C)	$Inc_F = 0$	$Inc_M = 0$	$Inc_F = 1$	$Inc_M = 1$	$Inc_F = 0 \& Inc_M = 0$	$Inc_F = 1 \& Inc_M = 1$
num_type	-0.965 (0.249)	-2.454* (0.059)	-1.651** (0.012)	-1.513*** (0.008)	-3.563** (0.019)	-1.778** (0.011)
Observations	533	292	856	1,097	192	756
R-squared	0.513	0.355	0.372	0.413	0.451	0.381
Indiv. Controls	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N	N	N	N
Number of candidates	Y	Y	Y	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of right-wing pairs of candidates for which we could observe the ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot).  $Inc_F$  indicates whether the female candidate is an incumbent and  $Inc_M$  indicates whether the male candidate is an incumbent. Panel (A) controls for the number of candidates in the precinct. Panel (B) also control for the number of candidates in the precinct, the age, socioprofessional categories and political experience of male and female candidates. Panel (C) controls for the same variables, but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Robust standard errors. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

### 8.3 Additional results on probability of being elected

Table 25: Effect on probability of being elected

<b>(A)</b>	XLeft	Left	Right	XRight
Woman First	0.634 (0.590)	-1.568 (0.549)	-4.462* (0.088)	-0.147 (0.797)
Observations	1,188	1,341	1,391	1,893
R-squared	0.008	0.003	0.044	0.011
Indiv. Controls	N	N	N	N
Precinct characteristics	N	N	N	N
First letter of the woman's surname	N	N	N	N
Number of candidates	Y	Y	Y	Y
<b>(B)</b>	XLeft	Left	Right	XRight
Woman First	0.166 (0.904)	-1.581 (0.617)	-4.016 (0.199)	0.580 (0.415)
Observations	1,187	1,334	1,389	1,882
R-squared	0.219	0.189	0.244	0.135
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
First letter of the woman's surname	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y
<b>Mean of the Outcome Variable</b>	4.377	35.347	57.153	1.585

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome variable is a dummy variable indicating whether the pair of candidates eventually won the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for interacted age of man and woman, interacted socioprofessional categories of man and woman, interacted political experience of man and woman, the first letter of the woman's surname, as well as the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Robust standard errors. p-values between parentheses. Coefficients are multiplied by 100.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 8.4 Descriptive evidence on observed ballots

Table 26: Determinants of ballot availability

Ballot Availability	All	Restricted Samples			
		Extreme Left	Left	Right	Extreme Right
Woman First	-0.0375 (0.555)	-0.0314 (0.868)	-0.0855 (0.619)	-0.156 (0.356)	-0.0233 (0.872)
Previous Political Exp. (W)	-0.123 (0.102)	0.102 (0.665)	-0.0884 (0.614)	-0.0960 (0.583)	0.0667 (0.797)
Previous Political Exp. (M)	-0.0714 (0.338)	-0.0828 (0.694)	-0.140 (0.447)	0.0699 (0.744)	0.0497 (0.810)
Age (W)	-0.00331 (0.311)	-0.00988 (0.319)	-0.0192* (0.060)	-0.00130 (0.892)	0.00307 (0.650)
Age (M)	-0.00793** (0.013)	-0.00872 (0.402)	-0.0292*** (0.002)	-0.00517 (0.573)	0.00226 (0.726)
Intermediary Profession (W)	-0.168 (0.342)	-1.207 (0.266)	-0.712 (0.376)	-0.168 (0.619)	-0.277 (0.388)
Private Sector Employee (W)	0.164 (0.146)	-0.453 (0.233)	-0.113 (0.757)	-0.546** (0.0370)	0.0902 (0.676)
Liberal Occupation (W)	0.310** (0.0380)	0.661 (0.172)	-0.0131 (0.978)	0.00932 (0.976)	0.201 (0.627)
Education Occupation (W)	0.293** (0.025)	-0.213 (0.586)	0.416 (0.264)	0.0748 (0.821)	0.289 (0.413)
Civil Servant(W)	0.0590 (0.664)	-0.196 (0.611)	0.475 (0.194)	-0.593* (0.092)	-0.215 (0.587)
Public Firm Worker (W)	0.273 (0.127)	-0.417 (0.421)	0.318 (0.521)	-0.116 (0.802)	0.271 (0.570)
Retired (W)	0.0221 (0.870)	-0.499 (0.228)	0.498 (0.214)	-0.638* (0.062)	-0.119 (0.660)
Intermediary Profession (M)	0.353** (0.017)	0.902 (0.247)	-0.616 (0.236)	0.0326 (0.924)	1.118*** (0.006)
Private Sector Employee (M)	0.245* (0.0581)	0.754 (0.102)	-0.342 (0.316)	-0.0367 (0.902)	0.791** (0.041)
Liberal Occupation (M)	0.146 (0.366)	0.817 (0.192)	-0.0660 (0.872)	-0.109 (0.736)	0.862* (0.086)
Education Occupation (M)	0.159 (0.290)	-0.379 (0.481)	-0.273 (0.446)	-0.137 (0.728)	1.530*** (0.000)
Civil Servant(M)	0.188 (0.214)	0.135 (0.794)	-0.364 (0.305)	0.202 (0.575)	1.342*** (0.003)
Public Firm Worker (M)	0.357* (0.0566)	0.234 (0.683)	-0.0940 (0.830)	-0.214 (0.689)	1.084 (0.102)
Retired (M)	0.0404 (0.779)	0.293 (0.569)	-0.309 (0.408)	-0.126 (0.684)	0.762* (0.0693)
Left	0.0812 (0.527)				
Right	-0.00155 (0.990)				
XRight	-0.179 (0.179)				
XLeft	-0.149 (0.299)				
R2_Adj	0.0102	0.0369	0.0388	0.0148	0.0175
Chi2	67.13	30.88	39.82	16.11	24.55
Observations	9,081	1,187	1,341	1,389	1,883

Logistic Regressions. Column (1) considers all candidates. In Columns (2) to (5) each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run. The outcome is a variable equal to one if we observe the ballot and zero otherwise. The coefficients on male and female candidates' occupations are expressed considering farmers and other occupations as the reference modality. Standard errors are clustered at the precinct level in Column (1), and robust in Columns (2) to (5). p-value are in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 27: Ballots with reported information gain more votes

<b>(A) - Full Sample of available ballots</b>	(1)	(2)	(3)	(4)
Any Info.	2.669*** (9.96e-05)			
Photo Info.		1.435 (0.150)		
Political Exp. Info.			3.318*** (1.02e-05)	
Occupation Info.				-0.811 (0.466)
Observations	1,149	1,149	1,149	1,149
R-squared	0.558	0.552	0.561	0.551
Indiv. Controls	Y	Y	Y	Y
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y
<b>(B) - Full Sample of available ballots</b>	(1)	(2)	(3)	(4)
Any Info.	2.439*** (0.000)			
Photo Info.		1.368 (0.188)		
Political Exp. Info.			3.083*** (8.98e-05)	
Occupation Info.				-0.968 (0.400)
Observations	1,149	1,149	1,149	1,149
R-squared	0.578	0.573	0.580	0.572
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y
<b>(C) - Full Sample of available ballots</b>	(1)	(2)	(3)	(4)
Any Info.	2.504*** (0.000)			
Photo Info.		1.406 (0.187)		
Political Exp. Info.			3.191*** (5.50e-05)	
Occupation Info.				-0.921 (0.421)
Observations	1,148	1,148	1,148	1,148
R-squared	0.580	0.574	0.582	0.574
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y

OLS Regressions. Each column considers the full sample of candidates for which we could observe a ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. Panel (A) controls for the number of candidates in the precinct, as well as the age, socioprofessional categories, political experience of male and female candidates and political affiliation. Panel (B) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Panel (C) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree and the share of voters living in rural areas within the precincts. Standard errors are clustered at the precinct level. p-values in parentheses. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Table 28: Effect of incumbency controlling for reported political experience

<b>Political Experience</b>	(1)	(2)	(3)
Woman First	-5.290 (0.176)	-3.983 (0.288)	-5.638 (0.152)
Total Incumbents	3.139 (0.333)	3.379 (0.239)	5.307* (0.0651)
Woman First#Total Incumbents	5.025 (0.244)	3.296 (0.430)	6.339 (0.160)
Observations	166	166	166
R-squared	0.235	0.378	0.585
Indiv. Controls	N	Y	Inter.
Precinct characteristics	N	N	N
Number of candidates	Y	Y	Y

OLS Regressions. Each column considers the restricted sample of right-wing pairs of candidates for which we could observe the ballot. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. "Woman first" represents the treatment variable (i.e. a dummy equal to one if the female candidate is first on the ballot). Column (1) controls only for the number of candidates in the precinct. Column (2) also controls for the age, socioprofessional categories and political experience of male and female candidates. Column (3) controls for the same variables but interacts the age of man and woman, the socioprofessional categories of man and woman, and the political experience of man and woman. Robust standard errors. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 8.5 Performance of right-wing female candidates in earlier *cantonaes* elections

Table 29: Vote shares of right-wing female candidates in previous *cantonaes* elections

<b>Years of election</b>	2001-2011	2001	2004	2008	2011
Right-wing	18.04*** (0.000)	24.79*** (0.000)	22.04*** (0.000)	20.22*** (0.000)	14.00*** (0.000)
Female	-2.174*** (0.000)	-1.803*** (0.000)	-1.474*** (0.000)	-2.056*** (0.000)	-2.110*** (0.000)
Right-wing * Female	-1.741*** (0.000)	-1.462* (0.073)	-2.489*** (0.000)	-0.304 (0.691)	-0.838 (0.218)
Observations	42,684	11,501	12,302	8,520	10,361
R-squared	0.521	0.522	0.513	0.552	0.458

OLS Regressions. In each column, the outcome variable the share of votes of candidates in the first round of *cantonaes* elections, controlling for the number of candidates in the precinct and the exact label of the candidate. "Female" indicates the considered candidate is a woman, and "Right Wing" indicates that the candidate's partisan affiliation belongs to a right-wing party. In the first column, we also control for precinct fixed effect and year fixed effects. Standard errors are clustered at the precinct level. p-values in parentheses.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$