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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-bias 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 is 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, who receive about 1.5 points lower shares of vote when the female candidate appears first on the ballot. The missing votes prevented some pairs of candidates from being elected. Using the fact that the candidates can (but do not have to) report additional information about themselves on the ballot, we show that this discrimination is likely to be statistical, since the most affected women are those running in pairs which do not report any information.

Keywords: Political Economy; Gender Discrimination; Voting Behavior

JEL Classifications: P16; J16; D72

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* [1] 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). Upon casting their ballot, voters could only opt for one of the different pairs of candidates, so that for every pair, each male and female candidate 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: this order determined only the place of the candidate's name on the ballot. As we argue, such a setting yields an as-good-as-random allocation of the order of gender on the ballot, and allows us to explore whether pairs where the woman appears first on the ballot have different electoral outcomes than pairs where the man appears first.

The rationale behind this test is that, although the order of appearance of the candidates on the ballot does not have any impact on the subsequent prerogatives attributed to the candidates, some voters may mistakenly have thought that the first candidate would be the "main" candidate. Indeed, since voters were typically used to voting for a single candidate and a substitute, the new rules are unlikely to have been fully understood by everyone. As the French statistical institute IFOP acknowledged some weeks before the election: "These elections were characterized by insufficient information", and "the introduction of pairs of candidates unsettled long-established landmarks" in the mind of voters (IFOP (2015)). Therefore, any observed difference

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[1]The *Département* is a French territorial unit gathering numerous competences in terms of schooling, public infrastructures, culture, sports.

between pairs with a male or female candidate listed on the first position would mean that we observe two phenomena. First, limited attention from some voters, as defined by DellaVigna (2009). Indeed, because the fates of both candidates on a ballot are tied, if all voters knew perfectly the rules of the elections, we would not find any treatment effect. Secondly, a pure gender bias from these voters.

The identification of this bias comes from several particularly interesting features of our setting. First, the number of male and female candidates are exactly identical - in order to enforce strict parity in local councils. Secondly, while the characteristics of male and female candidates are on average different, candidates characteristics do not predict whether the male or the female candidate appears first on the ballot. The effect we measure is therefore unlikely to be affected by selection biases, since it consists in comparing whether identical pairs on average perform differently when the male or the female candidate is 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 distribution 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 shares of vote during the first round, while on average this was not the case of pairs from other parties. These effects substantially affected the outcome of the election: indeed, the affected pairs were 4 points less likely to go to the second round or to win the election.

This setting not only allows to identify pure discrimination, but also to characterize the type of discrimination at stake. Discrimination is often viewed as being either taste-based or statistical. In the first case, voters dislike voting for female candidates whatever their characteristics or the information they have about them. In the second case, voters apply stereotypes on women candidates because of a lack of information about the characteristics of the candidates. We argue that, in our setting, our treatment effect reflects statistical rather than taste-based discrimination against female candidates. To identify it, we follow a methodology similar to the one developed by Altonji and Pierret (2001) and exploit a unique feature of the French electoral law, which

states that the candidates can report additional information about themselves on the ballot - such as their political experience, age, occupation, or picture. Comparing treatment effects between ballots with reported information and ballots without any information, we show that, for the right-wing pairs, discrimination disappears when information about the candidates is displayed.

We show that these missing votes do 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. However, the competing pairs with a female candidate listed first did not receive more votes than others. Such a result stacks the desk against our interpretation of the results as reflecting statistical rather than taste-based discrimination. Indeed, if our result was driven by taste-based discrimination, we should have observed that pairs of candidates with a male candidate listed first benefited more from the discrimination against right-wing women.

Finally, we explore two different types of heterogeneity. First, we show that discrimination does not depend directly on the incumbency status of the candidates. Assuming that these characteristics are a proxy for candidates' quality, this alleviates the concern that the results are directly driven by differences of quality between male and female candidates. Secondly, we test whether discrimination depends on the characteristics of the precincts. We show that, while electoral discrimination does not vary with the age, unemployment rate and level of education of the population, it is greater in areas with high gender discrimination on the labor market, as measured by the unexplained component of a Oaxaca-Blinder decomposition of wage gaps at the local level[2].

These results bear important implications for the public debate around electoral discrimination. First of all, while our results show discrimination against right-wing female candidates, it does not imply that right-wing voters are more prejudiced against women than voters from other parties. Indeed, the presence of limited attention is necessary for the identification of discrimination. Not observing discrimination against the female candidates of other parties can simply indicate that they are less subject to the limited attention bias. Secondly, since the amount of information available about the candidates on the ballot seems to play an important role on the

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[2]Our results therefore reach a conclusion close to Le Barbanchon and Sauvagnat (2018) using a different methodology and a different set of election.

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outcome of the election, it calls for a more general reflexion about a potential standardization of the ballots' layout. Finally, since electoral discrimination seems to be higher in places with a greater gender discrimination on the labor market, policies aiming at reducing gender biases in politics are likely to be more effective if coordinated with policies on other markets.

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. (2017b), 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)). 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))[3].

Secondly, our study is among a small group of studies causally identifying statistical discrimination in politics in a real-world setting. Understanding the determinants of gender discrimination is of particular importance since women in office are likely to behave differently than men in office (Chattopadhyay and Duflo (2004), Ferreira and Gyourko (2014), Brollo and Troiano (2016)). The debate over whether discrimination involves discriminatory tastes (Becker (1957)) or im-

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[3]In fact, a large stream of literature using various methodological tools finds weak evidence of gender discrimination from voters : analyses of aggregate votes generally found that male and female candidates have equal success rates in elections, thus arguing that voters do not have gender biases (Darcy and Schramm (1977), Seltzer et al. (1997), McElroy and Marsh (2009)). Some studies even argue that women might have an electoral advantage compared to men (Black and Erickson (2003), Borisyuk et al. (2007)), and that after their first election, they are at least as likely to be reelected as men (Shair-Rosenfield and Hinojosa (2014)). Milyo and Schosberg (2000) even argue that the barriers to entry faced by women makes female incumbents of higher quality than male incumbents, resulting in an advantage for female incumbents. On the other hand, several studies argue that voter biases are marginal compared to partisan preferences (Dolan (2004), Dolan (2014), Hayes and Lawless (2016)).

perfect information (Phelps (1972), Arrow et al. (1973)) is a long-standing one. Current evidence on gender-discrimination in politics vastly points towards the existence of statistical discrimination. Numerous survey studies show that different types of individuals have different preferences over female politicians: McDermott (1998) and Burrell (1995) find that women are more likely to prefer female candidates, while Dolan (1998) finds that minorities and elderly are more likely to vote for women. McDermott (1997) argues that liberal voters are more likely to prefer female candidates. Such preferences are likely to be driven by gender stereotypes (Koch (2002)). In particular, in a context of low information, the gender of the candidate can be interpreted by the voters as signals about the ideology of the candidates: McDermott (1998) shows that female candidates are typically perceived as more liberal and more dedicated to honest government. Evidence from lab experiments also tend to point the existence of different mechanisms leading to statistical discrimination. Leeper (1991) shows that even when women candidates emit "masculine" message, voters attribute them "feminine" characteristics. Huddy and Terkildsen (1993) show that gender-based expectations over policies were more related to gender-traits stereotypes than to gender-beliefs stereotypes. King and Matland (2003) show that biases against women are likely to depend on partisan preferences, while Mo (2015) shows that both explicit and implicit attitudes against women shape the probability of voting for female candidates.

However, very few studies managed to propose causal identifications of discrimination in politics using natural experiments. Most of the studies on gender in politics rely primarily on aggregate data, surveys or laboratory experiments, which are problematic for several reasons. 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, such as her gender (Huddy et al. (1997), Flores-Macias and Lawson (2008), Pino (2017), Benstead (2013)), religion (Blaydes and Gillum (2013)) or language (Lee and Pérez (2014)). Finally, while laboratory experiments allow to disentangle more accurately the mechanisms leading to potential gender-biases, they are hardly likely to represent real-world election settings.

By overcoming these issues, natural experiments are particularly appealing. Discrimination on the labor market has been plausibly identified through a vast range of field and natural experiments, involving audit and correspondence studies, and the precise mechanisms behind observed discrimination have been extensively discussed (see, among others, Bertrand and Mullainathan (2004), Bertrand et al. (2005), Charles and Guryan (2008) , and Bertrand and Duflo (2017) for a survey). Recent developments of big data also have allowed to plausibly identify statistical discrimination on the housing market (Laouénan and Rathelot (2017)). 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. However, recent studies managed to exploit natural experiments and to causally identified discrimination from voters - mostly in a statistical way. Bhavnani (2009), Beaman et al. (2009) and De Paola et al. (2010) suggest that reserved seats for women in office is an efficient way of reducing gender stereotypes and statistical discrimination. Relatedly Pino (2017) shows that women living in environments emphasizing traditional gender roles are less likely to vote for women[4].

Finally, our analysis provides evidence of limited attention from voters. Since the seminal work of Simon (1955), various pieces of research - coming especially from laboratory experiments - suggested that attention is a scarce resource and that individuals make decisions using only part of the available information (see DellaVigna (2009) for a survey). Voters might themselves be myopic, punishing or rewarding incumbents for what happens shortly before the election (Achen and Bartels (2004)), and replacing information about a whole electoral term (which might be more difficult to access) by easy-to-grasp information about the last year in office (Healy and Lenz (2014)). However, to the best of our knowledge, few studies provided evidence as regard to whether individuals actually know the rules of the election when they cast their ballot. By focusing on a type of discrimination which is possible only because of limited attention of the voters, we therefore show that a non-negligible part of them were subject to limited attention concerning the rules of the election [5]. We therefore also contribute to a recent stream of research showing how ballot layout can influence voters' decision. Recent evidence showed that minor

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[4]To the best of our knowledge, only one study identified taste-based discrimination in an electoral setting (Broockman and Soltas (2017), on racial discrimination in Republican primary elections in the United States. Another field where gender-biases have been explored through the lens of natural experiments is the field of academic recruitment - see Bagues et al. (2016) for example.

[5]Whether this limited attention is due to differential costs of acquiring electoral information regarding the electoral rules is left for further research.

candidates are likely to perform better when their name is located close to the name of a major candidate (Shue and Luttmer (2009)), or when it is listed at the top of the ballot (Ho and Imai (2006), Ho and Imai (2008) among others). Relatedly, the number of decisions to make on a ballot can induce "choice fatigue", which substantially affects abstention (Augenblick and Nicholson (2015)). Because our identification relies upon ballot order effects, it therefore reasserts that limited attention concerning the rules of an election can play a key role on aggregate outcomes. From this standpoint, this paper is to the best of our knowledge among the first to highlight the link between limited attention and discrimination in politics[6].

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 selection into the treatment is unlikely. Section 3 describes our estimation strategy. Section 4 gathers our main empirical results. Section 5 studies potential channels for our results and Section 6 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 councellors 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 sex as her. Overall, 9,097 pairs of candidates ran for office.

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: it 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

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[6] A recent contribution from Bartoš et al. (2016) shows that in contexts of complete information, discrimination can occur if processing all the available information is costly. In such a case, agents might focus only on a subset of information, thus triggering statistical discrimination. As we argue later, such a setting is unlikely to apply to our context, since the amount of information to process by default in our setting is minimal.

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.

Figure 1: Examples of valid ballots

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. Finally, we also matched these information with sociodemographic information at the precinct-level, retrieved from the 2013 Census.

In order to carry on 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*[7].

We first begin by documenting the differences between candidates of different partisan groups in Table 1. Overall, 28% of candidates were left-wing, a number which is comparable to the

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[7]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.

share of right-wing candidates. 14% of candidates were classified as extreme-left, while 22% were classified as extreme-right. Concerning political experience we categorized a candidate as having previous political experience if she was, at the time of election, either an incumbent, a municipal councellor in a municipality belonging to the precinct, a regional councellor, or a member of parliament.

For all parties, the share of male candidates with political experience is greater than the share of female candidates with political experience. Incumbents were slightly more numerous among right-wing candidates (69% of men and 53% of women) than among left-wing candidates (63% of men an 46% of women). Only 29% of men and 19% of women were previously elected 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 the male candidates are older than the female candidates. Extreme-right candidates are younger (around 50 years old), and among them, female candidates are 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, we find that 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 the pairs where the female candidate is listed first differ on observable characteristics compared to pairs where the male candidate is listed first. For sake of brevity, we focus both on the full population of candidates, and on the subsamples that we will use later in our analysis.

As we argue in the next section, 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. This hypothesis is likely to be violated if we consider altogether several candidates from a same precinct. Indeed,

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
Previous Political Exp. (W)	0.344	0.475	0.194	0.395	0.462	0.499	0.526	0.499	0.094	0.292
Previous Political Exp. (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	

This table presents the 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 reported the mean and standard deviation by party.

let us assume that the treatment affects negatively a given pair of candidates. One can therefore imagine that the votes they lost positively affected another pair of candidates from the same precinct (especially if the voters reacting to the treatment are non-partisan).

In order to avoid such a scenario, we run an analysis on different samples of pairs of candidates having the same partisan affiliation, and being the sole pair of candidates of their party in their precinct. Such subsamples meet the *SUTVA* assumption: while it is possible that these candidates are affected by the treatment status of candidates of other parties, they cannot be affected by the treatment status of other units in the sample.

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 logistic model, we regress the dummy variable indicating whether the female candidate is listed first on the whole set of individual characteristics. Overall, whether we consider the full population of candidates or the restricted subsamples, even though some 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. 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, and if the male candidate is an retired. Finally, among extreme-right candidates, younger female candidates are more likely to be on the top of the ballot. So do female candidates who are retired or working in liberal occupation. 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.

2.3   Manipulation of the treatment

An important 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 that the distribution of first letters of surnames are different 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 can-

Table 2: Determinants of the treatment (Total population of candidates and restricted samples)

		Restricted Samples			
Woman First	All	Extreme Left	Left	Right	Extreme Right
Previous Political Exp. (W)	0.078	0.070	0.019	0.102	0.134
	(0.050)	(0.151)	(0.115)	(0.117)	(0.171)
Previous Political Exp. (M)	-0.016	0.120	0.044	-0.228	-0.197
	(0.051)	(0.133)	(0.130)	(0.142)	(0.136)
Age (W)	-0.001	-0.004	-0.005	0.005	-0.009
	(0.002)	(0.007)	(0.007)	(0.006)	(0.004)**
Age (M)	-0.001	0.007	0.001	-0.008	-0.001
	(0.002)	(0.006)	(0.006)	(0.006)	(0.004)
Intermediary Profession (W)	0.260	-0.040	0.712	0.381	0.319
	(0.105)**	(0.501)	(0.403)*	(0.238)	(0.198)
Private Sector Employee (W)	0.148	0.173	0.335	0.155	0.184
	(0.072)**	(0.257)	(0.227)	(0.180)	(0.141)
Liberal Occupation (W)	0.369	0.187	0.458	0.370	0.670
	(0.106)***	(0.373)	(0.288)	(0.227)	(0.286)**
Education Occupation (W)	0.103	0.112	0.377	-0.059	0.100
	(0.088)	(0.274)	(0.241)	(0.245)	(0.243)
Civil Servant(W)	0.103	0.058	0.319	-0.030	0.389
	(0.088)	(0.270)	(0.240)	(0.225)	(0.244)
Public Firm Worker (W)	0.098	0.200	0.274	0.053	-0.304
	(0.121)	(0.329)	(0.339)	(0.322)	(0.349)
Retired (W)	0.076	-0.228	0.486	-0.064	0.531
	(0.086)	(0.271)	(0.256)*	(0.216)	(0.177)***
Intermediary Profession (M)	0.019	0.379	0.681	0.055	-0.390
	(0.100)	(0.553)	(0.327)**	(0.226)	(0.207)*
Private Sector Employee (M)	0.045	0.209	0.106	0.042	-0.292
	(0.085)	(0.276)	(0.241)	(0.197)	(0.186)
Liberal Occupation (M)	0.057	0.136	0.290	-0.036	-0.088
	(0.104)	(0.421)	(0.290)	(0.215)	(0.276)
Education Occupation (M)	-0.036	0.046	0.398	-0.157	-0.432
	(0.100)	(0.294)	(0.251)	(0.260)	(0.250)*
Civil Servant(M)	-0.077	-0.174	0.259	-0.199	-0.317
	(0.099)	(0.301)	(0.245)	(0.246)	(0.256)
Public Firm Worker (M)	-0.043	-0.195	0.202	-0.249	-0.553
	(0.128)	(0.343)	(0.316)	(0.331)	(0.430)
Retired (M)	0.028	-0.098	0.207	0.187	-0.264
	(0.092)	(0.288)	(0.240)	(0.207)	(0.206)
XLeft	0.089				
	(0.095)				
Left	0.035				
	(0.089)				
Right	0.119				
	(0.089)				
XRight	0.060				
	(0.090)				
Pseudo R2	0.00	0.01	0.01	0.01	0.01
Chi2	29.35	18.43	11.83	16.72	22.13
N	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 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 in parentheses are clustered at the precinct level in column 1, and robust in columns 2 to 5.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3: Tests of equal distributions of surnames initials

P-Value	All	Restricted samples			
		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

The table presents the 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.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

didates and on our subsamples of interest: in all cases, the distributions are strikingly similar. In Table 3, 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, for all the tests and all the samples of interest, we cannot reject the null hypothesis that the distributions are identical. The only exception is for the restricted subsamples 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 is unlikely to represent a more general manipulation of the treatment. This suggests that parties did not strategically chose to match candidates based on their surnames. Finally, as additional checks for the absence of manipulation of the treatment, we report in Annex the share of votes 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 share of votes is very close to the sample average.

2.4 Data on ballot layout

An important feature of the French electoral law is that it allows candidates to add additional information about themselves on the ballot, so long as it does not confuse the voter about their identity. In order to account for this specificity, we manually collected data on the electoral ballots that were used for these elections. While there does not exist a systematic recording of electoral ballots for the local elections in France, we could access a sample corresponding to about

Figure 2: Distribution of surname initials across gender and parties
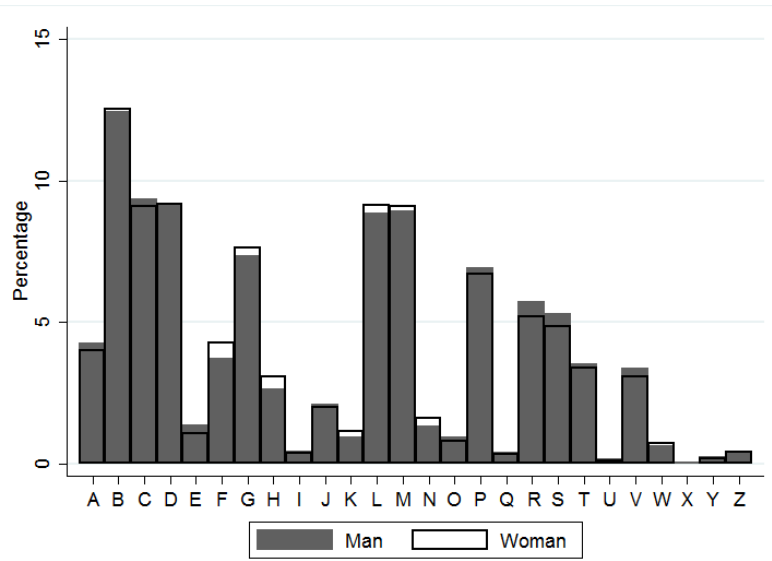
(a) Total population of candidates
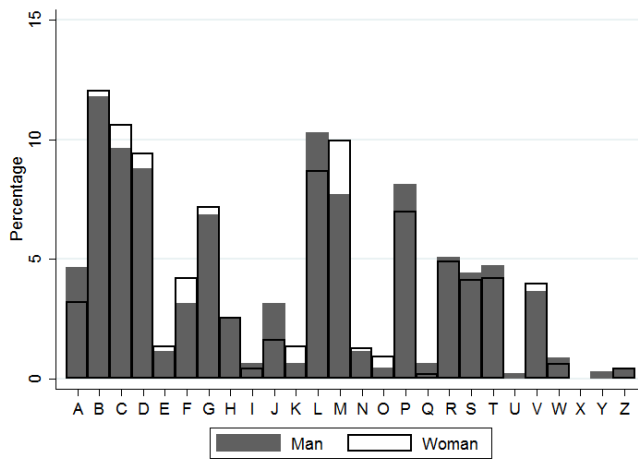
(b) Restricted Sample: Extreme Left
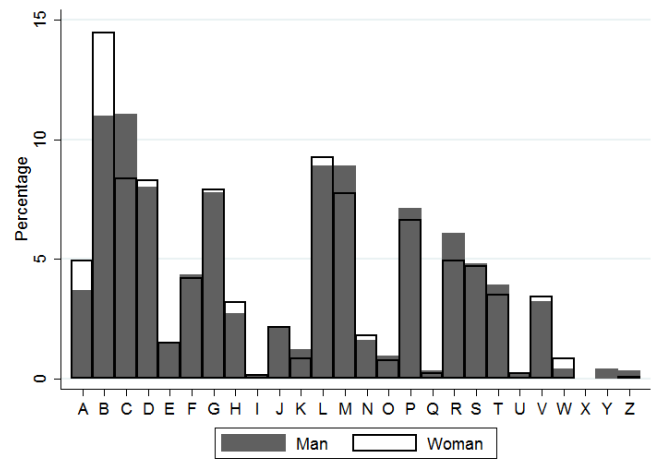
(c) Restricted Sample: Left

(d) Restricted Sample: Right

(e) Restricted Sample: Extreme Right

12% of the electoral ballots of the considered elections. To do so, we used three types of data. First, the Centre for Political Research of SciencesPo (CEVIPOF) provided 780 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. We managed to recover 168 ballots from the *Loire-Atlantique* de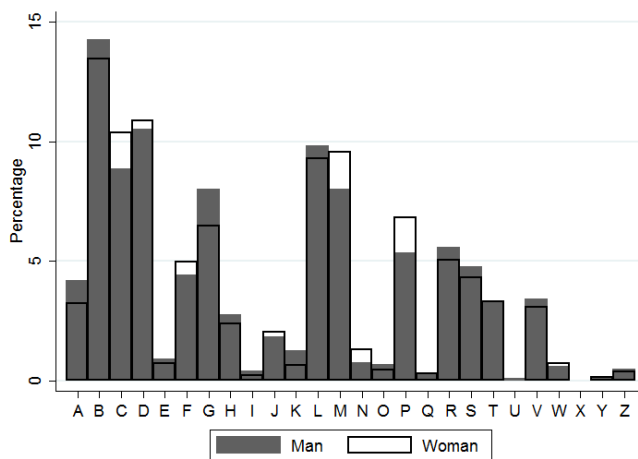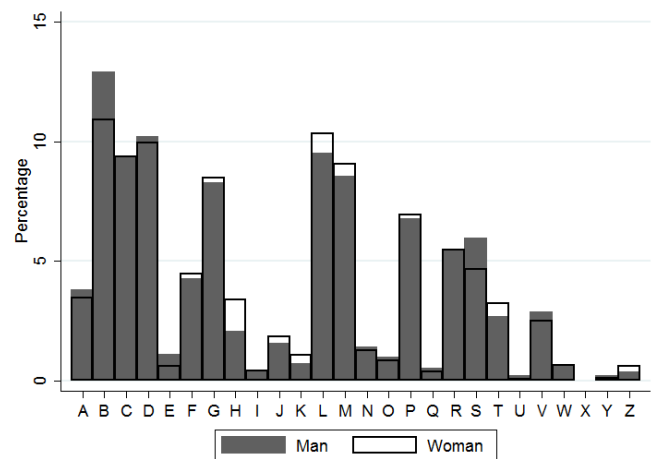partment. Finally, we systematically looked up for pictures of ballots on the Internet, using Google, Twitter and Facebook keywords[8]. Using this methodology, we managed to recover 191 full ballots.

To the best of our knowledge, this represents the first effort to collect and analyze ballot layouts 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. In Table 4, we regress the availability of the ballot on the main characteristics of the candidates for each of the subsamples of interest, using a logistic regression.

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. At the extreme-left, we observe more ballots when the female candidate has a liberal occupation, and when the male candidate is working in the private sector. 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, 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 and foremost, 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.

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[8]Using in particular requests such as "Bulletins de vote élections départementales 2015", or other versions of it.

Table 4: Determinants of ballot availability

Ballot Availability	All	Restricted Samples			
		Extreme Left	Left	Right	Extreme Right
Woman First	-0.056	-0.057	-0.085	-0.172	-0.014
	(0.064)	(0.190)	(0.172)	(0.169)	(0.145)
Previous Political Exp. (W)	-0.119	0.128	-0.088	-0.104	0.092
	(0.076)	(0.236)	(0.175)	(0.176)	(0.259)
Previous Political Exp. (M)	-0.084	-0.114	-0.140	0.067	0.024
	(0.075)	(0.213)	(0.184)	(0.215)	(0.209)
Age (W)	-0.004	-0.012	-0.019	-0.002	0.004
	(0.003)	(0.010)	(0.010)*	(0.010)	(0.007)
Age (M)	-0.009	-0.009	-0.029	-0.006	0.002
	(0.003)***	(0.010)	(0.009)***	(0.009)	(0.006)
Intermediary Profession (W)	-0.186	-1.194	-0.712	-0.169	-0.282
	(0.178)	(1.086)	(0.804)	(0.339)	(0.322)
Private Sector Employee (W)	0.150	-0.453	-0.113	-0.549	0.048
	(0.113)	(0.381)	(0.366)	(0.262)**	(0.217)
Liberal Occupation (W)	0.312	0.797	-0.013	0.010	0.196
	(0.150)**	(0.474)*	(0.470)	(0.309)	(0.413)
Education Occupation (W)	0.289	-0.219	0.416	0.070	0.299
	(0.131)**	(0.391)	(0.372)	(0.331)	(0.352)
Civil Servant(W)	0.031	-0.238	0.475	-0.597	-0.219
	(0.137)	(0.388)	(0.366)	(0.352)*	(0.397)
Public Firm Worker (W)	0.271	-0.419	0.318	-0.121	0.271
	(0.179)	(0.519)	(0.495)	(0.462)	(0.478)
Retired (W)	0.014	-0.501	0.498	-0.690	-0.144
	(0.136)	(0.416)	(0.400)	(0.346)**	(0.272)
Intermediary Profession (M)	0.363	0.922	-0.616	0.084	1.085
	(0.149)**	(0.780)	(0.520)	(0.343)	(0.411)***
Private Sector Employee (M)	0.254	0.793	-0.342	0.010	0.772
	(0.131)*	(0.462)*	(0.341)	(0.302)	(0.388)**
Liberal Occupation (M)	0.163	0.812	-0.066	-0.053	0.866
	(0.162)	(0.634)	(0.411)	(0.326)	(0.503)*
Education Occupation (M)	0.178	-0.382	-0.273	-0.087	1.520
	(0.151)	(0.539)	(0.358)	(0.397)	(0.437)***
Civil Servant(M)	0.203	0.049	-0.364	0.252	1.342
	(0.152)	(0.526)	(0.355)	(0.364)	(0.452)***
Public Firm Worker (M)	0.381	0.241	-0.094	-0.163	1.074
	(0.188)**	(0.576)	(0.438)	(0.538)	(0.662)
Retired (M)	0.077	0.285	-0.309	-0.059	0.740
	(0.145)	(0.515)	(0.373)	(0.309)	(0.420)*
XLeft	-0.154				
	(0.144)				
Left	0.081				
	(0.128)				
Right	-0.010				
	(0.129)				
XRight	-0.195				
	(0.134)				
Pseudo R2	0.01	0.04	0.04	0.02	0.02
Chi2	71.04	35.94	39.82	17.28	24.68
N	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 could 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 in parentheses are clustered at the precinct level in column 1, and robust in columns 2 to 5.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 5: Balance check on reported information: all candidates

	Man First	N	Woman First	N	Diff	T-Stat
At least one information	0.362	575	0.362	564	0.000	0.001
At least one information (M)	0.348	575	0.351	564	-0.003	-0.114
At least one information (W)	0.327	575	0.340	564	-0.013	-0.481
Information: Political Experience (M)	0.268	575	0.253	564	0.014	0.548
Information: Political Experience (W)	0.221	575	0.220	564	0.001	0.041
Information: Occupation (M)	0.050	575	0.060	564	-0.010	-0.726
Information: Occupation (W)	0.066	575	0.070	564	-0.005	-0.323
Information: Age (M)	0.009	575	0.005	564	0.003	0.682
Information: Age (W)	0.009	575	0.005	564	0.003	0.682
Photo	0.090	575	0.092	564	-0.002	-0.103

This table presents T-Tests of difference of information reporting across treatment status for the full sample of available ballots

In Table 5, we provide evidence that the treatment status is uncorrelated with the reporting decision and the kind of information reported. We categorized the type of information into three types: declared past or present political experience, age and occupation. Moreover, since it is possible to put the picture of the candidates on the ballot, we identified the pairs of candidates who did so. We observe, that out of 1,139 ballots available, 36% have some kind of 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 male candidates report their occupations, while it is the case of 7% of 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: out of 412 ballots with at least one information, 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 first on the ballot.

In an initial specification, we test whether, on average, the electoral performances of pairs where the female candidate is first on the ballot are different from those where the male candidate is 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:

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

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*.

As explained above, the *SUTVA* is likely to be violated if we do not restrict our analysis to a sample of observations which cannot interact with each other (meaning that the treatment status of one observation will not affect the outcome of any other unit). To do so, we therefore restrict our analysis to candidates who are the only ones to represent their party in the precinct.

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 we have shown in the last 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:

$$Y_i = \alpha + \beta T_i + \delta X_i + \epsilon_i \tag{1}$$

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 first on the ballot and 0 otherwise, X_i is a set of candidates characteristics, and ϵ_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, and compare the results of the different candidates pairwise.

4 Results

4.1 Main estimation

In this section, we present our main results, by estimating equation (1). In order to do so, we compare the scores received by candidates in the first round of the election in the control and in the treatment group. Note that in this setting, the number of candidates is not identical in each precinct, and the scores of pairs facing different are therefore not directly comparable. In order to make the electoral performances comparable across different number of candidates, we control in each regression for the number of candidates competing in the precinct.

In Table 6, we test whether the order of the candidates affect the electoral performance of the pairs. It summarizes the estimates of such an average treatment effect across several specifications. Panel (A) reports results without any controls except the number of candidates in the precinct. 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 the third one, but also controls for precinct characteristics (including the average age of the population, the share of voters in rural areas, the share of voters with at

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Table 6: Effect on share of votes in the first round

(A)	XLeft	Left	Right	XRight
Woman First	0.381	-0.291	-1.878	0.035
	(0.396)	(0.536)	(0.536)***	(0.348)
R^2	0.15	0.14	0.28	0.09
N	1,188	1,341	1,391	1,893
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	0.084	-0.206	-1.589	0.066
	(0.350)	(0.480)	(0.497)***	(0.327)
R^2	0.35	0.32	0.40	0.22
N	1,187	1,341	1,389	1,883
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	-0.149	-1.583	0.122
	(0.364)	(0.492)	(0.511)***	(0.335)
R^2	0.39	0.37	0.43	0.25
N	1,187	1,341	1,389	1,883
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	-0.085	-0.206	-1.397	0.429
	(0.420)	(0.586)	(0.581)**	(0.378)
R^2	0.43	0.41	0.49	0.38
N	1,187	1,334	1,389	1,882
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 Outcome Variable	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. 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 between parentheses.

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

Table 7: Effect on probability of getting to the second round or of winning the election in the first round

(A)	XLeft	Left	Right	XRight
Woman First	0.015	0.002	-0.049	-0.004
	(0.013)	(0.026)	(0.020)**	(0.023)
R^2	0.01	0.01	0.03	0.01
N	1,188	1,341	1,391	1,893
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	0.010	0.013	-0.039	0.002
	(0.015)	(0.030)	(0.022)*	(0.026)
R^2	0.26	0.26	0.25	0.22
N	1,187	1,334	1,389	1,882
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 the Outcome Variable	0.058	0.64	0.83	0.58

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. 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 between parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

least an undergraduate degree, and the unemployment rate, all as of 2013), and for the first letter of the female's surname.

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 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.

This discrimination had a substantial electoral impact. In Table 7, 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

Table 8: Effect on probability of being elected

(A)	XLeft	Left	Right	XRight
Woman First	0.006	-0.016	-0.045	-0.001
	(0.012)	(0.026)	(0.026)*	(0.006)
R^2	0.01	0.00	0.04	0.01
N	1,188	1,341	1,391	1,893
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	0.002	-0.016	-0.040	0.006
	(0.014)	(0.032)	(0.031)	(0.007)
R^2	0.22	0.19	0.24	0.14
N	1,187	1,334	1,389	1,882
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 the Outcome Variable	0.044	0.35	0.57	0.016

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. 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 between parentheses.
$* p < 0.1$; $** p < 0.05$; $*** p < 0.01$

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 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 8, 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 7. Overall, we find that, because of gender discrimination, right-wing pairs of candidates were between 4 and 4.5 points less likely to win the election. An important point is that the magnitude of the results is exactly the same as the magnitude observed when we considered the probability of going to the second round or winning the election in the first round. It suggests that the overall effect is channeled through the proba-

bility of reaching the second. In fact, we find no treatment effect during the second round[9]. This additional noise explains why our results are less significant: the simplest specification only yields significance at the 10% level, and the treatment effect is not significant anymore when we include covariates - even though the point estimates are very stable.

4.2 Alternative specifications

4.2.1 Full Sample

In Table 9, we run the same baseline model on the full population of candidates. While in such a setting we cannot exclude that the *SUTVA* is violated, it provides consistent evidence that our main estimates are not an artifact of our sample selection. Panel (A) reports average treatment effects on the vote shares during the first round on the population of candidates in each of the four specifications detailed in our main estimation - controlling in each of them for the party of the candidate. We find no evidence of treatment effects whatsoever.

However, 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).

4.2.2 Opponents' characteristics and dyadic estimation

In this section, we check that our estimates are not affected by the characteristics of the political opponents faced by a given pair of candidates. In Table 10, we run the most stringent regression of the main specification - including interacted individual characteristics, the first letter of the female's surname and the characteristics of the precinct - controlling for the average characteristics of the male and female opponents on the age, political experience and occupation dimensions, as well as for 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.

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[9]These results are available upon request.

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(A)	(1)	(2)	(3)	(4)
Woman first	-0.117	-0.191	-0.172	-0.187
	(0.210)	(0.185)	(0.186)	(0.226)
R^2	0.40	0.54	0.54	0.55
N	9,097	9,081	9,081	9,018
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)	(1)	(2)	(3)	(4)
Woman First	0.445	0.489	0.443	0.432
	(0.492)	(0.493)	(0.502)	(0.506)
Extreme Left	-1.286	-1.070	-1.041	-0.910
	(0.447)***	(0.440)**	(0.444)**	(0.438)**
Left	12.081	8.007	7.988	7.972
	(0.465)***	(0.451)***	(0.456)***	(0.449)***
Right	15.981	11.044	11.064	11.076
	(0.508)***	(0.497)***	(0.499)***	(0.494)***
Extreme Right	12.703	14.880	14.845	14.989
	(0.459)***	(0.461)***	(0.466)***	(0.462)***
Woman First*Extreme Left	0.048	-0.383	-0.351	-0.338
	(0.628)	(0.609)	(0.617)	(0.607)
Woman First*Left	-0.143	-0.452	-0.388	-0.426
	(0.649)	(0.618)	(0.627)	(0.617)
Woman First*Right	-1.510	-1.464	-1.389	-1.418
	(0.695)**	(0.654)**	(0.659)**	(0.646)**
Woman First*Extreme Right	-0.378	-0.313	-0.214	-0.163
	(0.629)	(0.609)	(0.619)	(0.615)
R^2	0.40	0.54	0.54	0.55
N	9,097	9,081	9,081	9,018
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. Panel (A) presents the treatment effect on the full population. Panel (B) interacts this treatment with the party of the candidates.ts the treatment with the party of the candidate. 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. Clustered standard errors at the precinct level in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 10: Effect on votes in the first round, controlling for average characteristics of opponents

Share of votes in the first round	XLeft	Left	Right	XRight
Woman First	0.064	0.267	-1.065	0.427
	(0.401)	(0.537)	(0.512)**	(0.375)
R^2	0.48	0.52	0.59	0.40
N	1,187	1,333	1,387	1,882
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' characterics	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. 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 between parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Finally, in order to take into account more thoroughly the structure of the political competition, we compute for each pair of candidates the difference between their score and the score of each of their opponents in the first round of the election. We then regress the relative score between the considered pair and its considered opponent on their respective characteristics and treatment statuses.

Formally, we therefore run the following estimation:

$$Y_{ij} = \alpha + \beta T_i + \gamma T'_j + \delta X_i + \nu X'_j + \epsilon_{ij} \tag{2}$$

where Y_{ij} is the difference between the score of the pair i and the score of the pair j, T_i is the treatment status of pair i, T'_j is the treatment status of pair j, X_i is a set of characteristics of pair i, X'_j is a set of characteristics of pair j, and ϵ_{ij} is an error term.

We run the specifications in the same fashion as in the main specification. Panel (A) controls only for the number of competing candidates. Panel (B) controls for the characteristics of each dyad of pairs. Panel (C) controls for the same characteristics, but interacting them within each pair of the dyad. Finally, panel (D) adds as controls the first letter of each woman in the dyad, and the sociodemographic characteristics of the precinct.

Table 11: Results: Dyadic Specification

(A)	XLeft	Left	Right	XRight
Woman First	0.595	-0.384	-2.058	-0.020
	(0.482)	(0.675)	(0.702)***	(0.463)
Woman First (Opponent)	0.193	0.105	-0.391	0.072
	(0.404)	(0.504)	(0.498)	(0.377)
R^2	0.09	0.03	0.01	0.07
N	4,450	4,413	4,333	6,603
Indiv. Controls	N	N	N	N
Indiv. Controls (Opponent)	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	0.163	-0.002	-1.442	-0.060
	(0.432)	(0.537)	(0.567)**	(0.13)
Woman First (Opponent)	0.075	0.483	-0.160	0.312
	(0.325)	(0.381)	(0.374)	(1.03)
R^2	0.40	0.47	0.44	0.40
N	4,438	4,406	4,316	6,569
Indiv. Controls	Y	Y	Y	Y
Indiv. Controls (Opponent)	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	0.110	0.042	-1.603	0.042
	(0.444)	(0.543)	(0.574)***	(0.466)
Woman First (Opponent)	0.017	0.470	-0.062	0.217
	(0.330)	(0.372)	(0.375)	(0.306)
R^2	0.43	0.50	0.47	0.42
N	4,438	4,406	4,316	6,569
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Indiv. Controls (Opponent)	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	-0.049	0.315	-1.460	0.409
	(0.513)	(0.660)	(0.635)**	(0.504)
Woman First (Opponent)	0.067	0.530	0.087	0.189
	(0.326)	(0.371)	(0.363)	(0.288)
R^2	0.45	0.51	0.51	0.48
N	4,438	4,406	4,316	6,569
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Indiv. Controls (Opponent)	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

OLS Regressions. Each subsample considers only the candidates who are the only ones of the considered party in the precinct where they run, and compares them to all of their political opponents. The outcome variable is the difference between the share of votes of the considered pair and the share of the considered competing pair. Panel (A) controls only for the number of candidates in the precinct. Panel (B) also controls for age, socioprofessional categories and political experience of man and woman, within the considered pair and the competing pair, as well as for the party of the competing pair. 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 within the considered pair and the competing pair. Panel (D) adds to these controls the first letter of the woman's surname in the considered pair, 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 clustered at the precinct level between parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

The results of this estimation are gathered in Table 11. The results look very similar to the main estimation: we do not find any treatment effect for extreme-left, left-wing and right-wing candidates, but we do a find a negative treatment effect for right-wing candidates, corresponding to between -1.4 and -2 percentage points. To the contrary, we do not find, in any of the specifications, that the treatment status of the considered opponent affects the score of the considered pair.

5 Channels

5.1 Taste-based or statistical discrimination ?

How can this observed gender discrimination be explained ? On the one hand, voters may be reluctant to vote for women, regardless of their characteristics or quality. We would then talk, in the spirit of Becker (1957), of taste-based discrimination. On the other hand, if the characteristics and quality of candidates are not perfectly observable by the voters, they might apply potentially negative group stereotypes on the female candidate. In that case, we would then talk, following the seminal contributions of Arrow et al. (1973) and Phelps (1972), of statistical discrimination. In this section, in the spirit of Altonji and Pierret (2001), we show evidence pointing towards the presence of statistical discrimination.

It is worth noticing that, in our particular setting, testing properly for the presence of statistical discrimination needs to cope with an additional element: the limited-attention bias from the voters. As we explained above, according to the electoral law, two elected candidates from a same ballot have exactly the same prerogatives once in office: there is no hierarchy between them. In this light, had voters perfectly known this framework, they should not have been influenced by the relative positions of the two candidates of the ballot.

In such a framework, testing for statistical discrimination requires a shifter of information that affects the knowledge that the voters have of candidates, while keeping the level of information about the electoral rule constant. To do so, we exploit an additional feature of the electoral rule, that allows candidates to report additional information on the ballot. Importantly, this additional information is only about the candidate herself, and is not informative about the

rule of the election. Consequently, it is unlikely to affect the understanding that a voter has about the general rules of the election. Using this information we test whether, conditional on characteristics that we can observe thanks to administrative data but which might not be observed by the voters, discrimination is lower when these information are revealed on the ballot.

It is important to notice that, in the theory of statistical discrimination, individuals have imperfect information about the quality of the people they face. Contrarily to some settings where quality is easily observable (such as transaction data on the housing market, for example Laoué-nan and Rathelot (2017)) getting a proper measure of the quality of a politician is difficult. Most of the literature on the topic proxied the quality of politicians with their education level (Ferraz and Finan (2009), Besley et al. (2011), Daniele and Geys (2015) among others), or with the performance of their constituency (Alesina et al. (2015), Daniele and Vertier (2016)). However, recent contributions found new ways of measuring political competence, notably through earnings and IQ score (Besley et al. (2017a), Dal Bó et al. (2017)). In our study, we do not observe such characteristics, nor the actual performance of previously elected leaders in office: hence the extent to which we can control for the quality of politicians is limited. However, the information we have on candidates embeds part of it, since it includes previous political experience.

In Table 12, we show that reporting information matters for electoral results. For sake of brevity, we only present results on the whole sample of ballots that we could manually recover. Here again, we explain the share of votes received in the first round and present different specifications, with an increasing number of controls, and controlling in each of them for the number of candidates in the precinct and the party of the considered pair of candidates. The results presented in this table cannot be interpreted as causal, since the fact of reporting information might be correlated to unobservable characteristics which also matter for electoral success. Nevertheless, it is indicative of the role that information might play in the electoral process.

Overall, 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 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

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Table 12: Ballots with reported information gain more votes

(A) - Full Sample of available ballots	(1)	(2)	(3)	(4)
At least one information	2.655 (0.686)***			
Photo		1.408 (1.000)		
Any information on political experience			3.279 (0.749)***	
Any information on occupation				-0.801 (1.123)
R^2	0.56	0.55	0.56	0.55
N	1,138	1,138	1,138	1,138
Indiv. Controls	Y	Y	Y	Y
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y
(B) - Full Sample of available ballots	(1)	(2)	(3)	(4)
At least one information	2.438 (0.710)***			
Photo		1.297 (1.031)		
Any information on political experience			3.049 (0.789)***	
Any information on occupation				-0.949 (1.166)
R^2	0.58	0.57	0.58	0.57
N	1,138	1,138	1,138	1,138
Indiv. Controls	Inter.	Inter.	Inter.	Inter.
Precinct characteristics	N	N	N	N
Number of candidates	Y	Y	Y	Y
(C) - Full Sample of available ballots	(1)	(2)	(3)	(4)
At least one information	2.509 (0.712)***			
Photo		1.346 (1.059)		
Any information on political experience			3.151 (0.792)***	
Any information on occupation				-0.876 (1.157)
R^2	0.58	0.57	0.58	0.57
N	1,137	1,137	1,137	1,137
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 and political experience of male and female candidates. 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. Clustered standard errors at the precinct level in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

between 3 and 3.2 percentage points more. Conversely, if any of the candidates mentions her occupation or prints her picture, they do not seem to have an advantage[10].

In Table 13, we show how reported information affects discrimination against right-wing women in the first round of the election. Namely, we evaluate whether displaying information on the ballot affects the discrimination faced by right-wing female candidates. To do so, we interact the treatment variable with a dummy indicating whether any type of information is available on the ballot. 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 5.8 points less of received votes when the female candidate is listed first - this effect is totally cancelled out when at least one information about the candidates is revealed. This result holds for all the specifications even after controlling for individual and locals characteristics. Therefore, it suggests the presence of statistical discrimination.

Such a finding could be explained by the historically low representation of women among right-wing politicians - since, as the literature on the topic as shown (Beaman et al. (2009), De Paola et al. (2010)), exposure to women in office increases the probability of voting for them in the future. As a matter of fact, the main right-wing party has often preferred to field male candidates in various types of elections - notably during the parliamentary elections of the decade 2000 which were subject to gender quotas - while other parties were more compliant.

In the following paragraphs, we explore whether alternative explanations are likely to explain our results.

5.2 Are candidates with political experience less likely to be discriminated ?

One might worry that the difference of vote shares that we observe when a female is listed first or second only reflect the differences of underlying characteristics existing between them. Let us assume that voters believe that the first candidate is the "main" candidate and that they do not have a preference over the gender of this candidate. If the quality of female candidates is lower than the quality of male candidates and the voters vote based the quality of the presumed

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[10]Note that, because of bunching of information reporting, both by gender and by type of information, disentangling the impact of information by gender and by type is hardly feasible in our setting.

Table 13: Information affects the level of discrimination among right-wing female candidates

Share of votes in the first round	(1)	(2)	(3)	(4)
Woman First	-4.962	-5.737	-5.813	-5.127
	(2.430)**	(1.975)***	(2.029)***	(1.811)***
Any Info. Ballot	-0.064	-2.435	-2.580	-2.846
	(2.068)	(1.782)	(1.899)	(1.733)
Woman First*Any Info. Ballot	5.292	7.521	7.584	6.710
	(2.931)*	(2.649)***	(2.704)***	(2.545)***
R^2	0.18	0.42	0.42	0.54
N	165	165	165	165
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. 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 in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

"main" candidate, then the observed result might only reflect this underlying difference of quality between male and female candidates.

While we do not observe the quality of the candidates, we do observe a proxy of it: the political experience of the candidate. In Table 14, we interact the treatment with the incumbency status of the candidates and show that discrimination is not responsive to it. In panels (A) and (B), we show that the treatment effect does not vary with respect to past political experience of either the female (Panel (A)) or the male candidate (Panel (B)), whatever the stringency of the set of included controls: in all cases, the interaction term is not statistically significant. Thus, differences of experience between male and female candidates do not drive directly the effect we detect.

5.3 Where Did the Missing Votes Go ?

Right-wing pairs of candidates received less votes when the female candidate was listed first on the ballot. A key question is therefore to understand where these lost votes went. A first hypothesis is that discriminatory voters did not show up on the day of election, leading to a

Table 14: Absence of treatment heterogeneity with respect to male and female characteristics on the right-wing ballots

(A)	(1)	(2)	(3)	(4)
Woman First	-2.073	-1.528	-1.395	-1.161
	(0.858)**	(0.805)*	(0.804)*	(0.762)
Previously Elected (W)	5.334	4.175	4.107	3.716
	(0.752)***	(0.744)***	(0.748)***	(0.707)***
Woman First*Previously Elected (W)	0.243	-0.098	-0.309	-0.368
	(1.075)	(1.019)	(1.017)	(0.966)
R^2	0.33	0.40	0.43	0.48
N	1,391	1,389	1,389	1,389
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
(B)	(1)	(2)	(3)	(4)
Woman First	-2.435	-2.083	-1.941	-1.835
	(1.135)**	(1.091)*	(1.138)*	(1.063)*
Previously Elected (M)	6.506	4.700	5.036	4.774
	(0.917)***	(0.905)***	(0.928)***	(0.877)***
Woman First*Previously Elected (M)	1.046	0.627	0.451	0.569
	(1.275)	(1.227)	(1.270)	(1.199)
R^2	0.34	0.40	0.43	0.48
N	1,391	1,389	1,389	1,389
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. The outcome variable is the share of votes received by the pair of candidates in the first round of the election. 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. Panel (A) interacts the treatment with the political experience of the female candidate. Panel (B) interacts the treatment with the political experience of the male candidate. Robust standard errors in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 15: Abstention, Blank and Null votes do not depend on the treatment status of the right-wing candidate

(A) - Abstention Rate	(1)	(2)	(3)	(4)
Right-Wing Woman First	0.002	0.003	0.003	-0.001
	(0.003)	(0.003)	(0.003)	(0.002)
R^2	0.10	0.15	0.21	0.63
N	1,391	1,389	1,389	1,389
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
(B) - Blank and Null Votes	(1)	(2)	(3)	(4)
Right-Wing Woman First	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
R^2	0.41	0.45	0.47	0.55
N	1,391	1,389	1,389	1,389
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. 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 errors in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

differential abstention. This hypothesis cannot be ruled out, since every voters receive the ballots and electoral programs of all candidates at home. A second hypothesis is that voters who might have voted for the right-wing pair, were the male candidate first, ended up casting no ballot at all or invalid ones: in this case, we would expect an increase in blank and 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 share of votes of the other candidates.

We test these hypotheses in Tables 15 and 16, focusing on constituencies where only one right-wing candidate ran, and on the treatment status of this candidate. Here again, we present results for different types of specification. The results in Table 15 suggest 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. This result confirms that the decisions leading to a lower share of votes for female-led right-wing candidates were unlikely to be made before the election

day. Similarly, we do not find a higher share of blank or null votes in these constituencies. In both cases, this absence of effect holds whatever the specification.

In Table 16, 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. Overall, 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 points higher shares of votes. This effect is significant at least at the 10% level across all the specifications. In Panel (B), we propose an indirect test of absence of taste-based discrimination. Namely, for all competing pairs of candidate, we check whether the additional vote shares they received when the right-wing woman was listed first differed with their own treatment status - i.e. with the position of the female candidate on their own ballot. Our results suggest that while opponents received more votes when they faced a right-wing pair with a female candidate listed first, this advantage did not depend on the position of the woman on their own ballot. This result therefore leads us to argue that the discrimination we identify is unlikely to be taste-based: had it been so, we would have expected opponents to receive less votes if their own female candidate was listed first. In other terms, we would have expected a negative and significant interaction term in the regressions of Panel (B).

5.4 Variation across precinct characteristics

In this section, we test whether discrimination varies with local characteristics of the precinct. Namely, we test whether the treatment effect that we find varies with respect to the level of education of the population (measured through the share of people above 15 holding a graduate degree), the unemployment rate among the population aged between 15 and 64, and the average age of the population. Finally, we relate our observed treatment effect to discrimination against women on the labor market. To do so, we build on data released by Chamkhi (2015), reporting unexplained wage gaps between men and women in 321 French employment zones in 2010. These unexplained wage gaps are computed from a Oaxaca-Blinder decomposition, controlling for a wide range of explanatory factors. We then interact this measure of discrimination with the treatment variable. In this section, we use municipality-level data for two reasons. First,

Table 16: Votes for political opponents of the right-wing pairs

(A)	(1)	(2)	(3)	(4)
Right-Wing Woman First	0.508	0.360	0.402	0.334
	(0.196)***	(0.187)*	(0.189)**	(0.186)*
R^2	0.44	0.57	0.58	0.58
N	4,333	4,321	4,321	4,321
Indiv. Controls	N	Y	Inter.	Inter.
Precinct characteristics	N	N	N	Y
Number of candidates	Y	Y	Y	Y
(B)	**(1)**	**(2)**	**(3)**	**(4)**
Right-Wing Woman First	0.383	0.264	0.305	0.221
	(0.327)	(0.293)	(0.294)	(0.292)
Woman First	0.147	0.091	0.080	0.049
	(0.362)	(0.313)	(0.314)	(0.313)
Right-Wing Woman First*Woman First	0.255	0.190	0.193	0.225
	(0.521)	(0.452)	(0.455)	(0.454)
R^2	0.44	0.57	0.58	0.58
N	4,333	4,321	4,321	4,321
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. Panel (A) reports the effect, for a political opponent of the right-wing pair, of having a female listed first on the right-wing ballot. Panel (B), interacts this effect with the treatment status of the considered political opponents. 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.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 17: Heterogeneity with respect to local characteristics

Share of votes in the first round	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Woman First	-0.788	-0.690	-1.350	0.022	-0.636	-1.565	-0.902	-0.192
	(0.938)	(5.839)	(1.309)	(2.574)	(0.942)	(5.771)	(1.261)	(2.522)
Unemployment Rate	-38.170				-40.522			
	(4.618)***				(4.734)***			
Woman First*Unemployment Rate	-4.374				-5.134			
	(6.293)				(6.301)			
Mean Age		0.278				0.345		
		(0.084)***				(0.085)***		
Woman First*Mean Age		-0.013				0.008		
		(0.120)				(0.119)		
Share Graduate			3.769				2.082	
			(3.522)				(3.560)	
Woman First*Share Graduate			-0.019				-1.269	
			(4.888)				(4.753)	
Unexplained Wage Gap				-0.422				-0.393
				(0.185)**				(0.182)**
Woman First*Unexplained Wage Gap				0.153				0.109
				(0.271)				(0.267)
R^2	0.31	0.30	0.29	0.29	0.31	0.31	0.31	0.31
N	25,964	25,966	25,966	25,966	25,964	25,964	25,964	25,964
Indiv. Controls	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.
Municipality characteristics	N	N	N	N	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y

OLS Regressions at the municipality level. 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. Columns (1) to (4) control for the number of candidates in the precinct, the interacted age of the man and woman, the interacted socioprofessional categories of the man and woman, and the interacted political experience of the man and woman. Columns (5) to (8) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree within the municipality and a dummy variable indicating whether this municipality is located in a rural area. Standard errors clustered at the precinct level in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

the characteristics of local population and the vote shares are available at the municipality level. Secondly, because the precincts and the employment zones overlap, it is preferable to study the relationship between the electoral and job-market discrimination at the municipality level[11].

We present the results of these interactions in Tables 17, 18 and 19. In Table 17, we interact the treatment variable directly with the different local characteristics of interest. For sake of brevity, we present only the results for the two most stringent specifications. For all the variables considered, we detect no interaction effect. However, one might worry that this absence of result comes from non-linear interactions. Therefore, in Tables 18 and 19, we present interactions with respect to the top and bottom deciles of each of the considered local characteristic variable.

Overall, we find no interaction effect with the top and bottom deciles of age, education and unemployment. However, we do find that discrimination is greater in areas belonging to the top decile of unexplained wage gap on the labor market. In particular, we find that in these areas, the discriminatory effect is greater by 2.7 to 3.2 percentage points, depending on the specification.

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[11]Note that all the previous results also hold at the municipality level.

Table 18: Heterogeneity with respect to local characteristics

Share of votes in the first round	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Woman First	-1.244 (0.595)**	-1.278 (0.576)**	-1.371 (0.618)**	-1.008 (0.624)	-1.155 (0.595)*	-1.187 (0.559)**	-1.163 (0.599)*	-0.870 (0.607)
Top Decile Unemployment	-3.329 (0.588)***				-3.307 (0.597)***			
Woman First*Top Decile Unemployment	-0.546 (0.770)				-0.651 (0.772)			
Top Decile Mean Age		2.476 (0.810)***				2.734 (0.805)***		
Woman First*Top Decile Unemployment		-0.606 (1.145)				-0.282 (1.141)		
Top Decile Share Graduate			1.288 (0.612)**				1.086 (0.614)*	
Woman First*Top Decile Share Graduate			0.135 (0.890)				-0.050 (0.875)	
Top Decile Unexplained Wage Gap				2.937 (1.178)**				2.768 (1.162)**
Woman First*Top Decile Unexplained Wage Gap				-3.237 (1.521)**				-2.736 (1.495)*
R^2	0.30	0.29	0.29	0.29	0.30	0.31	0.31	0.31
N	25,966	25,966	25,966	25,966	25,966	25,964	25,964	25,964
Indiv. Controls	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.
Municipality characteristics	N	N	N	N	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y

OLS Regressions at the municipality level. 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. Columns (1) to (4) control for the number of candidates in the precinct, the interacted age of the man and woman, the interacted socioprofessional categories of the man and woman, and the interacted political experience of the man and woman. Columns (5) to (8) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree within the municipality and a dummy variable indicating whether this municipality is located in a rural area. Standard errors clustered at the precinct level in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 19: Heterogeneity with respect to local characteristics

Share of votes in the first round	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Woman First	-1.411 (0.569)**	-1.321 (0.606)**	-1.401 (0.581)**	-1.477 (0.630)**	-1.340 (0.571)**	-1.185 (0.591)**	-1.233 (0.566)**	-1.305 (0.614)**
Bottom Decile Unemployment	3.670 (0.568)***				3.349 (0.557)***			
Woman First*Bottom Decile Unemployment	0.638 (0.860)				0.645 (0.867)			
Bottom Decile Mean Age		-0.567 (0.581)				-0.727 (0.573)		
Woman First*Bottom Decile Mean Age		-0.461 (0.825)				-0.634 (0.813)		
Bottom Decile Share Graduate			0.717 (0.744)				1.011 (0.717)	
Woman First*Bottom Decile Share Graduate			0.247 (0.969)				0.427 (0.926)	
Bottom Decile Unexplained Wage Gap				-0.876 (0.931)				-0.816 (0.909)
Woman First*Bottom Decile Unexplained Wage Gap				0.853 (1.595)				1.098 (1.551)
R^2	0.30	0.29	0.29	0.29	0.30	0.31	0.31	0.31
N	25,966	25,966	25,966	25,966	25,966	25,964	25,964	25,964
Indiv. Controls	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.	Inter.
Municipality characteristics	N	N	N	N	Y	Y	Y	Y
Number of candidates	Y	Y	Y	Y	Y	Y	Y	Y

OLS Regressions at the municipality level. 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. Columns (1) to (4) control for the number of candidates in the precinct, the interacted age of the man and woman, the interacted socioprofessional categories of the man and woman, and the interacted political experience of the man and woman. Columns (5) to (8) adds to these controls the unemployment rate, the average age of the population, the share of individuals with a graduate degree within the municipality and a dummy variable indicating whether this municipality is located in a rural area. Standard errors clustered at the precinct level in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

These results call for two comments. First the absence of interaction with the characteristics of the population in the precinct might reflect an aggregation effect, coming from the fact that different types of population might be subject to limited attention and discriminatory behaviors[12]. Secondly, the fact that gender discrimination in politics and on the labor market are linked suggests that policies aiming at reducing discrimination should tackle those different aspects simultaneously.

6 Conclusion

Among the numerous reasons which might explain why women are under-represented in politics, gender-bias of voters is 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 is 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 cleanly 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 arguably were simultaneously subject to limited attention concerning the rules of the election and to discriminatory behaviors. Overall, the right-wing pairs where the female candidate was listed first on the ballot saw their score 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 decreasing by 4 percentage points. Furthermore, we provide evidence that this discrimination is rather statistical than taste-based.

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[12]In fact, identifying the respective roles of these two effects among different categories of population cannot be done with aggregate administrative data, and calls for field or laboratory experiments which we reserve for future research.

Such results call for several important comments. First and foremost, while we find evidence of gender-biases against right-wing candidates, the absence of evidence concerning the candidates of other parties does not necessarily imply that they are not also affected by gender biases. Indeed, not detecting evidence of discrimination for other parties can be either explained by the fact that the voters are less subject to limited attention or by the fact that they discriminate less.

Secondly, since limited attention seems to be at the heart of our result, it is crucial to understand what are its determinants. Indeed, as acknowledged by DellaVigna (2009), understanding limited attention requires to know the cost of acquiring relevant information about the decision which is made - in our case, about the electoral rule. While our setting prevents us from investigating this matter further, such findings raise important questions about how the electoral rules and the governmental action are perceived by the citizens.

Thirdly, since the information available on the ballot on the day of election seems to affect both the overall electoral performances of the candidates and the discrimination that women face, a broader consideration should be paid about to the design of electoral ballots.

Finally, since we find greater electoral discrimination in places where discrimination against women on the labor market is higher, gender discrimination among voters in politics is unlikely to be reduced without other coordinated policies.

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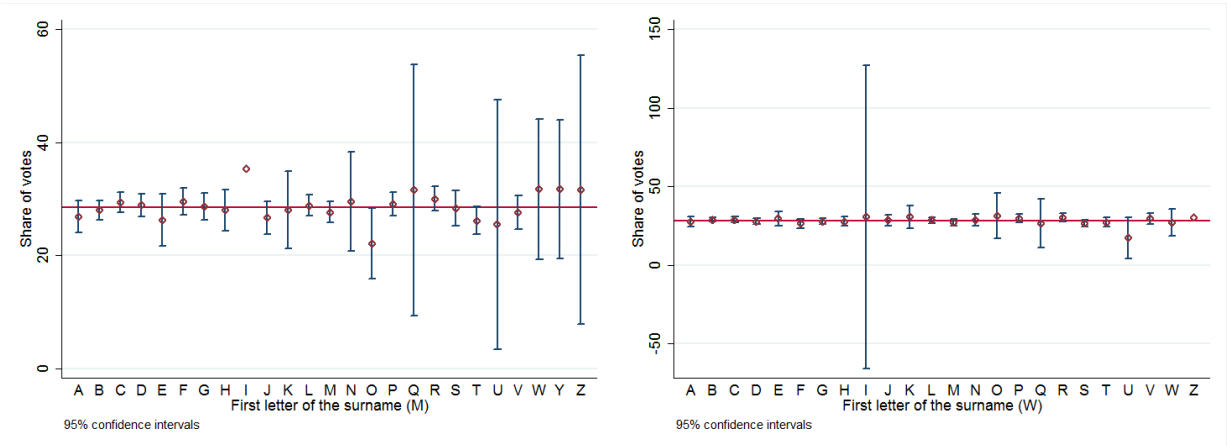
7 Annex

7.1 Distribution of vote shares in each subsample, across first letter of surnames

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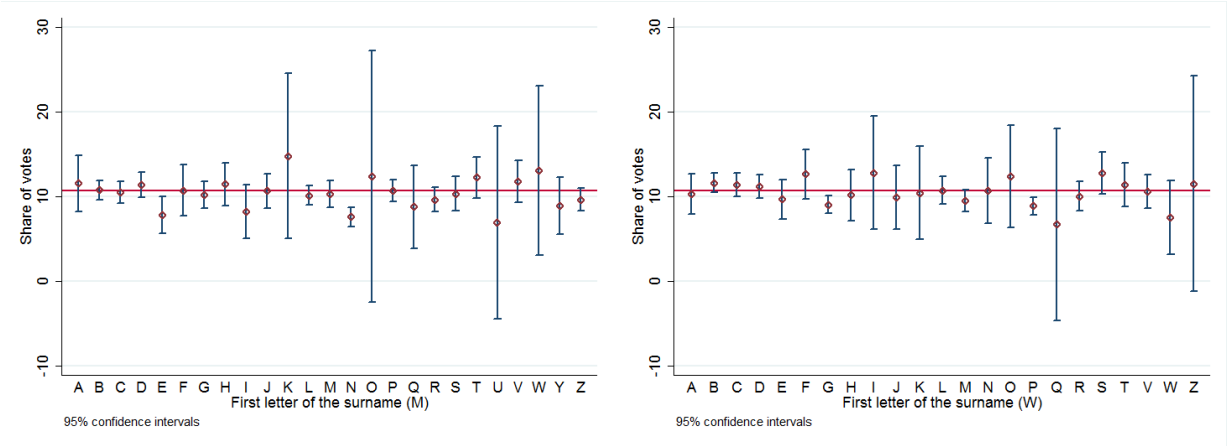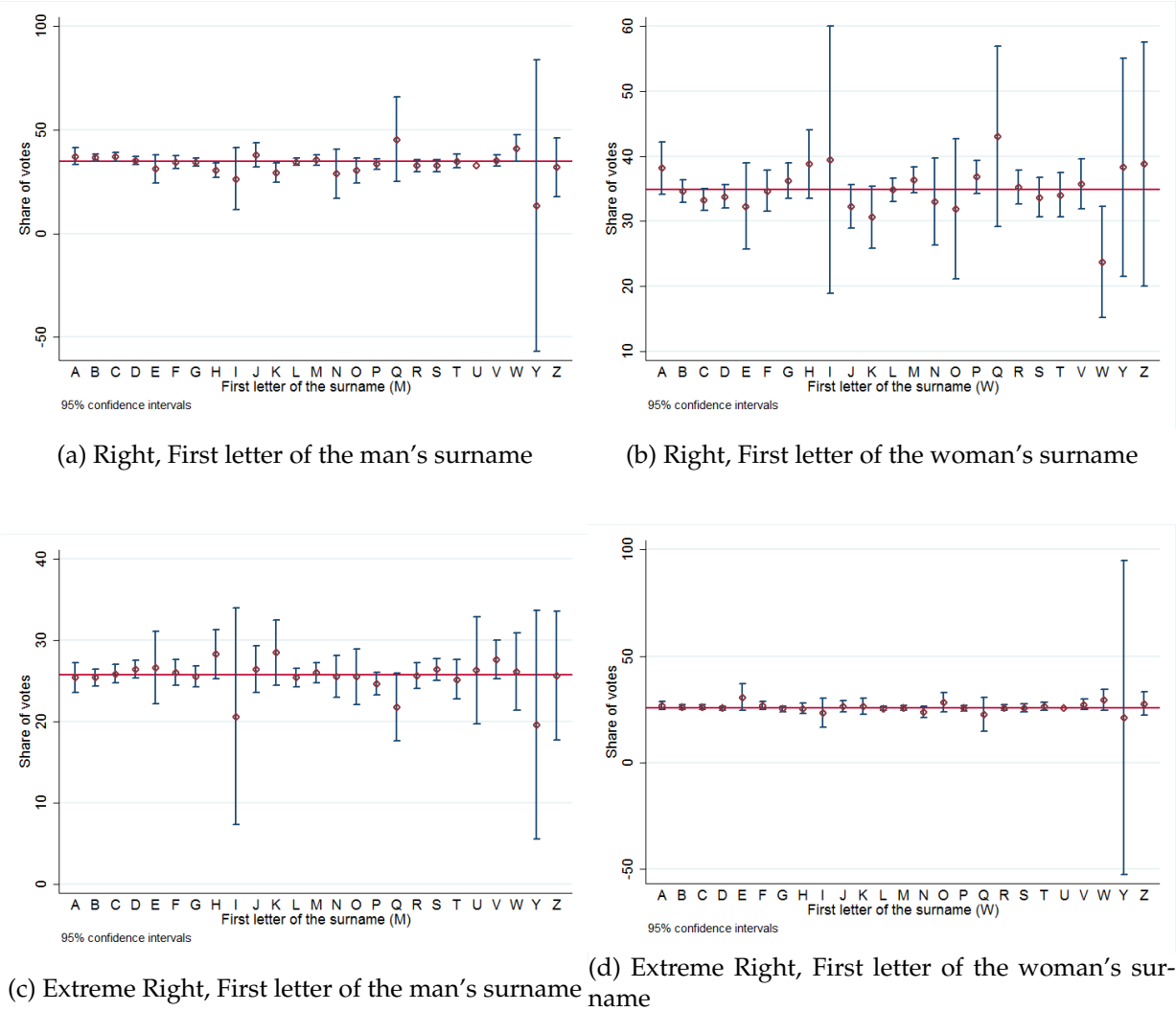

(a) Extreme Left, First letter of the man's surname

(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)

(a) Right, First letter of the man's surname

(b) Right, First letter of the woman's surname

(c) Extreme Right, First letter of the man's surname

(d) Extreme Right, First letter of the woman's surname

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