Women and Power: Unpopular, Unwilling, or Held Back?

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Abstract

We delineate three mechanisms that could explain women's under-representation in electoral lists and political power: voter demand, candidate supply, and internal party dynamics. We use Spain's Equality Law, which mandates a 40 percent female quota on electoral lists, to test these alternative theories. The law was enacted by the Social-Democratic Party after the surprise parliamentary electoral results following the Madrid terrorist bombings in 2004. It was therefore completely unexpected by local political organizations. The quota only applied to towns with populations above 5,000 and forced heterogeneous growth in the number of female candidates by party. Using pre- and post-quota data by party and municipality, we implement a triple-difference design and find that female quotas resulted in slightly better electoral results for the parties that started out with fewer women, and hence were most affected by the quota. Our evidence is not consistent with the existence of pro-male voter preferences, or with the hypothesis that the best female candidates effectively available to the parties displayed poor quality as politicians.

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1 Introduction

In most of the world's democracies, men are largely over-represented in powerful positions in the public and private arenas. Several reasons may explain why women do not reach influential positions more often. Women may be discriminated against by insiders occupying powerful positions, who historically have been men. Women may prefer alternative occupations, perhaps because they offer a better balance between professional and personal life. This could potentially leave a less competitive pool of available female candidates. Additionally, in the case of political representation, voters may have preferences for male representatives. Parties would therefore rationally respond to this bias by fielding fewer women candidates.

We argue that it is possible to test among these hypotheses by looking at the effects of introducing female candidate quotas. If local party leaders do not discriminate against women, they should choose their candidates to maximize electoral results. We would only observe fewer women than men if either there were not enough available high-quality female candidates, or if their voters preferred male politicians. Hence, any constraint imposed by female quotas on the party's selection of candidates should result in worse electoral outcomes.

In contrast, internal party dynamics may lead to female under-representation on some candidate lists at the expense of electoral results. In this case, female quotas should increase the voting shares of parties that were fielding fewer female candidates than would be optimal for voters. Hence, constraints on the discretion of male party elites or on the internal processes that cast women aside would yield better outcomes for the party as a whole.

We exploit an exogenous change in electoral rules to test whether quotas can indeed improve the electoral results of affected parties. Spain's Equality Law was passed in 2007 to promote gender parity. The passage of the law—an indirect effect of the Madrid terrorist bombings—had been completely unanticipated by local political parties, candidates, and voters. It required parties to field lists for local elections with a minimum of 40 percent female candidates. However, the quotas only applied to municipalities with more than 5,000 inhabitants. The law effectively increased the presence of women in the affected lists by more than 8.5 percentage points. This represented an increase of 32 percent in the number of female candidates. Moreover, the law forced parties to maintain the same minimum percentage of women in every five-position bracket of the list. As a result, the number of women in the top five positions also increased by a similar amount.

Using non-quota municipalities as controls, and first-differencing vote shares by party

and town between 2003 and 2007, we can factor out local and party-specific confounders as well as general changes in voters' attitudes toward female politicians. We find that parties affected by the quota increased their vote share by more than their counterparts in the control group. Parties that were forced to make larger *relative* increases in the number of female candidates slightly improved their electoral performance relative to other parties within the same municipality.

Voter turnout in the municipalities affected by the quota was not reduced as a result of the larger number of additional women candidates. Thus the evidence shows that, at the margin, voters seemed to be happier with more balanced lists. These results are not consistent with the existence of major voter aversion to female candidates.

We also show that parties did not have major problems finding suitable female candidates to comply with the quotas. The quota was not associated with increased list attrition or difficulties forming new lists. Parties did not need to retain past female candidates more often or to promote existing female candidates to top positions either. Together with the results on electoral outcomes, this evidence is not consistent with the existence of major supply constraints for high-quality female candidates.

There has been considerable research trying to understand the effect of female candidates on electoral outcomes, with mixed results (Dolan, 2004; Lawless and Fox, 2010). Surveys consistently show the importance of gender stereotypes (Koch, 2000; Lawless, 2004; McDermott, 1997, 1998). Women candidates are seen as more liberal, having an advantage in issues related to education, health, or poverty. But men are seen as more competent managers when the issues relate to economics, crime, or the military (Dolan, 2005). Polls also show that voters tend to vote for candidates of their own gender (Smith and Fox, 2001; Plutzer and Zipp, 1996).

However, the net effect of these findings on actual electoral results is unclear. Most of the literature in political science finds that female candidates who run for office tend to win at similar rates as males (Darcy and Schramm, 1977; Burrell, 1992; Gaddie, Keith, and Bullock, 1995; Fox and Oxley, 2003). Some papers claim that women candidates obtain fewer votes (Frechette et al., 2008), while others find a net positive effect (Hogan, 2010). The caveat is that these studies are based on correlational evidence and suffer from: i) endogeneity problems (parties strategically choose candidate gender contingent on expected results),[1] and ii) omitted ability biases (they could reflect voter discriminatory preferences that prevent all but the most extraordinary women from entering competitive elections). To the best of our knowledge, ours is the first attempt to measure the effect of female candidates on votes using

[1]For instance, using data from the introduction of gender quotas in France at the national legislative level, Murray (2008) finds evidence that "women are indeed placed in the most difficult seats" as candidates.

a quasi-experimental design that exogenously increased their number in a treatment group of municipalities and parties and left a control group untreated. We can thus eliminate the effects of potentially confounding factors on electoral outcomes.

Our paper complements previous evidence about the importance of internal political party dynamics in accounting for female under-representation (Sanbonmatsu, 2002; Murray, 2008; Bagues and Esteve-Volart, 2009). It also relates to recent research on the policy effects of women in power (e.g. Chattopadhyay and Duflo, 2004; Beaman et al., 2009).[2] This literature has focused mainly on the policy outcomes of female elected leaders, the effects of quotas on the number of elected women, or the change in attitudes toward women once they are elected, and not on the intrinsic theories that could account for women's under-representation.

Our research follows an extensive literature on discrimination in labor markets. There is evidence of gender discrimination in hiring (Goldin and Rouse, 2000) and in product markets (Ayres and Siegelman, 1995). A related literature on ethnic discrimination has studied market-driven preferences for residential segregation (e.g. Saiz and Wachter, 2011) and in other less conventional environments (Kahn, 1991; Szymaski, 2000; Price and Wolfers, 2010). Municipal elections allow us to study a very relevant setting, yet one where a very good performance measure is available: electoral results. Our argument that optimizing agents should equalize the productivity of the marginal candidates from each gender closely resembles Knowles, Persico, and Todd (2001).

Finally, the paper is distantly related to an emerging literature that tries to explain gender inequality in outcomes using differences in tastes and attitudes (Crosson and Gneezy, 2008). Women tend to display negative attitudes toward competition (Gneezy and Rustichini, 2004; Gneezy et al., 2003; Niederle and Vesterlun, 2007). They also tend to see themselves as less qualified to run for office (Fox and Lawless, 2004, 2005). These theories could explain why *the average* woman may be less likely to seek power. However, they cannot *by themselves* account for the lack of women at the top. In competitive environments, there could be enough women at the right tails of the ambition and ability distributions to satisfy a demand for more balanced gender allocations. We argue that one cannot fully understand female

[2]The literature on the impact of women in power on parliamentary votes, budget levels, budget composition, government stability, and government efficiency is now quite large. Note that we do not have much to contribute to this specific literature, since we are not examining the policy impact of the additional elected women due to the quota. Instead, we use the natural experiment to learn about the causes of female under-representation on the candidate lists. For the reader interested in women politicians andtheir effect on policy, other examples of this burgeoning literature include: Welch (1985), Swers (1998), Rehavi (2007), Clots-Figueras (2009), Funk and Gathman (2010), De Paola et al. (2010), Gallarduci and Passerman (2010), Ferreyra and Gyourko (2010), and Cavalcanti and Tavares (2011). Campa (2011) is the most relevant reference to our work: studies the impact of quotas in Spain on the provision of public goods.

under-representation in positions of power without considering the interaction between the demand-side of political markets (voter preferences); the *marginal* supply of qualified female candidates; and the industrial organization of the market: the role of parties and the degree of competition (Becker, 1957).

The paper proceeds as follows. In section 2 we develop a simple model of electoral competition that encompasses the theories explaining low female representation. The model illustrates the alternative predictions about the effects of a newly-introduced quota according to each theory. Section 3 describes the experimental design and data that we use to test the different theories, and section 4 presents the results. We offer concluding remarks in section 5.

2 Female Representation and Quotas: Framework

There are several reasons for women's under-representation in powerful positions. First, political parties may behave as if they were discriminating against women by fielding fewer female candidates in electable positions (Sanbonmatsu, 2002, 2006; Bagues and Esteve-Volart, 2009). This could be due to powerful elites—who are traditionally male—explicitly failing to promote women. Alternatively, it could be due to internal organizational dynamics that implicitly favor men (Reuben et al., 2010) or to female disadvantages in managing *internal* competition for power within the parties (Gneezy et al., 2003, Verge and de la Fuente, 2014). All of these explanations can be encompassed under what we name the "party discrimination theory."

A second explanation for low female participation resides in voter tastes. As long as voters prefer to be governed by men, political parties will rationally respond by restricting female promotion. They will do so in order to increase their chances of winning, even if the party's internal dynamics would have resulted in gender-neutral outcomes otherwise. We call this the "voter preference theory."

Finally, low female participation may also be the result of self-selection into political activities, leaving parties with a worse pool of female contenders. This explanation is related to statistical discrimination theories (Arrow, 1973). Current evidence suggests that female politicans are equally or more effective once elected in office (Bratton and Haynie, 1999, Anzia and Berry, 2011). Glagiarducci and Passerman (2012) report that "there are in fact no differences between male and female mayors in various measures of government efficiency." However, the possibility remains that the female contenders available to parties are *less effective electoral campaigners.* Note that there are naturally few positions of power, so explanations in this direction need to focus on the right-tails of the distribution of po-

litical ability. *Talented* women may avoid a career in politics if it offers a worse work-life balance than other alternatives (Lawless and Fox, 2005; Goldin and Katz, 2008; Bertrand et al., 2010). Attitudinal differences toward competition (Niederle and Vesterlun, 2007) could disproportionally discourage high-ability women from competing in elections, *even if parties tried to encourage them*. We term these kinds of explanations the "self-selection theory."

We develop a framework that considerss all these explanations for low female representation. The model highlights the different predictions of the three theories with regard to female quotas, helping us discern their empirical validity. It is also helpful as a synthesis of what is currently a very heterogenous literature on women in power.

2.1 Theoretical Environment

Consider N parties in a local electoral contest. We assume that the local branches of political parties cannot choose their ideology and policies—which are set at the national level—but can choose their candidates. They must field a list with a continuum of candidates of mass one, which they do simultaneously *à la* Cournot. Each party has a pool of potential candidates to choose from each gender. Let f_{pm} and f_{pw} be the density functions for the distributions of the ability of men and women contenders to become candidates for party p. We denote the corresponding distribution functions by F_{pg}, for $g \in \{m, w\}$.

The share of elected candidates from a list is determined by its vote share, denoted by $\phi_p(V_p, V_{-p})$.[3] We assume that ϕ_p is increasing in V_p and decreasing in V_{-p}, where $V_p = A_p - d_v(p) W_p$ is a partial index of the appeal of party p's candidates to voters (V_{-p} denotes the corresponding index for competing parties). A_p is the average ability of party p's candidates, and W_p is the share of women on its list. The parameter $d_v(p) \geq 0$ measures potential voter distaste for female candidates among party p's constituency.

Parties choose their candidate lists with the objective of maximizing $\pi^p = \phi_p(V_p, V_{-p}) - d_p W_p$, where d_p measures the preference of a potential party's local leadership for having men on the list. While we use "party discrimination" to describe this situation, an observationally-equivalent interpretation has d_p capturing internal party dynamics that make it harder for women to move up the ranks.

The model captures with simplicity the three theories described above. The party discrimination theory states that $d_p > 0$. Under the voter discrimination theory, $d_v(p) > 0$. And finally, the negative selection theory is captured by the difference between f_{pw} and f_{pm}.

[3] Naturally, vote shares satisfy $\sum_{p=1}^{N} \phi_p = 1$.

2.2 The Dynamics of Gender Selection

Contingent on their gender allocation, parties are interested in choosing the best male and female candidates among their pools of contenders. Consequently, parties optimally set minimum ability thresholds of $\underline{a}_{pm}$ and $\underline{a}_{pw}$ for their candidates. As a result:

$$A_p = \int_{\underline{a}_{pm}}^{\infty} a f_{pm}(a)\, da + \int_{\underline{a}_{pw}}^{\infty} a f_{pw}(a)\, da,$$

and

$$W_p = \int_{\underline{a}_{pw}}^{\infty} f_{pw}(a)\, da = 1 - F_{pw}\left(\underline{a}_{pw}\right) = F_{pm}\left(\underline{a}_{pm}\right),$$

Because list sizes have a fixed measure, determining an ability threshold for women also sets the standard for men. Indeed, $\frac{d\underline{a}_{pm}}{d\underline{a}_{pw}} = -f_{pw}\left(\underline{a}_{pw}\right)/f_{pm}\left(\underline{a}_{pm}\right)$ and, effectively, party p only has one instrument to maximize its objectives conditional on other parties' behavior: $\underline{a}_{pw}$. We can write party p's objective as:

$$\max_{\underline{a}_{pw}} \phi_p\left(V_p, V_{-p}\right) - d_p W_p$$

The first-order condition for the party's best reaction is $\frac{d\phi_p}{d\underline{a}_{pw}} - d_p \frac{dW_p}{d\underline{a}_{pw}} = 0$. Differentiating A_p and W_p with respect to $\underline{a}_{pw}$, we can re-write it as:

$$\underline{a}_{pw} - \underline{a}_{pm} = d_v(p) + d_p \left(\frac{\partial \phi_p}{\partial V_p}\right)^{-1}$$

This equation defines the optimal selection policy of party p as a reaction function of competing parties' decisions. When neither parties nor voters display gender-based preferences, $d_v(p) = d_p = 0$. In this case we should obtain $\underline{a}_{pw} = \underline{a}_{pm}$, so that men and women face the same abilty threshold. Parties maximize the average ability of their candidate pool regardless of gender. However, this does not necessarily imply gender parity: more men are chosen if they are more politically-able than women in their respective candidate pools, as when f_{pm} first-order stochastically dominates f_{pw} due to self-selection into the candidate pool.

If parties or voters display gender-based preferences for candidates, the ability threshold becomes higher for women. $d_v(p)$ and d_p then determine the ability wedge between the genders. For example, suppose first that voters prefer male candidates, but parties do not, so that $d_v(p) > 0$ and $d_p = 0$. Such voters are willing to replace female candidates with male ones. as long as differences in ability between them are smaller than $d_v(p)$. The party

targeting these voters thus composes a list with: $\underline{a}_{pw} - \underline{a}_{pm} = d_v(p)$.[4]

On the other hand, suppose that voters do not display gender-based tastes, but parties do, so that $d_v(x) = 0$ and $d_p > 0$. Now the optimal selection policy sets $\underline{a}_{pw} - \underline{a}_{pm} = d_p \left(\partial \phi_p / \partial V_p\right)^{-1}$. Party leaders are willing to sacrifice votes in order to increase the number of male candidates. Note that $\partial \phi_p / \partial V_p$ is effectively a measure of the competitiveness of the election. If $\partial \phi_p / \partial V_p$ is large, party p's vote share is very sensitive to the quality of its candidates V_p. As a result, the cost of discrimination is large. If $\partial \phi_p / \partial V_p$ is low, electoral results are less sensitive to the number of women on the list. Hence, in environments where ideology is more important than candidate ability, parties can get away with indulging in candidate selection based on internal gender-biased preferences or processes.

2.3 Effects of Female Quotas on the Under-represented Party

Next, we describe the effects of imposing female quotas on the candidate lists that parties choose in equilibrium (see the appendix for the proofs and details). We assume that only one party is forced to increase the number of women, mimicking our empirical design. We briefly discuss the situation in which both parties are affected by the quota at the end of the section.[5]

Start by assuming that female under-representation is solely driven by voters' preferences or by self-selection into political activities that results in a better pool of male candidates. In this scenario all parties set $\underline{a}_{pw} - \underline{a}_{pm} = d_v(p)$ in equilibrium. If one of the parties is forced to increase the number of women, it must lower the ability threshold for female candidates below what the party's marginal voter would like. We can hence posit:

Proposition 1 (Voter preferences or self-selection)**.** *Suppose that $d_p = 0$, $d_v(p) \geq 0$, and f_{pm} first-order stochastically dominates f_{pw} for all p. Suppose also that $W_1 < W_p$ for all $p > 1$ when no female quotas are imposed. Then, introducing a quota $\underline{W} > W_1$ and $\underline{W} < W_p$ for $p > 1$ decreases the number of votes for party 1, and increases the number of votes for all other parties. Furthermore, if voter turnout is increasing in V_p for all p, then the quota also decreases electoral turnout.*

Conversely, the affected party can only benefit from the quota if its leadership preferences or internal dynamics are gender-biased. In such cases, a policy that restricts the gender-

[4]Notice that changes in the optimal selection of candidates rely on relative abilities at the margin, and do not depend on the distribution of talent for men and women. Nevertheless, the final number of women does depend on such distributions.

[5]In the empirical applications we will contrast the outcomed of parties that were affected by the quota with parties in the same town that were not affetcted as a source of identitifcation. Casas-Arce and Saiz present the results of a theoretical model where the quota affects all parties.

biased behavior may be beneficial for the party's electoral outcomes. To see this, consider what happens when voters do not display gender preferences and there are no differences in the distributions of talent across genders. Parties that display gender-biased preferences limit the number of women candidates by setting $\underline{a}_{pw} > \underline{a}_{pm}$, but voters would prefer a more gender balanced list, with $\underline{a}_{pw} = \underline{a}_{pm}$. The party that is affected by the quota is then forced to increase the number of women by lowering $\underline{a}_{pw}$. At the margin, the quota should thus increase the average ability of the candidates on the list. As a result, the electoral appeal of that party should increase, and the party will receive more votes.[6] This argument suggests that if the party leaders have preferences that conflict with those of their constituents, then limiting their discretion may have a positive effect.

In practice, the introduction of a quota is bound to affect more than one party, and some of our empirical analyses study such cases. Theoretical results then are subtler but similar under reasonable distributional assumptions.[7] What matters now is the *relative* marginal increase of female candidates. A version of proposition 1 still holds: if parties display gender-biased preferences, the party most affected by the quota will tend to improve its relative electoral results. Conversely, under the voter-preference and the self-selection theories we expect to see the most-affected party lose votes. (Casas-Arce and Saiz, 2011).

While the voter-preference and candidate-quality theories yield observationally-equivalent predictions with respect to the introduction of quotas, we can clearly distinguish these two from the existence of internal party dynamics that hinder female advancement. In the next section, we use the unexpected introduction of electoral female quotas to do so.

3 Experimental Environment

Town councilors in Spain are elected using closed lists (i.e., people vote for a list rather than for an individual person). Most lists concur under the umbrella of national or regional parties. Each list must present a number of candidates equal to the number of council seats at stake.[8] The seats are apportioned proportionally to vote shares using the d'Hont method. The law, however, establishes a minimum vote threshold of 5% in order for a list to qualify

[6] If the quota is too high, then the party may be forced to set $\underline{a}_{pw} < \underline{a}_{pm}$. In that case, although some women will replace lower-ability men on the list, some lower-ability women will be included too, reducing the effectiveness of the quota.

[7] In Casas-Arce and Saiz (2011) we assume that the ability distributions for different genders and parties only differ in their mean.

[8] For example, the number of seats is 11 for municipalities between 2,000 and 5,000 inhabitants, and 13 for municipalities between 5,000 and 10,000. Note that, in 2003, 94 percent of the lists in these population ranges obtained fewer than 7 seats, and only one list in about 30,000 reached 11 seats. In practice, therefore, all candidates appearing after number 7-8 on a list can generally be understood as "filler" candidates.

for the apportionment of seats.

Council members are drawn from each list using the exact order in which the candidates are listed. Upon convening for the first time, the council elects a mayor, typically the first person on the most-voted list.[9] The council also acts as a representative legislative body, passing and enacting all local budgets, laws, regulations, zoning, and tax codes for a period of four years.

On March 22, 2007, the "Law for the Equality of Women and Men" (the Equality Law henceforth) was passed by the Spanish Parliament. It required candidate lists in all elections to contain at least 40 percent of candidates from each gender. Moreover, in order to prevent parties from placing all women at the bottom of the list, the law required this proportion to be maintained for every bracket of five positions. Importantly, the law declared municipalities with fewer than 5,000 inhabitants exempt from the quota.

The law applied for the first time to the municipal elections held on May 27, 2007. In the previous election of May 25, 2003, no such legal change had been contemplated. Indeed, the passing of the law was made possible by the 2004 general election results, which were largely unanticipated (Montalvo, 2009). Only days before the Madrid train bombings of March 11, 2004, the Christian-Democratic Party (PP) was widely expected to win the elections. The bombings and post-attack management from the incumbent party changed the sentiment of many voters toward the Social-Democratic Party (PSOE), which won the elections four days after the terrorist strike.[10] It is therefore quite unlikely that the share of female candidates in the municipal elections of 2003 reflected an anticipation of the female quotas that were imposed in 2007.

The Spanish State Department (Ministerio del Interior) collects information related to the electoral process. On request, we obtained a non-confidential subset of their data. We were provided with the names of all candidates by list in all municipal ballots in the 2007 and 2003 elections,[11] their gender in 2007 (a disclosure required by the Equality Law), their list affiliation with major parties, information about each individual's position on the lists, and the outcome of their candidacy. We imputed gender in 2003 by using the first name of the candidate. Names in Spain have a very strong gender orientation and only a very small portion of candidates in 2003 had gender-ambiguous names. We also have information about the number of votes for all lists presented, the fraction of null or blank votes, estimated populations in the municipal census, and the number of registered voters in each town.

Since the law applied only to municipalities with more than 5,000 inhabitants, we can

[9] In fact, only the first person on each list can be considered in the initial mayoral vote.

[10] Gender parity in lists had been an important point in POSE's electoral platform (Verge, 2006).

[11] Other characteristics, such as birth date, were suppressed from the data for confidentiality reasons.

only obtain meaningful results around this threshold. In order to ensure both comparability and large-enough sample sizes, we restrict our study to municipalities with populations below 10,000 inhabitants. However, the results are not in the least sensitive to variations in this threshold. We also collected data on unemployment rates (a very good local socioeconomic status indicator in Spain) and other economic characteristics of the towns. These additional characteristics never mattered for any results in the paper and are omitted inasmuch as most specifications include municipal fixed effects. Furthermore, we found no differences in observables on either side of the population level around which the quota became binding. In contrast, there was a very strong effect of the quota on the number of women across lists on both sides of this discontinuity: a differential increase of 8.5 percentage points in towns with populations above 5,000. This figure amounted to a differential *32 percent increase in the number of women on lists in the towns affected by the quota.*[12]

4 Do Voters Dislike Female Politicians? Evidence

4.1 Women and Electoral Results: Descriptive Evidence

While the political slogan "when women run, women win" has been used to promote female political candidacy, the issue of the impact of women on electoral results is ultimately an empirical one. An extensive literature has studied the impact of parties fielding female candidates. The approaches in the literature have been based on either studying self-reported voter preferences as captured in surveys, or on comparing outcomes by gender in single-candidate elections. The former approach may not faithfully capture actual behavior or provide reliable field predictions. Results from the latter approach need to be interpreted with caution: because the share of women running for office is low, those who actually run constitute a very selected group. Finding no gender differences in vote shares between marginal candidates is completely consistent with the existence of general voter biases against women; these biases could explain why only a relatively small percentage of *extremely-capable* female candidates can afford to compete.

In order to illustrate the pitfalls of correlational approaches and to understand better the patterns of women's participation before the quotas, we start by showing the associations between the share of women on lists and electoral outcomes in 2003. We focus on small towns with populations below 10,000—our sample of interest. The dependent variable in Table 1 is the voting share and the unit of observation is each of the 14,377 party lists competing in

[12]These results are robust to considering alternative control-treatment samples and to the inclusion of polynomials in population, other controls, and municipal fixed effects. See Casas and Saiz (2011) and Campa (2011) for further analyses.

the relevant 4,582 municipalities. The main dependent variable is the share of women in the top five positions of each list. Presumably, women vying for top positions were more visible to voters, and we will focus on the overall female share later.[13]

The descriptive evidence in Table 1, column 1, shows that *lists with more women at the top fared significantly worse in the elections of 2003.* The results are robust to including municipal (column 2) and party (column 3) fixed effects. In column 4, we focus on the two major national parties, which amounted to 60% of lists and 67% of votes in our sample. We find that whenever one of the major national parties fielded a *relatively* large number of women, it tended to fare worse. These negative results are quantitatively large, suggesting that increasing the female share of candidates at the top by 20% (one woman) was associated with a loss in vote share of 3.6 percentage points (about 10 percent of the average vote share).

As in previous correlational studies, this evidence cannot be interpreted as capturing voters' gender preferences or candidate ability. In fact, reverse-causality is likely a major issue. In Panel B of Table 1 we run the inverse regression with the female candidate share on the left-hand side, focusing on the two main national parties. Were the main parties systematically fielding fewer women in municipalities where they were likely to win more seats? To test this hypothesis, we instrument each party's vote share in the 2003 municipal elections using the vote share they obtain, at the municipal level, in the 1997 European Parliament elections. The candidates and substantive issues in such elections are common to the whole country and are completely unrelated to local elections. While European elections are widely perceived as irrelevant by voters, they elicit general political sentiment for or against the major national parties (Binzer Hobolt and Wittrock, 2011). This measure of general political orientation in the town is very strongly associated with the local vote for one or the other party in municipal elections: the R-squared in the first stage of 2SLS is 0.49.[14] The results of this IV strategy (Table 1, Panel B, column 2) are statistically indistinguishable from the OLS reverse-causation equation (Table 1, Panel B, column 1). They suggest that the correlation between the share of female candidates and electoral results is driven by the actions of parties, not the preferences of voters.

Of course, it is possible that the local parties that were likely to win in 2003 had already been in power previously. Historically, executive teams have tended to be male. Furthermore, it seems likely that parties could try to minimize turnover in governing teams. Nevertheless,

[13]Results are very similar if we focus on the total share of women on the lists. In these local elections many voters can be swayed to vote for a list due to personal or family relationships with the candidate(s), regardless of their position on the lists.

[14]Solé-Ollé and Viladecans-Marsal (2011) show that local ideological preferences for each party in Spain are very persistent over time (since the first democratic elections in 1978) and do affect the outcomes of municipal elections.

controlling for the lists' winning the 2003 elections (i.e. obtaining the highest vote share) does not change the results (Table 1, Panel B, column 2, including a dummy for the most-voted lits). Non-winner lists that expected to *increase their number of seats* in the local legislative body tended to *decrease their share of women* at the top. Rather than winning *elections,* it seemed to be winning *seats* that changed the internal party dynamics of female promotion. Note that "winner status" is certainly an endogenous regressor that should be negatively associated with the female candidate share if voters really disliked female-laden *governing* teams (as opposed to women on non-governing lists). However, both variables happen to be uncorrelated after controlling for vote shares.

It is clear that in towns where a party was generally strong and expected to gain many seats in the municipal elections that party fielded fewer women on its list. Conversely, more women ran for office in towns where the party was in a more competitive situation. These results are consistent with our theoretical analysis of internal party dynamics pushing women aside from positions of power. They also illustrate the difficulties associated with studying female electoral success in a context of substantial endogeneity.

4.2 A Natural Experiment Induced by the Quota: "Male-Holdout" Lists

The previous results do not conclusively prove the existence of party discrimination. Fortunately, the introduction of the Equality Law provides us with an experimental design that is akin to the random forceful introduction of more women onto electoral lists. If the vote-maximizing best response of a party to voter preferences and candidate availability was to include fewer women, the new constraint on behavior should reduce its vote share.

We focus on a subset of lists where the quota was uniquely binding. Specifically, we study the evolution of vote shares for parties that were the only ones in their municipalities fielding fewer than two women (40%) in the top five positions in 2003. These "male-holdout" lists were deviating from their local norm. Towns with a single *male-holdout* list are interesting to study because we have only one party affected by the quota and we can directly apply the conceptual test in Proposition 1. We implement a difference-in-differences matching design (Smith and Todd, 2005) by comparing changes in vote shares before and after the quota, across male-holdout lists in quota and non-quota municipalities.

Of all towns with populations under 10,000 with single *male-holdout* lists, we have only 111 in which the quota became binding in 2007. 1,100 towns with *male-holdout* lists remained unaffected by the quota in 2007 (populations below 5,000). We therefore have many more observations in the non-quota group. Furthermore, the observable characteristics of the lists

in the quota and non-quota groups are somewhat different (Table 2). Saliently, male-holdout parties in quota towns tended to have smaller initial vote shares in the 2003 elections. Also, the number of contending parties in the elections was larger in the quota towns, and elections were more competitive (illustrated by a lower Herfindahl index on the distribution of initial vote shares).

Existing literature suggests that one should not compare treatment and control groups that are too different (Lalonde, 1996; Heckman et al., 1998). In order to produce a closely comparable control group, we first estimate a propensity score equation on a quota dummy using observable characterics, and match each of the 111 observations in the "quota male-holdout" group with the 10 closest "non-quota male-holdout" observations by propensity score (with repetition).[15] Importantly, results are not sensitive to changing the matching technique or the number of matched control observations. Table 2 shows that matching on the propensity score does very well in selecting non-quota lists that were ex-ante similar to those in the quota sample. Note that by taking first differences on the outcome of interest we mitigate other potential omitted variables problems (Smith and Todd, 2005).

In Table 3 we compare the evolution of male-holdout parties in the quota and non-quota groups. While all other lists in these towns were not forced to increase their female share, they could have done so as a best reaction to the changes in *male-holdout* lists. Therefore, we cross-tabulate the main outcome of interest—the 2003-2007 change in vote share of male-holdout lists—*by the reaction of their competitors* (columns). In order to operationalize the latter, we calculate the average change in the share of women in the top five positions among competing parties, weighted by their 2003 vote. We then separate the behavior of competitors into three categories based on whether their female shares did not change (column 1), increased (column 2), or decreased (column 3) in 2007.[16] Our focus is on column 1, where only *male-holdout* lists substantially changed female representation due to the quota (representing 77% of the treatment group).

In the first row we focus on *male-holdout* lists in which the quota was not enforced and which kept fewer than two women in the top five positions in 2007 (compliers). These lists suffered a substantial drop in vote share between elections. Non-complier lists in the control group (lists that increase their female share to at least 40%, despite not being required to do so) experienced a lower reduction in vote shares (row 2), and so did the lists that were

[15]Each thusly paired "control" observation is given a weight of 1/10. Since many of the control observations are matched to several treatment observations, we end up with 375 comparable male-holdout lists in municipalities where the quota did not apply. We use the routine "psmatch2" by Leuven and Sianesi (2012).

[16]The measure of municipalities with average changes exactly equal to zero is very small. Therefore, we define the towns for which the competitors' female share remains approximately the same as those with average changes between -0.1 and 0.10: less than half a woman, out of five candidates on average.

actually subject to the quota (row 3).

There was a substantial number of non-complying lists that were not bound by the quota but behaved as if they were. This could be due to general social change favoring more women at the top, but also may have been related to an "encouragement effect" of the law. In this environment, Wald (IV) estimates are useful in comparing relative changes in outcomes to relative probabilities of receiving the actual treatment of interest. We therefore present both the binding-quota effect proper (the overall difference between quota and non-quota groups)—in row 5—and a Wald (IV) estimate of the local treatment effect of moving toward gender parity in the top positions—in row 6.[17] We obtain the latter by dividing the former effect by the difference in the probability of receiving a gender-parity treatment (fielding at least 40% women candidates) for municipalities above and below the 5,000 population threshold. In the last column we present these results aggregating across reaction functions of competing parties. Contrary to the previous correlations, lists with more women (voluntarily or forced) tended to see slightly better electoral outcomes. Wald IV estimates suggest that moving male-holdout lists to gender parity increased their vote share by about 4 percentage points, representing an exchange of about 60 votes in the local elections under consideration.[18]

The results in Table 3 are clearly not consistent with a negative impact of women candidates on electoral outcomes. However, two issues complicate their interpretation. As demonstrated in Landonde (1986), non-parametric treatment effect estimates could be sensitive to specification and the composition of the treatment and control samples. Taking first-differences in the outcome of interest and making the samples comparable by matching may attenuate but not totally eliminate these problems (Heckman et al., 1998; Smith and Todd, 2005). Furthermore, treatment effects are bound to be quite heterogenous: in fact, we would not expect large effects for lists that did not generally attract voter attention anyway—regardless of candidate identity.

Thus, in Table 4 we extend the analysis to the whole (unmatched) sample of male-holdout lists in non-quota towns. We start by repeating the previous diff-in-diffs exercise. Remember that initial vote shares were quite different among quota and non-quota groups. Therefore, this time we weight each observation by each party's vote share in the previous election (column 1), and we include party fixed effects (column 2). The results are very similar to those of the propensity-score matched sample.

[17] Because the law mandates a gender quota in the top five positions, the closest that it can come to parity is a 40% minimum.

[18] Because changes in electoral shares are zero-sum, a party that captures 60 votes from its competitors in an environment with an average of 2,542 voters is gaining a 120-vote relative advantage over its competitors, which comes to about 4 percentage points.

In column 3, rather than weighting, we explicitly allow for heterogenous treatment effects. The vote share *level* in 2007 for each list is the main dependent variable. We then control for vote share in 2003 and its interaction with the quota dummy. Column 3 shows that, as suspected, the introduction of women candidates had a larger impact on more popular lists. We then include party fixed effects and characteristics of the municipalities: a polynomial in the town's population, number of lists in the election, Herfindahl index, and a quadratic in lagged vote shares. Using these specifications we cannot reject a positive impact of women on larger lists at the 10% level, and *can reject the one-sided null of a negative impact of gender parity on electoral results at 5% confidence.*

Remember that there was a large number of non-complying observations in the non-quota group that actually fulfilled the quota. Therefore, in column 6 we also offer instrumental-variables results. In these specifications, the quota dummy and its interaction with the initial vote share instrument for actual changes to 40% female representation in the top positions and their corresponding interaction. Again, we can reject the hypothesis that male-holdout lists that were forced to enact gender parity fared worse. In fact, the evidence is more consistent with the view that they tended to do slightly better.

4.3 Relative Growth of Female Candidates and Vote Share

We now generalize our results to all candidates and electoral lists affected by the quota. It is well known that "friends and neighbors" of candidates have a strong impact on the outcomes of local elections (Key, 1949; Smith, 2010). New female candidates may have been effective in canvassing voters from their social networks in the relatively small towns that we study, irrespective of whether they were likely to be elected themselves. Furthermore, in many towns several or even all parties were affected by the quota, but to different degrees: those with fewer women were forced to make larger increases. We can therefore use the larger variance in the effects of the quota on the total share of women on the lists to estimate the broader impact of female candidates on relative electoral outcomes.

In order to motivate this broader empirical approach, we start by showing in Table 5, column 1 that the more a list was forced by the quota to increase its number of female candidates, the better it fared in the 2003 elections. The unit of observation in the OLS regression is each of the municipal party lists concurring in the 2003 and 2007 elections. The dependent variable—on the left-hand side—is the change in the vote share of the list. The main independent variable takes the expression $D_{ki} \times (0.4 - FemSh_{ki,03})$, where D_{ki} is a dummy that takes value 1 if municipality i's population in 2007 was above 5,000 and party k's female share in 2003 (denoted by$FemSh_{ki,03}$) was below 40%. The further away

a list was from the quota in the towns where it was binding, the more women it was forced to incorporate. Of course, voter preferences could be changing over time, affecting parties with different initial numbers of women in different ways. Therefore, we also control for a quadratic in the initial list's share of women in 2003 on the right-hand side in all specifications in Table 4.[19] Furthermore, we always include municipal fixed effects. If all lists in a town were similarly affected by the Equality Law, we would not expect the quota to have much effect on vote shares. By controlling for town fixed effects, we are effectively looking at *deviations* of the change in the number of women and vote shares relative to their town's averages. Finally, we include main party fixed effects (e.g. PSOE, PP) to account for broader changes in political sentiment, and weight all observations—party lists—by their vote share in 2003 to obtain voter-representative results.

The regression considers 11,556 repeat lists in 4,364 municipalities. The results (Table 5, column 1) indicate that lists in quota towns that were forced to increase their female representation more dramatically fared relatively better, gaining voting share. Note that we are first-differencing the dependent variable, controlling for the initial female shares (including a quadratic term), and saturating the model with town and party fixed effects. It is thus extremely difficult to account for the additional importance of a particular function of the initial relative distance from a 40% female share in lists and towns where the quota was binding using alternative explanations.

While intuitive, the results in column 1 cannot be interpreted quantitatively. Hence, in column 2 we use $D_{ki} \times (0.4 - FemSh_{ki,03})$ as an instrument for the endogenous regressor of interest: $\triangle FemSh_{ki}$, the change in the number of women in party k of municipality i between 2003 and 2007. The inclusion of municipal fixed effects signifies that we are looking at relative changes in vote and female shares within municipalities. Overall, the identification strategy is conceptually based on triple-differencing the data and considering simultaneously: differences in vote shares by party between 2003 and 2007;[20] differences in propensities to introducing more females on the lists between quota and non-quota towns in 2007; and relative differences in how far from the quota each party was in 2003 within its municipality. The results suggest that a party that was forced to increase its female share by 10 percentage points *more than its opponents* experienced a 4.2 percentage point gain, which would on average imply 53 votes shifting party allegiance, out of about 2,500 cast.

[19]Note therefore that the empirical strategy is not based on comparing lists with many initial female candidates to lists with few. Rather, we are conditioning on the initial number of women and comparing parties affected by the quota to non-affected parties.

[20]Note that some lists dropped from contention in 2007, and some new lists appeared; however, the probability of attrition or new list formation was orthogonal to the application of the quota (Casas and Saiz, 2011).

While the effect is relatively modest, we can reject the hypotheses that parties that were fielding fewer women did so because of their unpopularity or lower ability as politicians.

A potential concern with these results is that they may be driven by candidate turnover. Indeed, one of the effects of the quota was to increase the number of new candidates. New candidates may be preferred by voters generally, or be chosen to compete better. In column 3 we thus control for the share of candidates who were new to the list in 2007, but the results do not change. In column 4 we exclude male-holdout towns in order to make sure that we are not solely exploiting the same source of variance as in Tables 3 and 4. Results are similar in towns where more than one party was affected by a binding quota: parties that had to increase their female share by *relatively* more fared *relatively* better.

Note that our research design is not based on a regression discontinuity, because the outcome (vote shares) cannot possibly change in the aggregate across both sides of the boundary that defines the quota (population 5,000), and because of the heterogenity and interdependence of the "treatment dosage" across observations. Nevertheless, it is still interesting to see if the results are sensitive to focusing on municipalities that are very close in terms of population. Concretely, in column 5 of Table 5, we limit our attention to municipalities with populations between 4,000 and 6,000. The 2SLS results are broadly similar to previous ones, but standard errors are three times as large as the ones in the baseline estimation (column 2) and the instruments are consequently weaker. These features are solely driven by the smaller sample size (less than one in ten of the original municipalities): parameter estimates do not change much, but standard errors steadily decrease as we go on increasing sample sizes on both sides of the population distribution.

Finally, we separate municipal elections based on their degree of competitiveness (columns 6 and 7). Remember that, under the "party discrimination" theory, parties whose internal dynamics resulted in gender biases were less likely to survive in very competitive electoral environments. We operationalize a definition of non-competitive municipalities as those where the largest party obtained 7 or more seats (out of a maximum total of 13) in 2003, an absolute majority. Consistent with this theory, gender-discriminating parties seem to have deviated more from the optimal candidate mix in non-competitive environments (column 6), and gained more voter share when forced to field more women.[21]

[21] The one sided- test with the hypothesis that the coefficient on competitive municipalities is larger yields a t-statistic of 1.511 and –given the large sample- a p statistic of 0.065. Alternative definitions of non-competitive environments—such as a high Herfindahl index in inital vote shares, or the difference between the party with the most votes and its closest competitor—always yield the same picture: parties with "exogenously forced" women improved more strongly in less competitive towns.

4.4 Availability of Willing Women, Voter Turnout, and Other Margins of Adjustment

Our results so far point to the presence of internal party dynamics that limit women's political careers. We now conduct further tests for other explanations.

One concern with our earlier results is that the quota forced some parties (especially those with few women) to drop out of the 2007 elections due to a lack of female candidates. In our earlier working paper (Casas-Arce and Saiz, 2011), we show that there was no list attrition or increased difficulty in forming new lists: even lists in quota municipalities with no female candidates at the start were no more likely to drop out of the elections after the quota.

If qualified women had been scarce, another margin of adjustment for parties could have been to increase the retention rate of incumbent female candidates. Since we have the full names of candidates, we can trace their participation across years and lists. Interestingly, in non-quota municipalities, the probability that a woman had already been on a party's list in the previous election—32 percent—was much lower than the equivalent percentage for men—43.55 percent. Women candidates experienced more turnover between elections than men, a fact that is not explained by their position on the list (similar results are obtained conditioning on rank in the list). Therefore, if qualified women candidates were truly scarce, one would expect more efforts geared toward increasing their retention rate. In Panel A of Table 6, we estimate linear probabilistic models where the observations are all candidates the 2003 and 2007 elections (pre- and post-quota). The left-hand-side (dependent) variable is a dummy or indicator variable describing an attribute of each candidate within a party. The main independent variable is an interaction of a dummy for municipalities where the quota was binding with a 2007 indicator. We control for year and municipal fixed effects. In column 1 the dummy variable takes value 1 if the candidate is a woman. In column 2 the dependent variable is a dummy that takes value 1 if the candidate is a *woman appearing on the list for the first time in 2007*. The coefficient estimates are very similar to those in column 1, suggesting that parties did not fill the new female positions required by the quota by increasing retention but rather by bringing in new women candidates. In columns 3 and 4 we repeat these regressions, focusing on the top five positions. While the quota required more female candidates overall, parties could have easily shifted incumbent lower-ranked candidates to the top positions. What we find, however, is that 81 percent of these top-five positions were actually filled with new women candidates. When parties were forced to place women in top positions they did not have major problems filling their lists, and new women

stepped in to take on the challenge.[22] This evidence from Spain is highly consistent with the evidence from French municipalities after the parity law establishing a 50% female quota. Bird (2003) finds that according to a survey of 600 mayoral candidates in France "*78 per cent considered that it was 'easy' to apply the parity law in selecting candidates for their lists.*"

In Panel B of Table 6 we consider voter turnout by municipality. If voters disliked female candidates, general animus against lists with more women could be expressed via lower voter turnout. In fact, turnout seemed to be higher in municipalities with more women on the lists before the quota (column 1) after controlling for observables (number of parties, Herfindahl index of vote shares, and a polynomial in population). Social capital—as measured by voter turnout—and female representation were strongly associated, a finding that we flag for future research. Moreover, when looking at the change in voter partcipation vis-à-vis the change in the share of female candidates (instrumented by the interaction between a quota dummy and 40 percent minus the town's share of female candidates in 2003), we find a positive—but statistically insignificant—effect of female candidates on turnout (column 2). We conclude that the presence of female candidates on the lists did not reduce voter turnout.

The bulk of the evidence is therefore not consistent either with the existence of major supply constraints on qualified female candidates prior to the quota, or with the existence of voter preferences for male candidates.[23]

5 Conclusion

Potential explanations for women's under-representation in democratic governments include the possibility that voters prefer male candidates. Alternatively, parties may not be able to find enough highly-qualified women to run for election. Based on correlational evidence, the existing literature has claimed that female candidates perform as well as males in the electoral contests in which they both run. However, such evidence is also consistent with generalized male-biased voter preferences or low female campaigning ability, which could explain why only a few extraordinary female candidates can afford to credibly compete at the margin.

[22] Casas and Saiz (2011) also show that the new women candidates on the lists were not more likely to have surnames or names associated with a higher socio-economic status, suggesting that the quality of female candidates did not increase.

[23] Of course, the latter could be a reflection of male voters becoming more disengaged together with a compensatory increase in female voter participation. Note that the origin of the voters should not matter to conclude that parties were not following vote-maximizing strategies. Furthermore, we did not find prima-facie empirical support for a hypothesis based on differences in gender turnout post-quota. While the vote is secret and we will never be able to know the identity of voters, we tried to find significant differences in outcomes across towns with relatively larger shares of female registered voters in Casas-Arce and Saiz (2011): we did not find any.

According to voter-taste or candidate-ability theories, parties that were fielding fewer women must have done so in order to gain an electoral advantage. However, using a natural experiment provided by the introduction of quotas in Spain, we strongly rejected that view. On the contrary, such parties modestly gained voting share when more women were mandated onto their lists. The results demonstrate that forcing parties to accept more women through quotas can increase female participation without necessarily decreasing their electability. They also suggest that internal party dynamics are important in accounting for female under-representation.

We have also found that women had been much less likely to run at the top of lists that were highly likely to win seats in the local councils. Therefore—as in Sabonmatsu (2002), Murray (2008), Bagues and Esteve-Volart (2010), and Verge and de la Fuente (2014)—the evidence suggests that *internal party dynamics seem to be especially at play against women when power is at stake.* The results are consistent with local party leaders implicitly discriminating against women by not engaging them often enough (Bird, 2003, Fox and Lawless, 2005). They could also be explained by the endogenous emergence of rent-seeking male coalitions within the parties. Alternatively, the result could indicate that women are effective at generating political ideas and enticing voters, but are less adept at elbowing out internal competitors.

Hence, alternative efficient policy responses could include leveling the playing field *within* political organizations: more reliance on party primaries at all levels, open lists, and more competitive electoral environments with fewer "safe" seats at the disposition of party machines. We hypothesize that such measures could induce more women to participate in the political process without having to impose strict quotas, a testable hypothesis for future research on this topic. In fact, women's representation is much larger in proportional electoral systems (Norris, 2006; Norris and Krook, 2011) where each vote counts, as opposed to majoritarian systems where many seats are de-facto owned and non-competitively allocated by the leadership of the locally-dominant party, especially after redistricting. Affecting the behavior of political machines vis-à-vis gender issues and understanding how competition changes internal party dynamics could thus be key to improving women's chances at equal participation.

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Appendix: Formal results.

The first proposition describes the effects of a quota in the absence of party discrimination.

Proposition 2 (Voter preferences or self-selection)**.** *Suppose that* $d_p = 0$*,* $d_v(p) \geq 0$*, and* f_{pm} *first-order stochastically dominates* f_{pw} *for all* p*. Suppose also that* $W_1 < W_p$ *for all* $p > 1$ *when no female quotas are imposed. Then, introducing a quota* $\underline{W} > W_1$ *and* $\underline{W} < W_p$ *for* $p > 1$ *decreases the number of votes for party* 1*, and increases the number of votes for all other parties. Furthermore, if turnout is increasing in* V_p *for all* p*, then the quota also decreases turnout.*

Proof. Notice that because $d_p = 0$, all parties choose $\underline{a}_{pw} - \underline{a}_{pm} = d_v(p)$. Define the function $\Psi\left(\underline{a}_w^{'}\right) = \int_{\underline{a}_w^{'}}^{\underline{a}_w} a f_{pw}(a)\, da - \int_{\underline{a}_m}^{\underline{a}_m^{'}} a f_{pm}(a)\, da - d_v(p) \int_{\underline{a}_w^{'}}^{\underline{a}_w} f_{pw}(a)\, da$, where $1 - F_{pw}(\underline{a}_w) - F_{pm}(\underline{a}_m) = 1 - F_{pw}\left(\underline{a}_w^{'}\right) - F_{pm}\left(\underline{a}_m^{'}\right) = 0$ and $\underline{a}_w - \underline{a}_m = d_v(p)$. It is easy to see that $\Psi\left(\underline{a}_w^q\right) = \Delta V_1$ when $p = 1$ and $1 - F\left(\underline{a}_w^q\right) = \underline{W}$. This means that $\Psi\left(\underline{a}_w^q\right)$ measures the change of party p's votes after the introduction of quotas. If we differentiate with respect to $\underline{a}_w^{'}$ we obtain:

$$\begin{aligned}\frac{\partial \Psi}{\partial \underline{a}_w^{'}} &= -\underline{a}_w^{'} f_{pw}\left(\underline{a}_w^{'}\right) - \underline{a}_m^{'} f_{pm}\left(\underline{a}_m^{'}\right) \frac{\partial \underline{a}_m^{'}}{\partial \underline{a}_w^{'}} - d_v(p) f_{pw}\left(\underline{a}_w^{'}\right) \\ &= -f_{pw}\left(\underline{a}_w^{'}\right)\left[d_v(p) - \left(\underline{a}_w^{'} - \underline{a}_m^{'}\right)\right]\end{aligned}$$

The equality in the second line follows from the fact that $f_{pm}\left(\underline{a}_m^{'}\right) \frac{\partial \underline{a}_m^{'}}{\partial \underline{a}_w^{'}} = -f_{pw}\left(\underline{a}_w^{'}\right)$.[24] Finally, notice that $\frac{\partial \Psi}{\partial \underline{a}_w^{'}} < 0$ whenever $\underline{a}_w^{'} - \underline{a}_m^{'} < d_v(p)$. Because party 1's policy was maximizing its share of the votes, it must be the case that $\underline{a}_w^{'} - \underline{a}_m^{'} < d_v(p)$, and hence $\frac{\partial \Psi}{\partial \underline{a}_w^{'}} < 0$, for all $\underline{a}_w^{'} \in \left(\underline{a}_w^q, \underline{a}_w\right)$. As a result, $\Psi\left(\underline{a}_w^q\right) < 0$ and V_1 falls when the quota is introduced.

Because the optimal policies of the other parties are unaffected by party 1's list, and are therefore the same before and after the quota, V_p does not change for $p > 1$. As a result, both party 1's share of the votes and turnout fall, while the vote share for the other parties increases. □

The next proposition describes the effect of quotas under party discrimination. We restrict attention to vote share functions ϕ_p that are either separable in V_p and V_{-p}, or take the form $\phi_p(V_p, V_{-p}) = \psi_p(V_p) / \sum_{n=1}^{N} \psi_n(V_n)$. These are very natural forms that arise in several contexts. For instance, consider a linear voting model in which two parties are located

[24] The last equality follows from differentiating the equation $1 - F_{pw}\left(\underline{a}_w^{'}\right) - F_{pm}\left(\underline{a}_m^{'}\right) = 0$ with respect to $\underline{a}_w^{'}$.

at the extremes of the $[0,1]$ interval and voters are distributed uniformly along the line. We represent the preferences of a voter located in $x \in [0,1]$ as: $u(x,p) = v_p - \frac{t}{2}|p-x| + A_p - d_v(x) W_p$, where $u(x,p)$ represents the utility from voting for the party located in $p \in \{0,1\}$. The term $-\frac{t}{2}|p-x|$ captures the disutility from voting for a party whose policy p differs from the preferred policy x. The parameter t measures the degree of competition between the two parties (how substitutable they are for voters). Suppose also that the utility from not voting is sufficiently low to induce all voters to turn out to vote. Then, the marginal voter is implicitly defined by the equation: $\overline{x} = \frac{1}{2} + \frac{1}{t}\left[(A_0 - A_1) - d_v(\overline{x})(W_0 - W_1)\right]$.[25] This equation also defines the vote shares of the two parties, assuming that ϕ_p are separable in V_p and V_{-p} is a generalization of such a model. Alternatively, another common approach to modeling political elections is to assume a Tullock contest success function, which takes the form $\phi_p(V_p, V_{-p}) = \psi_p(V_p) / \sum_{n=1}^{N} \psi_n(V_n)$. In this case, we can interpret $\psi_p(V_p)$ as the votes received by party p and $\sum_{n=1}^{N} \psi_n(V_n)$ would be the total voter turnout.

Proposition 3 (Party discrimination)**.** *Let ϕ_p be either separable in V_p and V_{-p}, or take the form $\phi_p(V_p, V_{-p}) = \psi_p(V_p) / \sum_{n=1}^{N} \psi_n(V_n)$. Suppose that $d_p > 0$, while $f_{pw} = f_{pm}$, and $d_v = 0$ for all p. Suppose also that $W_1 < W_p$ for all $p > 1$ when no female quotas are imposed. Then, introducing a quota $\underline{W} > W_1$, $\underline{W} < W_p$ for $p > 1$, and $\underline{W} \leq \frac{1}{2}$ increases the share of votes for party 1 and decreases votes for all other parties. Furthermore, if turnout is increasing in V_p for all p, then the quota increases turnout.*

Proof. Prior to the introduction of the quota, parties select candidates by setting $\underline{a}_{pw} - \underline{a}_{pm} = d_p \left(\frac{\partial \phi_p}{\partial V_p}\right)^{-1}$. Notice that $\underline{a}_{pw} - \underline{a}_{pm} > 0$, while voters would prefer parties to set $\underline{a}_{pw} = \underline{a}_{pm}$. Furthermore, because $f_{pw} = f_{pm}$ and $\underline{W} \leq \frac{1}{2}$, party 1 still sets $\underline{a}^q_{1w} - \underline{a}^q_{1m} > 0$ after the quota is introduced. Hence, $\partial \Psi / \partial \underline{a}'_w \geq 0$ for all $\underline{a}'_w \in [\underline{a}^q_w, \underline{a}_w]$. As a result, it must be the case that V_1 increases after the quota. Furthermore, it must be the case that party 1's share of the votes ϕ_1 increases as well. We show this for each of the two cases.

Suppose that ϕ_p is separable in V_p and V_{-p}. Then, $\partial \phi_p / \partial V_p$ depends only on V_p and not on V_{-p}. As a result, $\underline{a}_{pw} - \underline{a}_{pm}$ does not change after the quota for all parties $p > 1$. Because V_1 increases, it must be the case that ϕ_p decreases for all $p > 1$, while ϕ_1 increases.

Suppose now that $\phi_p(V_p, V_{-p}) = \psi_p(V_p) / \sum_{n=1}^{N} \psi_n(V_n)$, and suppose by contradiction that party 1's vote share decreases. Because V_1 increases, $\sum_{n=1}^{N} \psi_n(V_n)$ must also be higher after the quota. Furthermore, there exists another party $p > 1$ that gains vote share, so that $\sum_{n \neq p} \psi_n(V_n) / \sum_{n=1}^{N} \psi_n(V_n) = 1 - \psi_p(V_p) / \sum_{n=1}^{N} \psi_n(V_n)$ decreases after the quota. Then, it must be the case that $\left(\sum_{n=1}^{N} \psi_n(V_n)\right)^2 / \sum_{n \neq p} \psi_n(V_n)$ increases. Notice that $\left(\frac{\partial \phi_p}{\partial V_p}\right)^{-1} =$

[25] See our companion working paper for more details.

$\left(\sum_{n=1}^{N}\psi_n(V_n)\right)^2 / \sum_{n\neq p}\psi_n(V_n)$. Hence, $\underline{a}_{pw} - \underline{a}_{pm}$ increases and party p would be selecting fewer women than before. Because that reduces the average ability of its candidates, V_p (and hence $\psi_p(V_p)$) must decrease. But this contradicts the fact that party p increases its share of votes.

Next, we show that turnout cannot fall when all voters vote before the quota. To see this, assume instead that $\sum_{n=1}^{N}\psi_n(V_n)$ falls after the quota. Because party 1 gains vote share, there must be another party $p>1$ that loses vote share. As a result, $\sum_{n\neq p}\psi_n(V_n) / \sum_{n=1}^{N}\psi_n(V_n) = 1-\psi_p(V_p) / \sum_{n=1}^{N}\psi_n(V_n)$ increases, and hence $\left(\sum_{n=1}^{N}\psi_n(V_n)\right)^2 / \sum_{n\neq p}\psi_n(V_n)$ decreases after the quota. This means that $\underline{a}_{pw} - \underline{a}_{pm}$ decreases and party p would be selecting more women than before. Because this increases V_p, and turnout is lower, party p must gain vote share, in contradiction to what we assumed. It follows that turnout must increase after the quota.

Finally, suppose that party $p>1$ gains vote share after the quota, so that $\sum_{n\neq p}\psi_n(V_n) / \sum_{n=1}^{N}\psi_n(V_n)$ decreases, and hence because $\sum_{n=1}^{N}\psi_n(V_n)$ increases, $\left(\sum_{n=1}^{N}\psi_n(V_n)\right)^2 / \sum_{n\neq p}\psi_n(V_n)$ also increases after the quota. This means that $\underline{a}_{pw} - \underline{a}_{pm}$ increases and party p would be selecting fewer women than before. Because this decreases V_p, and turnout is higher, party p must lose vote share, in contradiction to what we assumed. It therefore follows that no party $p>1$ can gain vote share after the quota. □

TABLE 1

Panel A:

Lists With More Women at the Top Tend to Obtain Fewer Votes…

	Share of Total Votes for List in 2003 Elections			
	(1)	**(2)**	**(3)**	**(4)**
Share of Women on List (Top Five Positions)	-0.112 ***	-0.128 ***	-0.137 ***	-0.186 ***
	(0.009)	(0.012)	(0.011)	(0.019)
Municipality Fixed Effects	No	Yes	Yes	Yes
Party Fixed Effects	No	No	Yes	Yes
Only Two Main Parties	No	No	No	Yes
N (Lists)	14,333	14,333	14,333	8,503
Municipalities	4,581	4,581	4,581	4,440

Panel B

… but This Seems Mostly Due to Reverse Causation

	Share of Women on List (Top Five Positions)		
	(1)	**(2)**	**(3)**
Share of Total Votes for List in 2003 Elections	-0.129 ***	-0.109 ***	-0.100 ***
	(0.013)	(0.017)	(0.036)
List Wins 2003 Elections			-0.005
			(0.010)
Municipality Fixed Effects	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes
Only Two Main Parties	Yes	Yes	Yes
N (Lists from PSOE and PP)	8,114	8,114	8,122
Municipalities	4,057	4,057	4,057
Method	**OLS**	**IV: Vote Shares in 1999 Euro Elections**	
F-Test of Excluded Instruments	n.a.	2,573	1,059
P-Value of Sargan Test	n.a.	0.0024	0.002

Notes:

H0: Parameter=0: *** P<001; **P<0.05 ; *P<0.1.

The results in Panel A display estimates of the OLS coefficients of the share of women in the top five positions of a party's list on the total vote share won by that list in the 2003 municipal elections. Column (1) displays uncontrolled regressions; column (2) introduces municipality fixed effects (all the variation is in the female share within a town); column (3) introduces major political party fixed effects; and column (4) is limited to the lists fielded by the two larger national parties, PP and PSOE. Panel B shows the reverse-regression where the share of women in the top five positions on the party list in 2003 is the dependent variable and the share of votes in 2003 is the main explanatory variable. With unbiased party expectations, the average share of votes will proxy for ex-ante expectations about electoral outcomes. Column (1) limits the estimation to municipalities where both PP and PSOE presented a list (89% of all relevant municipalities). In column (2) we use a 2SLS specification and intrument for the share of votes won by the two parties by municipality in 2003 with the parties' vote share in that locality in the 1999 European elections. We restrict all estimates in the table to municipalities with populations below 10,000 inhabitants in order to make the results comparable with those in other tables.

TABLE 2

Male-Holdout Lists: Observable Characteristics

	QUOTA	NON-QUOTA			
	Population Between 5,000 and 10,000	*Population Below 5,000*		*Differences in Means*	
	All	All	Weighted Matched Sample	Raw	Matched
	(1)	(2)	(3)	(4) (1)-(2)	(5) (1)-(3)
Initial Vote Share	**0.27**	**0.45**	**0.27**	**-0.17** ***	**0.00**
	0.02	0.01	0.01	0.02	0.02
Initial Number of Women on List	**0.17**	**0.14**	**0.17**	**0.03** ***	**-0.01**
	0.01	0.00	0.00	0.01	0.01
Initial Electoral Participation	**0.72**	**0.79**	**0.72**	**-0.06** ***	**0.01**
	0.01	0.00	0.01	0.01	0.01
Number of Parties in Election	**4.25**	**2.90**	**4.09**	**1.34** ***	**0.17**
	0.14	0.03	0.06	0.10	0.11
Initial Herfindahl Index (Vote Shares)	**0.39**	**0.49**	**0.39**	**-0.09** ***	**0.00**
	0.01	0.00	0.01	0.01	0.01
Socialist Party (PSOE)	**0.14**	**0.32**	**0.15**	**-0.18** ***	**-0.02**
	0.03	0.01	0.02	0.05	0.03
Conservative Party (PP)	**0.38**	**0.48**	**0.38**	**-0.09** *	**-0.01**
	0.05	0.02	0.02	0.05	0.04
Izquierda Unida (IU)	**0.21**	**0.05**	**0.19**	**0.16** ***	**0.02**
	0.04	0.01	0.02	0.02	0.04
Esquerra Republicana de Catalunya (ERC)	**0.03**	**0.03**	**0.03**	**0.00**	**0.00**
	0.02	0.00	0.01	0.02	0.02
Convergencia I Unio (CIU)	**0.05**	**0.05**	**0.04**	**0.01**	**0.01**
	0.02	0.01	0.01	0.02	0.02
Partido Andalucista (PA)	**0.07**	**0.01**	**0.07**	**0.06** ***	**0.01**
	0.03	0.00	0.01	0.01	0.02
Bloque Nationalista Galego (BNG)	**0.02**	**0.01**	**0.02**	**0.01**	**0.00**
	0.01	0.00	0.02	0.01	0.01
Number of Lists/Municipalities	111	1,100	375		

Notes:

H0: |Difference in Means|>0: *** P<001; **P<0.05 ; *P<0.1.

Columns (1) through (3) present the means (in bold face) and standard deviations (regular font) of the observable variables that apply to male-holdout lists. Some of the characteristics pertain to the list and some to the municipality in which the list competed. Male-holdout lists are defined as those that were alone in their municipalities in fielding less than 40 percent of women in the top five positions in 2003. In other words, all lists in these municipalities except for male-holdout lists were already above the quota target. We include male-holdout lists that competed in both the 2003 and 2007 elections. In the first column we show descriptives for male-holdout lists in municipalities where the quota became binding in 2007 (populations between 5,000 and 10,000). In column (2), we show data for municipalities where the quota did not apply in 2007 (populations between 0 and 5,000). In the third column, we present descriptive statistics for those male-holdout municipalities that we matched to the quota ones using propensity scores. In order to calculate propensity scores, we used all the variables in this Table to fit a quota-dummy logit model. We then matched each observation in the quota group to the ten closest observations in the non-quota group based on the estimated propensity score, allowing for repetition across matches. Columns (4) and (5) present tests of differences in means between the quota and the broader and matched non-quota samples respectively. Differences in means are in bold face and standard deviations of these are below each estimate. While quota and non-quota observations are very different, we cannot reject equality in averages across the quota and matched non-quota groups.

TABLE 3

Evolution of Vote Shares in Male-Holdout Lists

			Average Change in Vote Share of Male-Holdout Lists Between 2003 and 2007			
			Number of Women in Opposition Parties Unchanged	Number of Women in Opposition Parties Increases	Number of Women in Opposition Parties Decreases	All Male-Holdout Lists
			(1)	**(2)**	**(3)**	**(4)**
Matched Municipalities in which the Quota is not Binding	**(1)**	List Had Less Than 40% Women in 2003 and 2007	-0.051	0.008	-0.065	-0.047
			(0.010)	(0.020)	(0.017)	(0.008)
		Complier Control	*102*	*29*	*75*	*206*
	(2)	List Had Less Than 40% Women in 2003 but 40% or More in 2007	-0.027	-0.036	0.000	-0.020
			(0.009)	(0.019)	(0.011)	(0.007)
		Non-Complier Control	*92*	*23*	*54*	*169*
	(3)	**Overall in Control Lists**	-0.040	-0.013	-0.037	-0.035
			(0.007)	(0.014)	(0.011)	0.006
		N Control	*194*	*52*	*129*	*375*
Quota Binding	**(4)**	List Was Bound by the Quota	-0.022	-0.006	0.049	-0.014
			(0.008)	(0.024)	(0.039)	(0.008)
		N Quota	*86*	*16*	*9*	*111*
	(5)	Average Effect of a Binding Quota	0.017	0.007	0.086	0.021
		P-Value Difference in Means Test	***0.085***	**0.765**	**0.002**	**0.018**
	(6)	Wald Estimate of Effect of 40% Women on List	0.036	0.014	0.153	0.041
		P-Value Difference in Means Test	**0.081**	**0.767**	**0.002**	**0.017**

Notes:

Each cell in this Table displays average changes in vote shares between 2003 and 2007 among male-holdout lists in 2003 that also competed in 2007. See Table 2 for the definition of "male-holdout" lists. Rows (1) through (4) cross-tabulate data by quota compliance in 2007 and by the average reaction of lists competing in the same municipalities as male-holdouts (columns (1) through (4)). Rows (1) through (4) show average changes in voting shares, displayed together with estimated standard errors of their means (in parentheses) and the number of observations in each cell (in italics). Non-quota observations correspond to the propensity-score matched observations in Table 2, column (3). Row (1) focuses on lists in towns where the quota did not apply and that fielded less than 40% of female candidates in the top five positions (compliers with their control [non-quota] assignment). Row (2) focuses on data for lists that were in non-quota towns but that decided to apply the 40% quota (non-compliers with their control [non-quota] assignment). Row (3) shows average vote-share changes for all non-quota observations. Row (4) shows average vote-share changes for male-holdout lists that were affected by the quota in 2007. Row (5) presents average (and p-values in bold font) for the null hypotheses of zero differences between quota and non-quota groups. Row (6) presents Wald estimates (and p-values in bold font) that adjust for the actual probability of receiving the 40% female treatment between quota and non-quota groups. Column (1) focuses on male-holdout lists in towns where the competing parties had changed their female share between 2003 and 2007 by less than 10 percentage points on

TABLE 4

Nonlinear Effect of Quota on Male-Holdout Lists by Initial Vote Share

	ΔShare of Vote 07-03		Share of Vote in 2007			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Quota is Binding	**0.023**	**0.020**	-0.034 **	0.007	-0.015	
	(0.011) **	(0.012) *	(0.01)	(0.017)	(0.021)	
Quota is Binding x List's 2003 Share of Vote			**0.088** **	**0.088** *	**0.086** *	
			(0.038)	(0.016)	(0.045)	
40% Women in Top Five Positions						-0.018
						(0.057)
40% Women in Top Five Positions x List's 2003 Share of Vote						**0.157** *
						(0.092)
List's 2003 Share of Vote			0.811 ***	0.718 ***	0.721 ***	0.621 ***
			(0.02)	(0.067)	(0.065)	(0.109)
List's 2003 Share of Vote Squared				0.104	0.104	0.159 *
				(0.079)	(0.077)	(0.095)
Initial Female Share in the Top Five				0.029	0.032	-0.028
				(0.034)	(0.034)	(0.053)
Initial Herfindahl Index				-0.232 ***	-0.231 ***	-0.244 ***
				(0.035)	(0.035)	(0.036)
Number of Parties in Election				-0.048 ***	-0.049 ***	-0.048 ***
				(0.004)	(0.004)	(0.004)
Initial Voter Turnout				0.012	0.013	0.004
				(0.040)	(0.041)	(0.043)
Initial List Vote Share as Weights	Yes	Yes	No	No	No	No
Main Party Fixed Effects	No	Yes	Yes	Yes	Yes	Yes
Quadratic in Population Levels	No	No	No	No	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	IV=Quota Dummmy and Interaction
R-Squared	0.002	0.0189	0.714	0.754	0.754	0.731
N				*1,211*		
F-Test of Excluded Instruments						12.774

Notes:

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Columns (1) and (2) present OLS regressions with the change in vote share by electoral list between 2003 and 2007 as the dependent variable. All male-holdout electoral lists in municipalities with populations below 10,000 are included, and vote shares in 2003 are used as weights. See Table 2 for the definition of "male-holdout" lists. Column (2) controls for national/regional party fixed effects. Columns (3) through (6) present specifications where the vote share by list in 2007 is the main dependent variable. We control for a quadratic in vote shares in 2003 and other controls, including political party fixed effects. The main independent variables are a dummy for the Equality Law (the quota is binding in municipalities with populations above 5,000) and its interaction with the initial vote share of the list in the 2003 elections; the purpose here is to acknowledge that any impacts of the law are likely to be contingent on initial vote shares (e.g., a fringe list, with a vote share of 3%, is unlikely to see a change in magnitude equivalent to that of a very popular list, with a vote share of 40%). Column (5) includes a quadratic in population levels: these variables are never close to conventional significance levels, as expected due to the fact that changes in vote shares are zero-sum within municipalities. Column (6) uses the interactions between the quota dummy and initial vote shares as instruments for actually moving to 40% female representation and interaction with initial vote shares.

TABLE 5

Positive Impact of Women on Electoral Results: All Lists and Candidates

	Change in Share of the Vote for List 2007-2003						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All Towns			Excludes Male-Holdout Towns	Pop. 4,000-6,000	Non-Competitive Elections	Competitive Elections
Change in Female Share on the List		0.424 ***	0.446 ***	0.375 ***	0.303	0.518 ***	0.272 *
		(0.116)	(0.121)	(0.141)	(0.283)	(0.190)	(0.156)
(0.4-Female Share in 2003) x Quota Binding	0.166						
	(0.057) ***						
Share of Candidates Repeating from 2003 List			0.039 ***				
			(0.013)				
Observations (Lists by Municipality in 2007)	11,556	11,556	11,556	8,573	1,195	2,141	9,415
Number of Municipalities	4,364	4,364	4,364	3,153	376	737	3,627
2SLS: Instrument	None (OLS)	(0.4-Female Share in 2003) x Quota Binding					
Controls for Quadratic in Female Share in 2003	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Municipality Fixed Effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Party Fixed Effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Weights	*Party Vote Share in 2003*						
F-Test of Excluded Instrument	n.a	*241.60*	*217.65*	*159.74*	*20.00*	*66.49*	*140.31*

Notes:

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

The main dependent variable in all specifications is the change in vote shares between 2003 and 2007 by list in all repeat lists in municipalities with populations below 10,000. All specifications include town and national/regional party fixed effects and use 2003 vote shares as weights. Column (1) presents OLS regressions where the main independent variable is the interaction between a dummy taking value 1 if the quota was binding for the list (the quota applied in its municipality, and the list was initially fielding less than 40% women candidates), and the distance between 40% and the share of female candidates on the list in 2003. As in the other specifications in this Table, the regression controls for a quadratic in the lists' 2003 female share: the rationale here is that an additional arbitrary piecewise function of the distance from the initial female share to 40%—applying only to an arbitrary set of towns—should not matter unless the quota did have an effect on electoral results. In columns (2) through (7) we use the pre-existing distance from a 40% female share interacted with a dummy for the quota being binding in 2007 to instrument for the change in the female share in the list between 2003 and 2007. The instrument is typically very strong, as captured in the first-stage F-statistics of the last row: parties that were further away from the quota in towns where it was applicable were forced to introduce more women on their lists. In column (3) we control for general candidate turnover. Column (4) excludes municipalities with a single "male-holdout" list as defined in Table 2: here, there is no overlap with the samples in Tables 2, 3, and 4. Column (5) focuses on municipalities with populations between 4,000 and 6,000. Columns (6) and (7) present results for the alternate sub-samples of non-competitive and competitive elections. We define non-competitive elections as those in which one party enjoyed an absolute majority in the municipal council in 2003.

TABLE 6

Effects of Quotas on Female Candidate Promotion and Voter Turnout

Panel A: New Women on Lists Where the Quota Was Binding

	All Candidates		*Top 5 Positions*	
	Female Candidates	Female Candidates Appearing Only on the 2007 List	Female Candidates	Female Candidates Appearing Only on the 2007 List
	(1)	**(2)**	**(3)**	**(4)**
Quota Applies x 2007	0.082	0.084	0.08	0.065
	(0.007)***	(0.006)***	(0.011)***	(0.009)***
Municipal and Year Fixed Effects	yes	yes	yes	yes
Observations: All Candidates on All Lists and Relevant Municipality, by Year	125,676	125,676	54,614	54,614
Sample (Years)	2003 and 2007		2003 and 2007	
Method	OLS	OLS	OLS	OLS
Number of Municipalities	4,662			
R-Squared	0.01	0.01	0.01	0.01

Panel B: Voter Turnout in Towns Where the Quota Was Binding

	(1)		**(2)**	
	Town's Average Voter Participation Rate: 2003		Town's Average Change in Voter Participation Rate: 2003-2007	
Town's Average Share of Female Candidates: 2003	0.074			
	(0.012)***			
Town's Average Change in Share of Female Candidates: 2003-2007			0.042	
			(0.043)	
Observations: Municipalities	4,662			
Method	OLS		IV	
IV	None		Quota Applies x Distance from Quota	
Other Town Variables in Table 3	yes	yes	yes	yes
R-squared				

Notes:

Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A offers the results of OLS regressions where the dependent variable is a dummy taking value 1 if the characteristics in the top row apply (e.g. female=1, male=0). Each individual observation corresponds to a candidate in all electoral lists in towns with populations below 10,000, including both the 2003 and 2007 samples. All regressions include municipal and year fixed effects. The coefficient is the interaction between a 2007 (post-policy) dummy and the quota dummy (towns above 5,000), and therefore captures the diff-in-diffs estimates of the quota on the share of candidates for which the dependent variable takes value 1 (e.g. change in female share). Panel B presents OLS regressions where the unit of observation is each municipality. In column (1) we focus on the voter participation—or turnout—rate (valid votes/registered voters) in 2003 (pre-quota): the main explanatory variable is the total share of female candidates in the elections, and we also control for all town observable variables contained in Table 2. In column (2) the main dependent variable is the change in the voter participation rate by town between the 2003 and 2007 elections. The main explanatory variable is the change in the share of female candidates, which we instrument in a 2SLS specification using the interaction between a quota dummy and the initial distance of the average town's female share from 40% (variables in Table 2 that pertain to the municipality are included).