

Do women spearhead increased female political representation?

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Abstract

Women remain underrepresented in most legislative bodies around the World. In this paper, we investigate if the election of a woman for office spearheads female representation. We rely on administrative data and close elections in Denmark from 1993 to 2017 to estimate the difference between marginally electing an additional woman compared to electing an additional man. Specifically, we focus on local elections, where a woman marginally wins a seat over a man competing for the same seat. Local elections in Denmark are proportional and most parties run on open lists where the number of personal votes alone decides who gets the seats that the party wins in the elections. Within clusters of each municipality, party list, and election year, this creates a number of close elections and in some of these, a woman marginally beats a man or not. We use this as a source of random variation in the share of elected women both within each party list and within each municipality board to estimate effects of increased female representation. Our findings show that a woman marginally elected increases the share of women within the same party in the succeeding election. The effect is driven by incumbent women being more likely to rerun, while an additional woman reduces the share of new female candidates in the future candidate pool. Other parties within the municipality also increase their share of women in the subsequent election.

1. Introduction

Women suffrage was granted in most countries more than a century ago, but even if women's political representation have increased in the meantime, women still remain underrepresented at all levels of decision-making worldwide and achieving gender parity in political life is still far off.¹ The gender gap has significant consequences in terms of quality of government and substantive representation (Besley et al., 2017; Croson and Gneezy, 2009; Chattopadhyay and Duflo 2004). Also it is a sign of inequity in possibilities for political participation. Hence, even stable democracies may be far less democratic than they seem, as they persistently suffer from gender democratic deficits.

It is widely argued that the election of more women is crucial to closing the gender gap. More women on the ballots and more female officeholders are expected to increase empowerment of women, encourage more women to vote and demonstrate that women can accomplish office, this again increasing women's political efficacy and willingness to run. Indeed, recent research based on experiments with randomized gender quotas in India identifies a number of important mechanisms in such a virtuous feed-back cycle (Bhavnani 2009; Beaman et al. 2009; Deininger et al. 2015). This suggests that the election of a woman should spearhead increased descriptive representation as well as women's political participation broadly. However, the virtuous cycle of representation has not been causally identified in settings where there are less negative gender norms. Broockman (2014) concludes that unlike in India the election of an additional woman in the US appears unable to break the barriers to equal representation. Similarly, Gilardi (2015) finds that the first women who run for office in Swiss municipalities generate spillovers that lead to more women running subsequently, but that this effect only is found in the early stages of women suffrage. Thus, the state-of-the art remains inconclusive about the causal effects of the marginal election of a woman in settings with a high level of gender equality. Therefore, we set out to investigate if the election of a woman can spearhead the political representation of other women in a setting with strong norms on gender equality. Specifically, we ask three research questions: Firstly, is there a causal effect of increased women representation on the future supply of women candidates in the same party? Second, is the effect contingent on the pool of women candidates at the

¹ UN Women:
https://www.unwomen.org/en/what-we-do/leadership-and-political-participation/facts-and-figures#_ednref14

outset? And third, is there a diffusion to other parties in the sense that they increase the supply of women candidates in future elections?

As a test bed, we use Danish local elections. Denmark has comparatively strong norms on gender equality, with a long history of women participating fulltime in the paid labor force. Currently, Denmark ranks second in the EU gender equality index (European Institute for Gender Equality 2020). Still, Denmark also has a persistent gender gap in political representation at the local level, where the proportion of women in the local councils has stagnated at around one third since 1989 (Kjaer and Kosiara-Pedersen 2019; Dahl and Nyrup 2021). This makes the setting particularly well suited for investigating the causal effect of the election of a woman in a setting with high levels of female participation. If the positive dynamics are found here, they may also be found in other settings. Hence, Denmark can be seen as a least likely case for a gender gap to persist.

We rely on administrative data linked to the universe of candidates for local office in Denmark from 1993 to 2017. For causal identification, we exploit that local elections in Denmark are proportional and most parties run on open lists where the number of personal votes alone decides who gets to occupy the seats won by the party. Within municipality, party list, and election year this generates a number of close elections where a woman marginally beats a man or not. We use this as a source of random variation in the share of elected women.

The contribution of the article is to causally identify how the marginal election of a woman spearheads future female representation also in a setting with high levels of gender equality. We find that for parties marginally electing a woman the share of women appearing on the list in the following election increases, but the effect disappears two elections after. This is surprising as the analysis shows, that the effect of having an additional woman elected is higher when the pre-existing share of elected women is higher. Furthermore, parties within the same municipality run a larger share of women on their list in the following election. Based on these findings we discuss why the level of descriptive representation remains stagnating.

2. Do female politicians empower women to participate in politics?

The election of more women could trigger a virtuous cycle crucial to closing the gender gap. Randomized experiments with gender quotas in India have become a valuable source of knowledge on how causal effects in this cycle unfold. Strong incumbency effects are identified at the local elections (Bhavnani 2009; Beaman et al. 2009). Also women are found to win more frequently in previously reserved areas after the removal of the policy. This occurs as new women candidates have more success against incumbent women than incumbent men, and because women incumbents run for reelection less frequently than incumbent men, leaving more open seats (Clayton and Tang, 2018).

In addition to the incumbency effect a number of interesting spillovers are identified. Firstly, the level and quality of women's political representation, their ability to hold leaders to account, and their willingness to contribute to public goods increase (Deininger et al. 2015). Second, improved effects on girls' aspirations and educational attainment and improvement in voters' perceptions of female leaders are found (Beaman et al. 2009). Positive effects of quotas are also found in countries with higher levels of female political representation and less negative gender bias. In Sweden the employment of a zipper quota in 1993 by the Social Democratic Party, led to the crowding out of mediocre men, as more women got represented (Besley et al. 2017) and to a long term increase in the pool of female candidates and political leaders (O'Brien and Rickne 2016). In Norway, a demand on the local executive board to comprise at least 40% politicians of each gender, caused more women to enter the executive board after the reform, though spillovers on women's representation in the local council, and on the probability of a female mayor or top administrator proved weak (Geys and Sørensen 2019). Thus, studies undertaken in quota settings have causally identified elements in the virtuous feed-back cycle.

However, it has been contested if there is a causal effect of a woman marginally elected in non-quota settings where the initial level of female representation is relatively high (Broockman 2014; Gilardi 2015). Gilardi (2015) finds that the election of a woman is associated with a 10% increase in female candidates in neighbouring municipalities, but only in the early stages of womens' suffrage, which came late in Switzerland. This relationship decreases over time and it is driven by female candidates in units with no female incumbents. Based on this Gilardi concludes that role models are important only in the early stages of

women suffrage. Unfortunately, the data does not measure the partisan affiliation of the candidates, and hence it does not allow for an analysis of party dynamics. Broockman (2014) finds that the marginal election of women in competitive US state legislative elections has no discernible effects on other women's political participation in terms of voting or mobilization of candidates. He does, however, find that women appear more frequently on the ballot after being elected due to incumbency.

These studies lead Broockman (2014) to conclude that role model effects are unlikely to break the gender gap in countries with high levels of female participation. The role model effect signifies the possibility that female politicians can challenge dominant norms about the suitability of women for politics. Thus, women politicians may encourage greater interest in political participation among girls and other women (Campbell, 2006; Gidengil et al., 2010). Certainly, women can inspire other women to participate, but this is more likely to happen if there is a closeness in geography, relations or attitudes. For instance, an individual's feelings about a particular candidate may affect whether or not that candidate is actually able to inspire that individual to run herself (Bonneau and Kanthak 2020; Ladam, Harden, and Windett 2018). Hence, a woman elected is more likely to mobilise more women in her own party and district than in neighbouring districts. Broockman is very well aware of this as he identifies the geographical distance in order to model where elites and potential female candidates might learn of women's electoral victories and witness women serving in office (Broockman, 2014: 195). Given the electoral system in the US it may be difficult to measure diffusion in the same district and across parties, but role model effects are less likely to be found in neighbouring constituencies than in the same district. Hence, attempts should be made to identify this mechanism within the same district and party.

The contagion effect signifies the situation where the success of a woman on one party list has an impact on other parties. This may happen as the election of women demonstrates that there is no electoral penalty associated with women candidates and because parties feel increased pressure to promote women themselves, when a woman is elected in a competing party (Matland and Studlar 1996, 712). Janowski et al. (2021) estimate the effect for four parties separately on the number of women candidates on the top of the party lists for the three other parties in the same electoral district in the next election in Poland. For the two parties closest to the political center there is no effect. For the two more radical parties the results show that when these parties barely elect a woman to parliament instead of a man, the other parties show significant

differences in the number of women placed at top positions. Interestingly, the treatment effects are reversed for the two parties. When the right-wing PiS elects a woman instead of a man, the other parties are more likely to nominate more women at the top of the party list as well. When the left-wing SLD elects a woman, the other parties are more likely to nominate more men to the top of their party list. Hence, a contagion from the right is identified. This result underlines that the dynamics may be highly contingent on the party system.

Thus, what we do know from the existing body of research is that mechanisms in the virtuous cycle have been causally identified in quota-settings and in contexts with comparatively low levels of female participation. What we still need to find out, however, is why the same mechanisms have not been identified in non-quota settings with high levels of gender equality. Also, the discussion shows that there is a need to study this in a multiparty system, where the cost of adding a woman to the ballot are low for competing parties and where role model effects are more likely due to higher levels of organizational and geographical proximity.

2.1 Incumbency effects

The most direct effect of a woman being elected to office is the incumbency effect. Incumbents have electoral advantages due to direct benefits from holding office, such as media exposure and established policy networks (Hirano and Snyder 2009). Furthermore, political parties prefer political candidates who have proven that they can be elected, and thus incumbents are more likely to become nominated (Murray 2008). In line with this, incumbents have the advantage of already being known to the voters. The incumbency effect disproportionately barriers women from entering office, as the majority of officeholders elected are men, but in principle women are likely to hold the same incumbency advantages as men, once they become elected. Empirical studies of female incumbency support this. It is well documented that there is a strong incumbency advantage in the US including for women (Gelman and King 1990, Lee 2008, Broockman 2014). In fact, some studies show that women in the US are more likely to be reelected than men (Ferreira and Gyourko 2014). As said, results from India show that female incumbents in state elections are more likely than male incumbents to re-contest (Bhalotra, Clots-Figueras, and Iyer 2018). On the other hand, a number of studies find that incumbency effects are weaker for women than for men. Female mayors in Brazil have a lower re-election probability than men apparently because they exploit the powers of holding office in a less corrupt manner (Brollo and Troiano 2016). In

addition to these studies from first-past-the-post systems, female incumbency is also found in Poland which has open-lists and proportional representation (Jankowski, Marcinkiewicz, and Gwiazda 2019). Similarly, local elections in Sweden find that women are less likely than men to be re-elected for office, but that competition between the political parties decreases the gap (Folke and Rickne 2012). Local politicians in Denmark also enjoy an incumbency advantage, but previous research does not study whether it applies differently for men and women (Dahlgaard 2016). Because women are expected to rerun if elected, the incumbency effect itself is likely to be an important mechanism for why a woman elected may spearhead future female representation.

2.2 The share of women as a moderating and accelerating factor

The share of women elected can be expected to moderate the causal effect of a marginally elected woman. There are strong arguments that a number of consequences of being a minority in an organisation can hinder female representation (Bratton 2005; Childs and Krook 2009; Studlar and McAllister 2002; Wahman 2021). Among these are tokenism, high visibility, role-conflicts, lack of allies in the organisation, exclusion from informal networks, lack of knowledge of the informal power-structure, higher drop-out rate, lower rate of promotion, feeling uncomfortable in the dominant culture in the organization, sexual harassment, lack of legitimate authority, stereotyping, and no consideration for family obligations by the organization, etc. (Dahlerup 1988). Moss Kanter (1977) sets out to theorize how the proportion of socially and culturally different people may influence interaction dynamics in groups, and she describes how gradual change may occur when the minority grows larger inside the organization identifying four different group sizes. First, the uniform group has only one significant group, which dominates culturally. Second, the skewed group (minority < 15%) is controlled by the dominant group, and the rest is regarded as tokens in the sense that they are considered representatives of their category and as symbols of their entire group. Moss Kanter argues that even if there are two tokens in a skewed group it will be difficult for them to form an alliance, which can become powerful. Third, in the tilted group (minority 15-40%) the 'tokens' become a minority which is strong enough to influence the culture of the group and form alliances. Fourth, in the balanced group (around 50:50) culture and interaction is balanced. Thus, in Moss Kanter's view gradual change can be expected when a minority grows larger inside an organization. Previous research suggests that especially female politicians deliberately work to recruit other women (Dahlerup 1988,

296). In line with this, the proportion of the minority in the group could cause an interaction effect where the proportion of women already represented interacts with the effect of a woman being elected to form a virtuous circle of female representation (Alexander, 2012).

2.3 Diffusion to competing parties

Another source of spillovers for female's representation is party competition. According to this argument, parties will feel pressured to nominate more women if one of their political rivals starts to. This is particularly likely to occur in proportional representation systems rather than in single-member district systems, because contagion pressures are more likely to develop, and the costs of adapting to these pressures are lower in proportional representation systems (Matland and Studlar 1996).

Considering the spillover to other parties, previous research on one hand shows a contagion effect is found, while on the other hand there are also results, which shows backlash. A study from Poland estimates the effect for four parties separately (Jankowski, Marcinkiewicz, and Gwiazda 2019). The outcome variable is the number of women placed on top of the party lists for the three other parties in the same electoral district in the next election. When the right-wing party, PiS, elects a woman instead of a man, the other parties are more likely to nominate more women at the top of the party list as well. When the left-wing party, SLD, elects a woman, the other parties are more likely to nominate more men to the top of their party list (*ibid.*). The result indicates that there is a positive competition if the parties compete with more gender-friendly parties.

Studies from India to some extent support that the election of a woman can give a negative backlash if the environment has a negative gender bias (Bhalotra, Clots-Figueras, and Iyer 2018). Here, the results show a decline in new female candidates from other major parties, which is most pronounced in states with entrenched gender bias and in male-headed parties. Similar results for (mostly male) Muslim candidates indicate the presence of institutionalised demand-side barriers to minorities. Therefore, the dynamics after an electoral victory depend on the supply of female candidates and officeholders and demand-side mechanisms with party competition and gender bias being potentially important factors (Folke and Rickne 2016). If party competition is an important spillover mechanism to political representation, a woman elected can be expected to lead to more female candidates in other political parties.

3. Context, Data and Identification Strategy

Danish municipalities are governed by a municipal council, which consists of between nine and 31 members except for Copenhagen, which has 55 members. Members of the council are elected for a four year period and the elections take place simultaneously for all municipalities on the third Tuesday in November. The elections in our data were held in 1993, 1997, 2001, 2005, 2009, 2013 and 2017. The municipalities are important public service providers with discretion over a considerable budget and they also collect taxes. Elections are competitive, dominated by the national parties, and are considered important to voters as evident in their comparatively high turnout rates that fluctuate around 70 percent (Bhatti et al 2014).

Each municipality comprises its own electoral district where the allocation of council seats is based on proportional representation by D'Hondt's rule. Voters can cast two kinds of votes, either a party vote or so-called personal vote for a specific candidate, where the latter also counts as a vote for the candidates' party. Seats are allocated by the total number of votes for the party and its candidates. After seats are allocated between parties, their allocation within parties depends on the party's list form. Two different list forms can be deployed, namely open-lists or semi-open lists. Parties with a semi-open list prioritize their candidates before the election and reallocate their party votes to the candidates starting from the top of the list, which makes it a considerable advantage to be high on the list. Contrarily, for parties with open-lists candidates seats are allocated within parties exclusively based on the candidates' number of personal votes. This means that if a party wins n seats, the candidates are ranked by their personal votes and the n highest ranked candidates are assigned a seat.

3.1 Data

We rely on data for the universe of candidates running in the municipality election data from 1993 to 2017. The election data contains variables for each candidate including the municipality in which they ran, party list, list structure, electoral success, and a metric expressing the vote margin with which the candidate won or lost a seat. All Danes have a civil registration number. This number is also in the election data and it allows us to uniquely link election data to administrative data for all permanent residents in Denmark born after December 13, 1912. Danish administrative data are rich data maintained by Statistics Denmark, and the data include variables such as gender, age, occupation, education, income

and country of origin (Thygesen et al. 2011). These data are collected on everyone with a permanent residence and do not rely on self-reporting. In combination, these two sources provide us with data of the universe of local political candidates in a 24 year period and various variables. We rely only on the candidates that ran for parties that used open lists as this makes identification of close winners straightforward. Open list forms are also by far the most used. In our data, 76% of the candidates ran on open lists. Unfortunately, for our first election year, we do not have the list form in our data, so we rely on close elections from 1997 and onwards only.

3.2 Identification strategy

In general, the share of women elected for office at the constituency or party level is not random, and were we to simply compare future outcomes by share of women, we would in all likelihood induce bias. Instead, we need as-if random variation in the share of women who win a seat at the party and constituency level. For this, we follow previous studies and rely on close elections (Broockman 2014, Dahlgard 2016, Folke, Persson, and Rickne 2016, Jankowski, Marcinkiewicz, and Gwiazda 2019). Unlike first-past-the-post systems where close elections between candidates are easily defined, it is not obvious how to express closeness of elections for candidates in an electoral system of proportional representation like the Danish (Lee 2008, Kotakorpi, Poutvaara, and Terviö 2017). In proportional systems candidates compete within and between parties, which makes it difficult to define a threshold to express the number of votes a candidate needs to win a seat. Accordingly, defining when a female candidate barely beats a male candidate is not straightforward. Previous studies have focused on intra-party competition in PR systems to study future outcomes for marginally elected candidates, and these studies have suggested different approaches to identifying marginal winners (Dahlgard 2016, Folke, Persson, and Rickne 2016, Kotakorpi, Poutvaara, and Terviö 2017, Cirone, Cox, Fiva 2021).

We define close elections as elections where candidates are competing with other candidates within the same party list for the same seat. Concretely, we take the distribution of party seats as given and focus on close elections, where the marginal seat within a municipality, party and election year is closely contested between a woman and a man. We argue that these close elections of male/female candidates will induce as-if random variation in the share of women seats held by the party in the council. We use this as an instrument for the share of women to

study the effect of increased female representation on future outcomes. To identify close elections according to our definition, we calculate a metric for electoral closeness in the following three steps.² *i)* For each municipality, m , each party, p and each election term, t , we calculate a midpoint of votes between the non-elected with most votes and the elected with fewest votes. This gives us a threshold between the winning and losing candidate for each cluster of municipality, party and election term. We denote this *ClusterThreshold*. *ii)* For each candidate, i , we then calculate the absolute distance in personal vote to the threshold for their cluster. This expresses in absolute votes how far each candidate was from the threshold of winning or losing. *iii)* We then divide the absolute distance by the threshold, and hence get a metric that expresses the candidate's distance to the threshold in a standardized way, namely relative to the particular cluster's threshold size. The smaller value on this metric, the more narrow a candidate won or lost their seat:

$$RelativeThresholdDistance_i = abs\left(\frac{PersonalVotes_i}{ClusterThreshold_{mpt}} - 1\right)$$

We partition this metric, $RelativeThresholdDistance_i$, into percentiles for each election term, t . This essentially expresses if a candidate was part of, say, the 1 percent most competitive elections in that election year. This measure can provide bandwidths of electoral closeness in the candidate pool of each election. To estimate how female representation affects future female outcomes, we use the regressions of the following form:

$$Y_{pmt+1} = \delta FemaleSeats_{pmt=0} + \varepsilon_{pmt}$$

Where Y_{pmt+1} is the outcome of interest for the party, p , in municipality, m , in the election, t . $FemaleShare_{pmt=0}$ is the seat share of females in the party, p , in municipality, m , in the previous election, $t=0$. Hence the parameter of interest is δ which captures how a change in the seat share of women affects the share of women in the future candidate pool. Because the share of women is endogenous, we use closely contested election between a woman and a

² In a previous study of the incumbency advantage, Dahlgard (2016) uses a bootstrapping method inspired by Kotakorpi, Poutvaara, and Terviö (2017) to create a forcing variable that can be used in a classical RDD estimation (Calonico, Cattaneo, and Titiunik 2014). However, this measure requires personal voters, which Statistics Denmark would not allow us to link to administrative data due to privacy concerns. Instead, we were allowed to make the manipulations of the personal votes described here prior to linking candidate data to administrative data.

man as an instrument that induces as-if random variation in the endogenous regressor $FemaleSeats_{pmt=0}$.³

$$FemaleSeats_{pmt=0} = \gamma FemaleWinner_{pmt=0} + \varepsilon_{pmt=0}$$

Where $FemaleWinner_{pmt}$ is an indicator, which equals 1 if the marginal seat within municipality m , party p , and election t was won by a woman over a man, and equals 0 if the marginal seat was won by a man over a woman. To do this, we find all races in each cluster, pmt , with where $RelativeThresholdDistance_i < b$ where $b \in (1, 100)$. In lay words, we take the $b\%$ closest elections for each election year. When we use it as an instrument variable, it will express the effect of an increase in the representation of women relative to men. We primarily pick our bandwidths for close elections by using the optimal bandwidth selector proposed by Calonico et al. (2014).

It is important that we have a large number of close elections in our dataset. In the models that we present below, we use an algorithm to select the optimal bandwidth and we never have between 797 and 2,183 observations depending on what outcome we are studying. Additionally, we have 363 observations that win an election with a smaller margin than 1 percentage point. At these bandwidths, the elections are close. In the most recent election in our data for which we also have outcome data, 2013, our smallest bandwidth are election decided with 8.1% of the party, municipality, election threshold and the widest bandwidth has elections decided within a 22.2% margin of the threshold. These thresholds are often less than 100 votes in elections where thousands of votes are cast. Additionally, we have 363 observations that win an election with a smaller margin than 1 percentage point. At these bandwidths, the electoral winner received 4.9 and 5.6 votes more than the loser, on average, making the elections extremely close.

When we can examine thresholds such as these, where electoral outcomes are likely to be as-if random, we can impose an assumption that the winner of the race is decided in an as-if random way, estimating the difference-in-means, rather than having to rely on the stronger identifying assumptions of smoothness of potential outcomes across the continuity Angrist &

³ While we focus on intra-party competition and use close elections primarily to instrument outcomes at the party level rather than looking at the individual level, we do, however, find the individual level incumbency advantage.

Pischke (2008). In Table 1 in the Results section, we show that our F-statistics reveal that the narrow election of a woman is a very strong instrument for the proportion of women in local office.

Figure 1 and figure 2 visualize the gender gap in Danish local politics across the pool of candidates and pool of officeholders for each cluster of party-municipality over time. The graphs are solely based on parties included in our estimations, i.e. we only include parties that 1) run on open-lists, 2) win a seat in the council in at least one election during the period of investigation⁴. Figure 1 shows the share of female candidates as well as the share of female officeholders have been stable at around 30 percent since 1993. Figure 2 shows the distributions of these shares (female candidates/officeholders) across party lists. The distributions are strikingly stable over time, and for every election year the typical party represented in Danish local politics do not have any women elected.

*****Figure 1: Stagnation in Share of Female Candidacy and Representation AROUND
HERE*****

*****Figure 2: Distribution of the Shares of Female Candidates and Female Officeholders
AROUND HERE*****

4. Results

In this section, we estimate the effect of narrowly electing a female candidate on the proportion of women in the candidate pool in future elections. We also show that the effect varies depending on the proportion of women in the party's candidate pool. Next, we examine how the spearheading effect of electing women interacts with the competitiveness of the political environment. Finally, we investigate how an additional woman in office changes the social backgrounds of the candidate pool and hence what effect an increased share of female politicians have on diversity more generally.

⁴ The latter is done, in order to make sure that only serious parties are included. In larger cities and especially in Copenhagen many party lists occur only time, and are created as a joke og protest. For example the party from Copenhagen in the election of 2017 named "Fabeldyret - Livstidspræsident" ("The Imaginary Creature - Lifetime President"). Such parties do never really win a seat - and are therefore not included in our estimations, as our treatment is a function of winning at least one seat. Therefore, we get rid of these frivolous parties by excluding parties that never win a single seat from 1993-2017.

4.1 Electing Women Induces Women to Run in the Future

In Table 1, we examine how electing a woman into office increases the prevalence of women in the next election's candidate pool at the party level. Columns 1 and 2 show the reduced form estimates of electing an additional women at $t=0$ on the share of women in the candidate pool at $t=1$ with and without municipality fixed effects, respectively. The results suggest that electing an additional woman into local office increases the prevalence of women in the candidate pool of the next election by 4 or 3.5 percentage points depending on whether we condition on municipality fixed effects. The estimates are very precise with 95% confidence intervals of [0.023; 0.059] and [0.017; 0.053].

Next, we use the narrow election of one additional woman as an instrument for the proportion of women in office. This allows us to estimate the effect of an increase in the representation of women *relative to men* rather than simply improving the absolute representation of women. Columns 3 and 4 show the first stage estimates (with and without municipality fixed effects). Examining the first stage F statistic reveals that the narrow election of a woman is a very strong instrument for the proportion of women in local office at the party level as it increases the share with almost 25%. Columns 5 and 6 show that potential female candidates respond strongly to how well women are represented relative to men in local office.

***** TABLE 1: The Effect of Electing Women on the Future Pool of Female Candidates
AROUND HERE *****

Does the effect of electing an additional woman on the share of women running in the next election persist? In Table 2, we examine the effect of narrowly electing women on the pool of candidates two elections into the future. We only look at the reduced form estimate for the party of electing an additional woman at $t=0$ on the share of women running for that party in $t=1$. The estimates of two elections downstream are less than half the size of those we present in column 1 and 2 of Table 1 where we estimate similar effects for the election immediately after an additional woman was elected. The confidence intervals for the estimates in Table 2 also include zero. This suggests that the effect dissipates over time, and is not detectable after the following election.

***** TABLE 2: Female Electoral Success and Future Female Candidates t+2 (Reduced form) AROUND HERE *****

4.1.1 Robustness

The regression discontinuity design is vulnerable to the choice of bandwidth. While we take away our own discretion in this choice by using an algorithm to choose our baseline bandwidth for us, we still want to make sure that results are not driven by this somewhat arbitrary bandwidth choice. In Figure 3, we plot estimates corresponding to our results in Table 1 and 2 for all bandwidths from the 1% closest elections to the 50% closest elections in which a man and a woman competed for the marginal seat with the party, municipality, and election year.

*****Figure 3: The Effect of Women Winning Office on The Future Pool of Female Candidates. AROUND HERE*****

4.2 The share of women in the candidate pool as a moderating factor

Next, we use the Callaway (2019) quantile treatment effect (QTE) estimator to examine whether the effect depends on the prior representation of women in the candidate pool. As quantile estimation requires considerable power, we only estimate the reduced form effect of electing an additional woman. Figure 4 shows how the effect varies from the 5th to the 95th percentile of the proportion of women in the party's candidate pool. This corresponds to women making up one out of ten candidates at the fifth percentile, to an approximately equal representation of the genders at the 95th percentile.

*****Figure 4: The effect of an additional woman on future share of women by prior share of women. AROUND HERE*****

The results show a more or less monotonous increase in effects from the lowest to the highest percentiles in the distribution. In the lower end, electing a woman increases the proportion of women in the next election's candidate pool by between two and three percentage points. The effect increases over prior representation, and when women make up more than thirty percent of the pool, the effect hovers between five and seven percentage points. Thus, we observe an approximate doubling of effect sizes across the distribution. However, it is important to note

that the effect is still visible and around the size of the overall average estimate of 4.1 percentage points even in the lower tail of the distribution and that the confidence bounds in the lower and upper end of the distribution tend to overlap. So while there may be a stronger effect when the share of women reaches a critical mass, electing a woman in a setting where few women are represented also has positive effects on political gender equality .

4.3 Disentangling the Incumbency and Role Model Effects of Female Representation

The results so far show that when a party elects an additional woman, women take up a larger part of the candidate pool in the next election; the effect dissipates after the first election; and the effect seems stronger, when there are already more women in the candidate pool. The question to what extent this is driven by an incumbency effect where the elected women become more likely to rerun and how much is driven by a role model effect where other women are more likely to run. In this section, we attempt to disentangle the two.

First, we turn to estimating the incumbency advantage among female candidates. To do so, we move down to the level of the individual candidate, and estimate three quantities of interest for men and women in close elections: 1) the incumbency advantage among female candidates, 2) among male candidates, and 3) the difference between the two. In particular, we look at the narrow election of a candidate, and whether this affects the likelihood of that candidate 1) running, and 2) running and winning office in the next election. The results are presented in Table 3 below. In columns 1 and 2, we pool all candidates and estimate an interaction between narrowly winning and the candidate's gender. The baseline estimate for *Candidate Wins* give us the incumbency advantage among men and the interaction term gives us the difference between men and women. For both men and women who are marginally elected there is a considerable incumbency advantage of around 18-20 percentage points on both rerunning and rerunning and winning.⁵ This suggests that the effects we observed above where parties run a higher share of women in a succeeding election when an additional

⁵ Our estimate of the incumbency advantage is larger than that previously reported from Denmark in a previous paper (Dahlgaard 2016). We point to some difference between our study and the previous paper: the previous paper only studied elections between 2005 and 2013 whereas we have data on close elections from 1997 to 2017. Our data includes elections before a large municipality merger in 2005, which reduced the number of municipalities by more than 60%, which made elections more competitive and potentially reduced the incumbency advantage. Dahlgaard (2016) also has data from a different source, which allows him to use a bootstrapping method and study parties running on both open and semi-open lists.

woman is marginally elected instead of a man is at least partly driven by the marginally elected women being more likely to rerun on the list.

*****Table 3: No Gender Difference in Incumbency Advantage AROUND HERE*****

To estimate the role model effect, we move back to examining the candidate pool at the party-municipality-year level. We are interested in examining whether electing a female candidate inspires women who have never previously run for office to seek election. We construct two new dependent variables capturing the number of new female and new male candidates in the party, respectively. We examine the effect of a female candidate winning office by estimating separate regression models for each dependent variable. We estimate models for every bandwidth up till the 50% most competitive elections and present the results in Figure 5.

***** Figure 5: Electing Women Discourages New Candidates From Running AROUND
HERE *****

Our estimate indicates that the narrow election of an additional woman *decreases* entry by new female candidates in future elections. Importantly, it seems to be a general effect, since the number of male candidates also tends to decrease. There are two caveats to the result for male candidates: first, they are generally less precise, and lose statistical significance earlier than the estimates for female candidates. Second, around the optimal bandwidth, women seem to be discouraged to a higher degree.

Overall, when a woman wins office, this tends to discourage women, who did not run in the previous election, from running. Additionally, men seem to be discouraged, too, however these results are less clear.

In Table 3, we saw that the likelihood of rerunning was the same for male and female incumbents, so the result in Figure 5 is not driven by the denominator being affected by the incumbent. Instead, the result suggests that when parties have an additional woman run and win, fewer women are nominated for the candidates list in the succeeding election. The results from Table 3 and and Figure 5 in combination indicates that the positive effect of an additional woman elected on the share of women in succeeding elections is driven by the increased likelihood of that woman rerunning, not other women being inspired to run by her success.

4.4 Electing Women to Office and Local Political Competition

There are a number of ways the increased representation of women may shape and be shaped by local political competition. Here, we examine three of them. First, we investigate whether the election of a female candidate improves the electoral fortunes of their party and future female candidates. Second, we examine whether other parties in the same municipality respond to the election of a woman by allowing more of their own female candidates to run for office. Finally, we examine whether the effect is moderated by the competitiveness of the local political environment.

4.4.1 *Electing Women and Electoral Fortunes*

There are at least two reasons to expect the election of women to impact the electoral fortunes of female candidates and their parties. First, as studies have found that female candidates are oftentimes preferred over their male counterparts, one could expect that electing a woman could improve the future electoral fortunes of the party (Schwarz & Coppock 2020; Dahl & Nyrup 2021). Furthermore, as voters grow accustomed to the presence of female candidates, they may have an easier time voting for them, increasing the support for women who run for office. In Figure 6, we find limited evidence of this. There seems to be an effect on the proportion of women who are elected (Panel A). However, we find no discernible effect on the number of votes for women (Panel B), nor votes and seats for their party (Panel C and D). This suggests that more women are elected when they run for office but that this does not happen, because women start performing better electorally. In other words, increased female representation seems to be driven by an increased supply of women instead of an increased voter demand for women following increased female participation.

*****Figure 6: The Effect of an Additional Woman Electoral Fortunes of Parties and Future Female Candidates. AROUND HERE*****

4.4.2 *The Response of Other Parties to the Election of Women*

There are two reasons why the election of women in one party may spur on female candidates in other parties. First, other parties in the municipality are likely to respond strategically to the election of women by running female candidates themselves. Second, there may be a role

model effect, where women in other parties are motivated to run after observing a successful female candidateship.

In Figure 7, we investigate whether the effect of a narrow electoral victory for a woman spills over to the candidate pool of other parties in the same municipality. We do so by re-estimating the baseline models, but use the proportion of female candidates in the municipality (excluding the successful woman's own party) as the dependent variable. We show reduced form and IV estimates from all bandwidths from the 1% closest elections to the 50% closest pool of elections for a marginal seat between a male and female candidate.

*****Figure 7: The effect of electing a Woman on the Proportion of Women in the Candidate Pool of Other Parties AROUND HERE.*****

We observe a clear spillover effect, where other parties see a larger share of female candidateship, when 1) a woman is elected by a competitor party, and 2) when women make up a larger share of office-holders in a competitor party.

4.4.3 The Competitiveness of the Local Election does not Moderate the Effect of Electing an Additional Women

Finally, we investigate how the local political competition shapes the effect of women winning office on the share of future female candidates. To measure competitiveness, we use the inverse Simpson's index to capture the effective number of parties. For each municipality, the index is defined as $\frac{1}{\sum_i \frac{m_i^2}{n}}$, where n is the number of parties that are represented in the

local council, and s represents the seat share of party p . In Table 4, we use the subset suggested by the optimal bandwidth selector, and estimate the effect on future women candidates in a reduced form interaction where we allow the effective number of parties in the municipality to moderate the effect of electing a woman. Since the effective number of parties is not randomly distributed across municipalities, we include fixed effects for municipalities. The results reveal a somewhat precise null estimate implying no strong moderation from competition on the effect of electing an additional woman on future female candidates.

*****TABLE 4: Political Competition Does Not Moderate the Effect AROUND HERE*****

4.5 Electing Women Changes the Social Make-Up of the Future Candidate Pool

Improving the relative representation of women as a group may on one hand involve a diversity trade-off, as other under-represented groups may have a harder time finding space in the pool of candidates. On the other hand, female political representation may spearhead representation of other under-represented groups, women may be more diverse in other characteristics, or parties may focus on other diversity goals once they have a sufficient share of women. All of these mechanisms could lead to increased female representation improving candidate diversity more broadly. In Figure 8, we estimate the reduced form effect of narrowly electing a woman on an array of characteristics of the candidate pool to examine the effect of marginally electing a woman on future candidate diversity. From Panel A through F, these include the proportion of *a*) immigrant candidates, *b*) candidates with a college degree, *c*) candidates with a vocational degree, *d*) the average age of the candidate pool, *e*) the average (log) income of the candidate pool, and *f*) the proportion of unemployed candidates.

*****Figure 8: The Effect of Electing Women on the Social Make-Up of the Candidate Pool. AROUND HERE*****

We estimate highly precise null effects on the proportions of immigrant and unemployed candidates; at most bandwidths, our 90% confidence interval is capped at 0.9 percentage points. For many of the narrowest bandwidths, our 90% confidence interval is capped at 0.2 percentage points on the proportion of immigrants. On the other hand, electing a woman does seem to increase the income and age of the candidate pool, and it also seems to increase the proportion of college graduates and decrease the proportion with a vocational background. While these results are not as precisely estimated as many of the previous ones, they provide suggestive evidence of a trade-off in representation. However, it is important to note that in the Danish case, candidates with vocational training are only slightly under-represented in local elections (Dahlggaard & Pedersen, n.d.), suggesting that at the current point, increasing female representation on that expense may not lead to substantially poorer representativeness of the overall system.

5. Conclusion

In conclusion the results show that a woman marginally elected spearheads future female representation. Firstly, we find that for parties marginally electing a woman the share of women appearing on the list in the following election increases, but the effect is indistinguishable from zero two elections after. The effect in the first election is driven by an incumbency advantage where both marginally elected women and men are more likely to run and win in a subsequent election. However, rather than encouraging new women to run, electing an additional woman reduces the number of women who run on the party list in the following election. A similar effect is found for the number of new men on the list, suggesting that having an additional woman win a seat reduces the share of new candidates in a future election.

Second, we explore if the effect of having an additional woman elected is higher when the pre-existing share of women in the candidate pool is higher. Our evidence suggests that this is the case. When we consider other aspects of diversity, we find that increasing the share of women representatives does not have an effect on the share of immigrant or unemployed candidates running for the party in the following election. However, it does make the candidate pool slightly older, better educated and more affluent. Since politicians are already selected on these criteria, candidates actually become less descriptively representative when the share of women increases. We find no effect of having a higher share of women on the number of votes for the party, the number of votes cast for women representing the party, nor the mandates that the party receives in the following election.

Third, we do find that other parties within the same municipality run a larger share of women on their list in the following election, which suggests that competitor parties balance. This is not contingent on the level of party competition if this is measured with the inverse Simpson's index. However, measures of political competition are contested and additional specifications should be used to analyse the dynamics behind this result.

Women do spearhead increased female participation also in stable democracies with high levels of gender equality. However, women retire at a higher rate and hence the gender gap persists. As we know that this effect is contingent on the share of women candidates, this suggests that there is a need to look into 'the secret garden' of the working environment of the political parties and the local councils, if the gender gap is to be closed.

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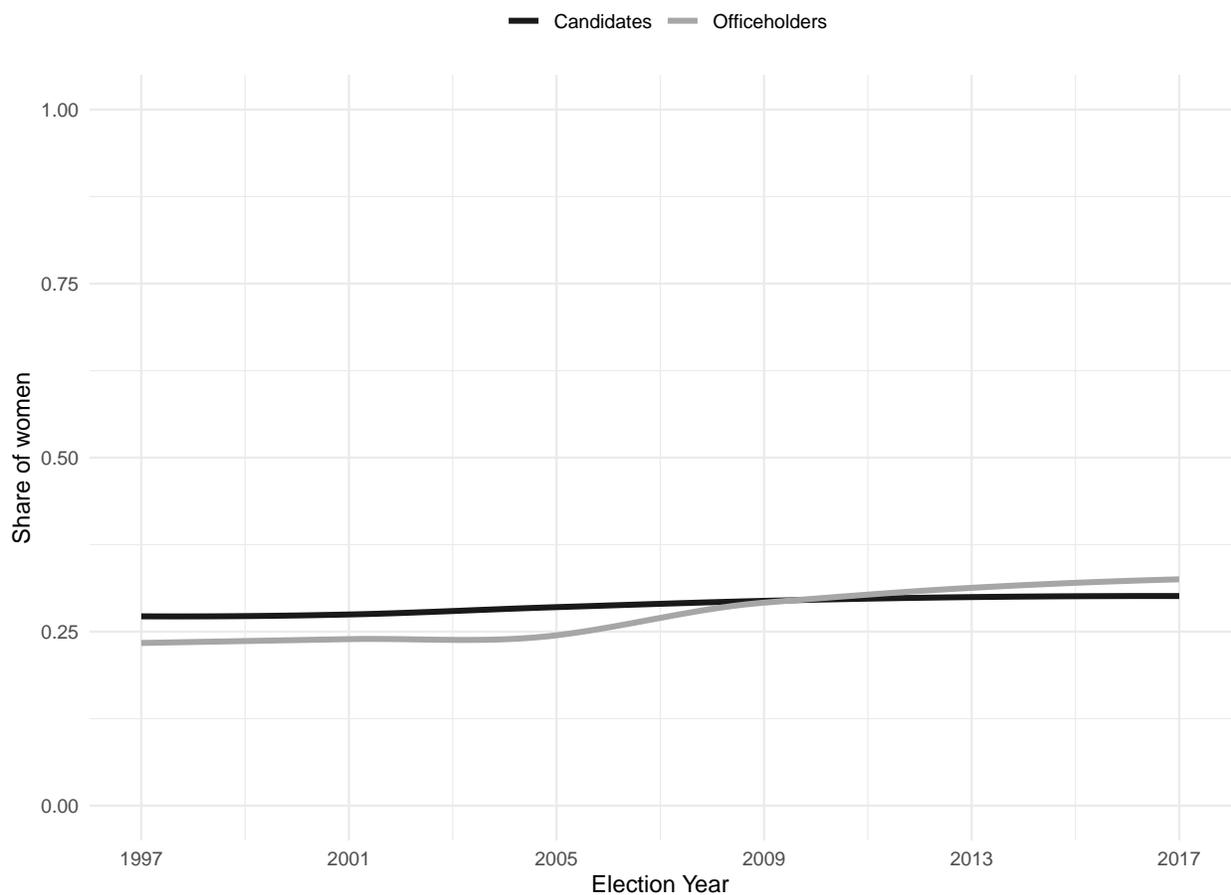


Figure 1: Stagnation in Share of Female Candidates and Female Officeholders.

Note: The figure shows that the share of female candidates and share of female officeholders have been stable at around 30 percent for the full time period in our data. The graph is solely based on parties included in our estimations, i.e. we only include parties that 1) run on open-lists, 2) win a seat in the council in at least one election during the period of investigation.

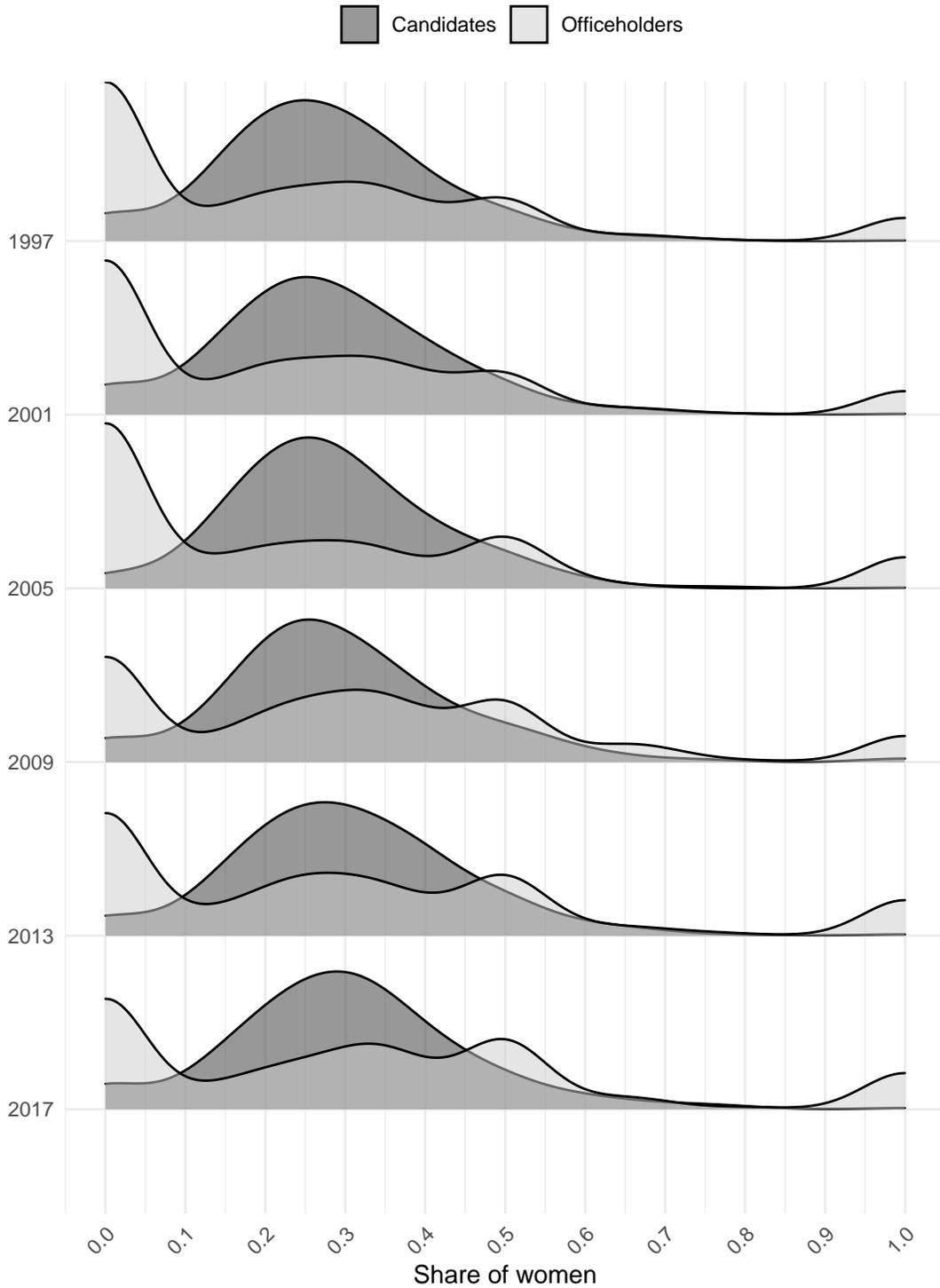


Figure 2: Distribution of the Shares of Female Candidates and Female Officeholders. *Note:* The figure shows the distribution of the shares of female candidates and female officeholders for each party-municipality cluster across six elections. The graph is solely based on parties included in our estimations, i.e. we only include parties that 1) run on open-lists, 2) win a seat in the council in at least one election during the period of investigation.

Table 1: The Effect of Electing Women on the Future Pool of Female Candidates

| | <i>Dependent variable:</i> | | | | | |
|---|---|---------------------|---|---------------------|-------------------------------|---------------------|
| | % Female Candidates t+1 Reduced Form | | Proportion Women Elected t=0 1st Stage | | % Female Candidates t+1 IV | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Female Candidate Win t=0 | 0.041*** (0.009) | 0.035*** (0.009) | 0.246*** (0.062) | 0.244*** (0.054) | | |
| Proportion Women Elected—Female Win t=0 | | | | | 0.648*** (0.060) | 0.120*** (0.021) |
| Constant | 0.273*** (0.012) | | 0.207*** (0.018) | | | |
| Bandwidth Selector | Optimal | Optimal | Optimal | Optimal | Optimal | Optimal |
| Bandwidth | 15 | 14 | 7 | 7 | 15 | 14 |
| F Statistic | | | 74.02 | 18.87 | | |
| Municipality FE? | No | Yes | No | Yes | No | Yes |
| Observations | 1,628 | 1,626 | 1,771 | 1,771 | 1,628 | 1,626 |
| Residual Std. Error | 0.123 | 0.121 | 0.191 | 0.184 | 0.199 | 0.118 |

Note: IV estimates of the effect of electing women on the proportion of women in the pool of candidates at the next election at the optimal bandwidth. Robust standard errors clustered by municipality and party in parentheses. *, **, and *** indicates $p < 0.1$, < 0.05 and < 0.01 , respectively.

Table 2: Female Electoral Success and Future Female Candidates t+2 (Reduced form)

| | <i>Dependent variable:</i> | |
|--------------------------|----------------------------|------------------|
| | % Female Candidate t+2 | |
| | (1) | (2) |
| Female Candidate Win t=0 | 0.014 (0.012) | 0.007 (0.014) |
| Bandwidth Selector | Optimal | Optimal |
| Bandwidth | 15 | 15 |
| Municipality FE? | No | Yes |
| Observations | 798 | 797 |
| Residual Std. Error | 0.128 | 0.127 |

Note: Reduced form estimates of the effect of electing women on the proportion of women in the pool of candidates two elections into the future at the optimal bandwidth. Robust standard errors clustered by municipality and party in parentheses. *, **, and *** indicates $p < 0.1$, < 0.05 and < 0.01 , respectively.

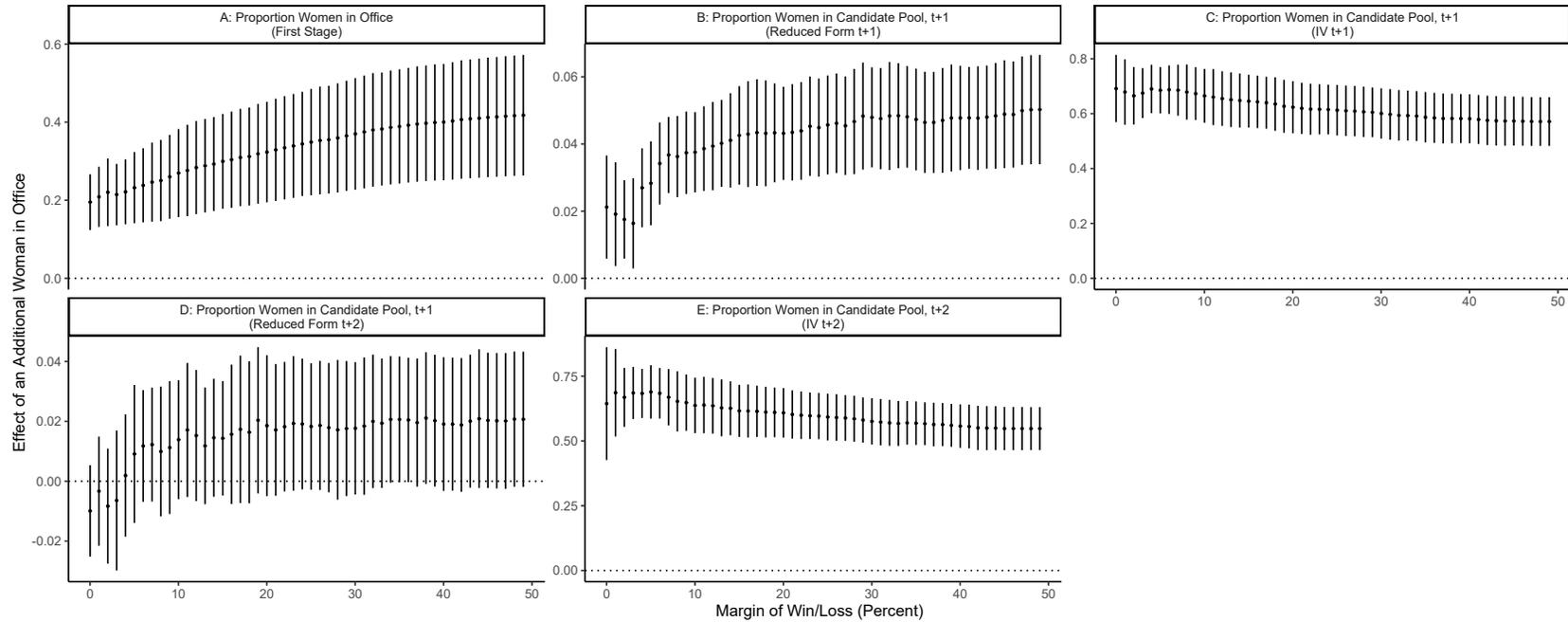


Figure 3: The Effect of Women Winning Office on The Future Pool of Female Candidates. *Note: Each estimate is from an OLS regression run on samples defined by increasingly larger bandwidths. Confidence intervals are 90% based on robust standard errors clustered on municipality-party.*

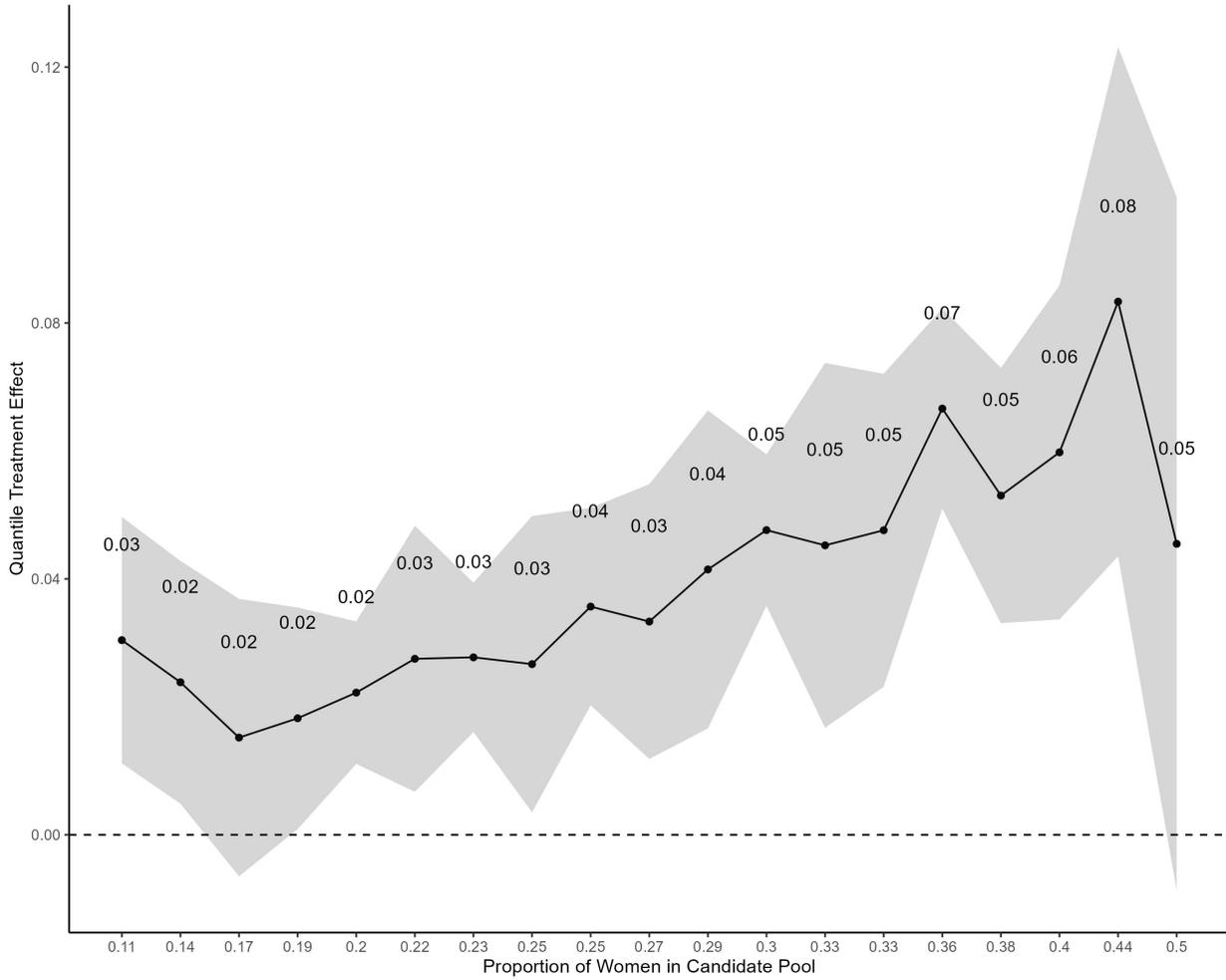


Figure 4: The effect of an additional woman on future share of women by prior share of women. *Note:* The figure shows the estimated quantile treatment effects (QTE) across the distribution of women in the candidate pool, using the Callaway (2019) estimator at the optimal bandwidth. Shaded area is the 95% confidence interval, estimated using bootstrapped standard errors with 1,000 resamples. Point estimate of QTE printed above.

Table 3: No Gender Difference in Incumbency Advantage

| | <i>Dependent variable:</i> | |
|-----------------------------|----------------------------|---------------------|
| | Rerun | |
| | All Candidates | All Candidates |
| | (1) | (2) |
| Candidate Wins t=0 | 0.182*** (0.012) | 0.196*** (0.011) |
| Candidate Wins t=0 X Female | -0.008 (0.022) | 0.001 (0.019) |
| Constant | 0.434*** (0.009) | 0.159*** (0.007) |
| Bandwidth | 10 | 10 |
| Observations | 9,069 | 9,069 |
| R ² | 0.035 | 0.052 |
| Residual Std. Error | 0.491 | 0.420 |
| F Statistic | 108.371*** | 166.185*** |

Note: Models at the level of the individual candidate showing the effect of narrowly winning an election on the probability of 1) running for office again in the next election, and 2) running and winning again in the next election. The optimal bandwidth used to define close election. Robust standard errors clustered by candidate. *, **, and *** indicates $p < 0.1$, < 0.05 and < 0.01 , respectively.

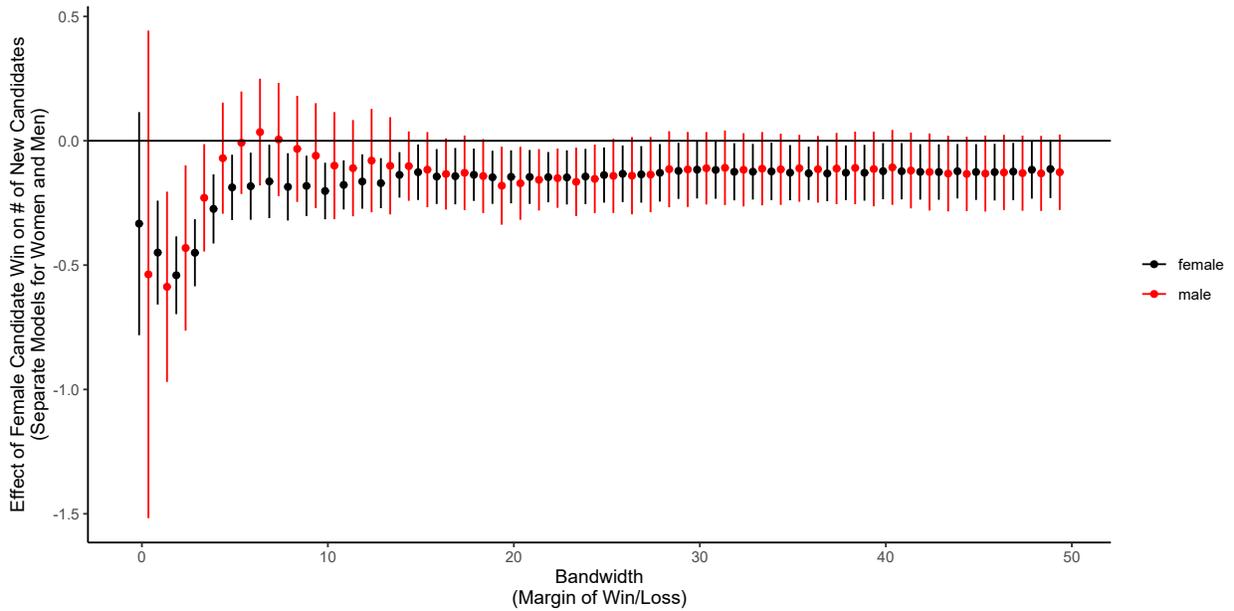


Figure 5: Electing Women Discourages New Candidates From Running. *Note:* The figure reports reduced form estimates of the impact of electing a woman on the number of new candidates in the first upcoming election. Estimates from all bandwidths from the 1% closest elections to the 50% closest elections. Confidence intervals are 90% from robust standard errors clustered on municipality and party.

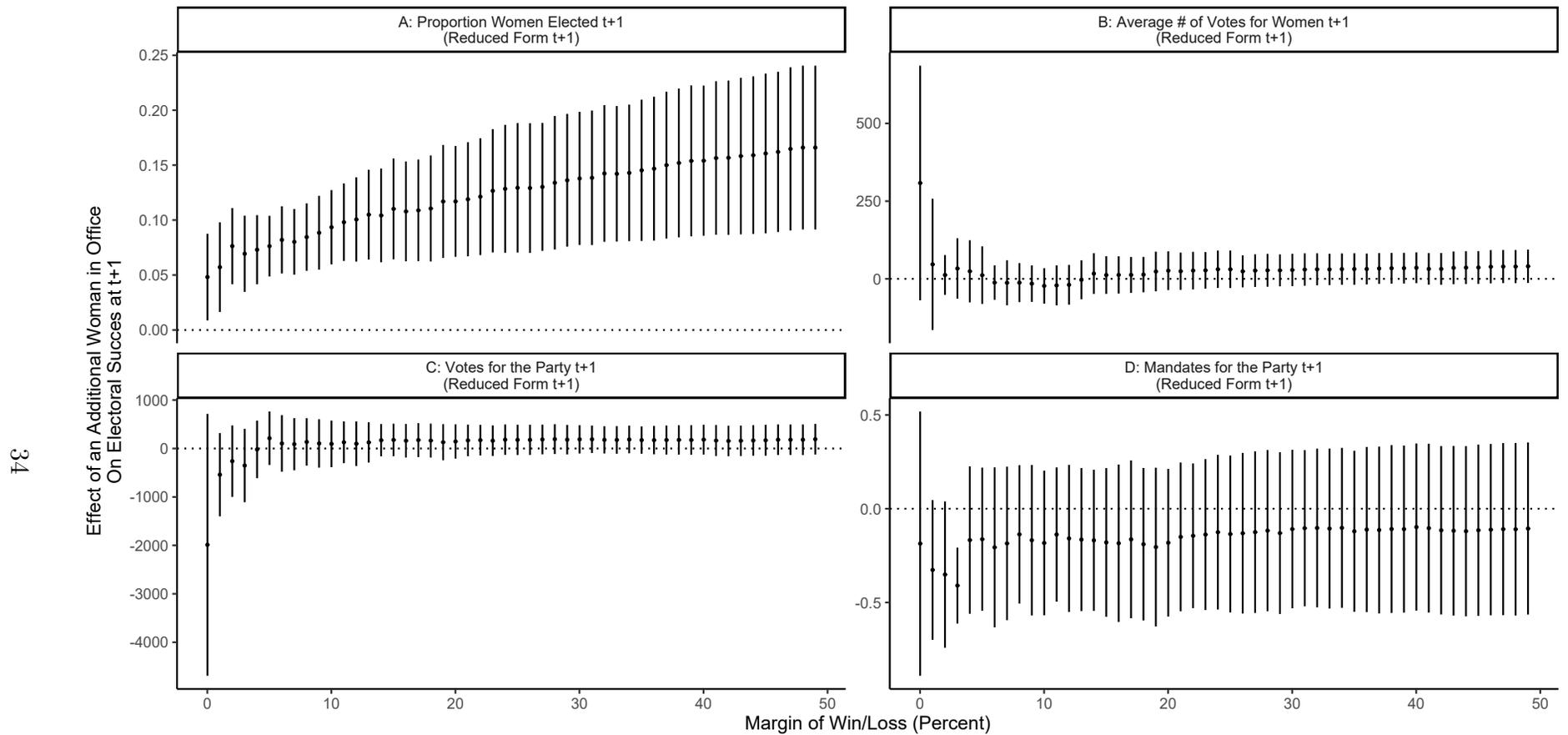


Figure 6: The Effect of an Additional Woman Electoral Fortunes of Parties and Future Female Candidates.

Note: The figure reports reduced form estimates of the impact of electing a woman on a) the proportion of women elected for the party, v) the average number of votes for female candidates from the party, c) votes for the party, and d) seats for the party. All measured at the succeeding election. Estimates from all bandwidths from the 1% closest elections to 50% most competitive elections. Confidence intervals are 90% from robust standard errors clustered on municipality and party.

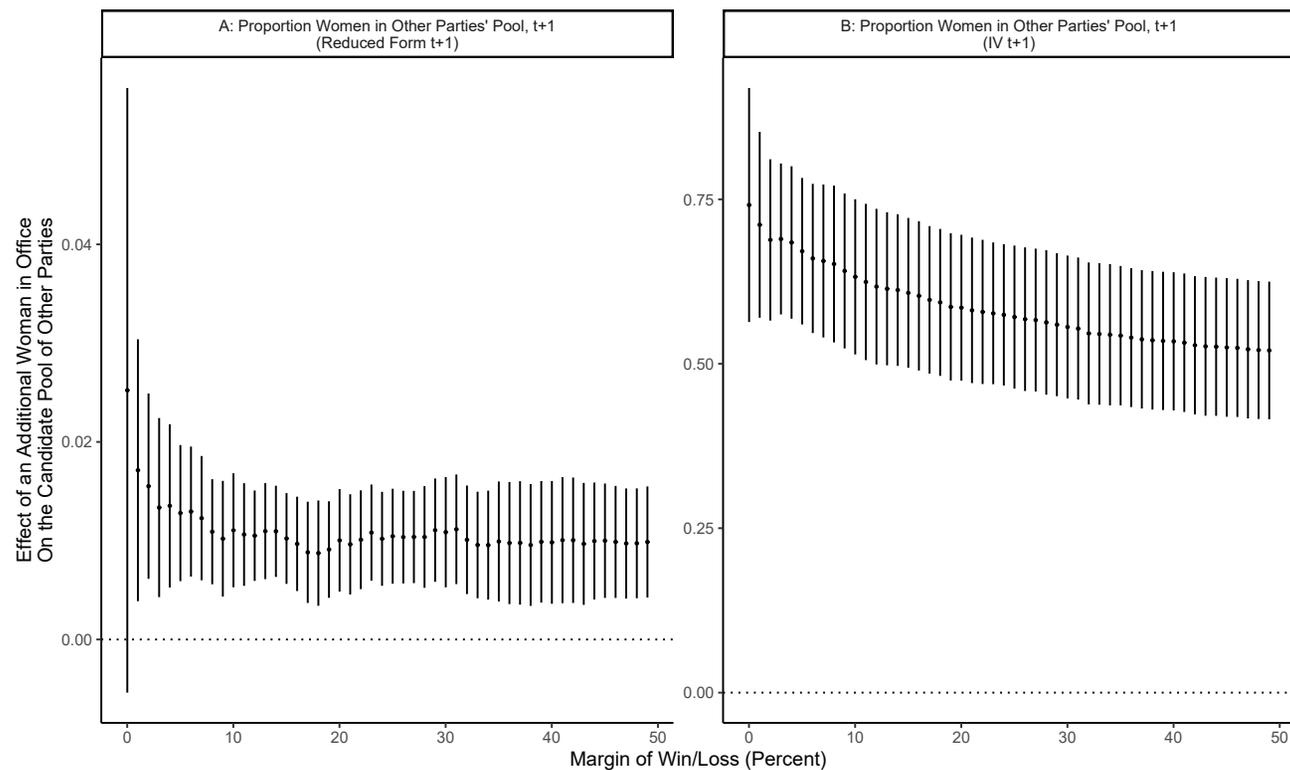


Figure 7: The effect of electing a Women on the Proportion of Women in the Candidate Pool of Other Parties.

Note: The figure shows reduced form results from models where the dependent variable is calculated by iterating over all party-municipality observations, excluding the current party, and calculating the municipality's proportion of female candidates among the other parties. Estimates from all bandwidths from the 1% closest elections to the 50% closest elections. Confidence intervals are 90% from robust standard errors clustered on municipality and party.

Table 4: Political Competition Does Not Moderate the Effect

| | <i>Dependent variable:</i> |
|--|----------------------------|
| | % Female Candidate t+1 |
| Female Candidate Win t=0 | 0.038* (0.020) |
| Effective number of Parties | -0.048** (0.023) |
| Female Candidate Win t=0 X Effective number of Parties | -0.006 (0.036) |
| Bandwidth Selector | Optimal |
| Bandwidth | 14.4 |
| Municipality FE? | Yes |
| Observations | 1,591 |
| Residual Std. Error | 0.121 |

Note: Reduced form estimates of the interaction between electing women and the effective number of parties in the municipality. The inverse Simpson's index is used to measure the effective number of parties. We subset the data by the optimal bandwidth. Robust standard errors clustered by municipality and party in parentheses. *, **, and *** indicates $p < 0.1$, < 0.05 and < 0.01 , respectively.

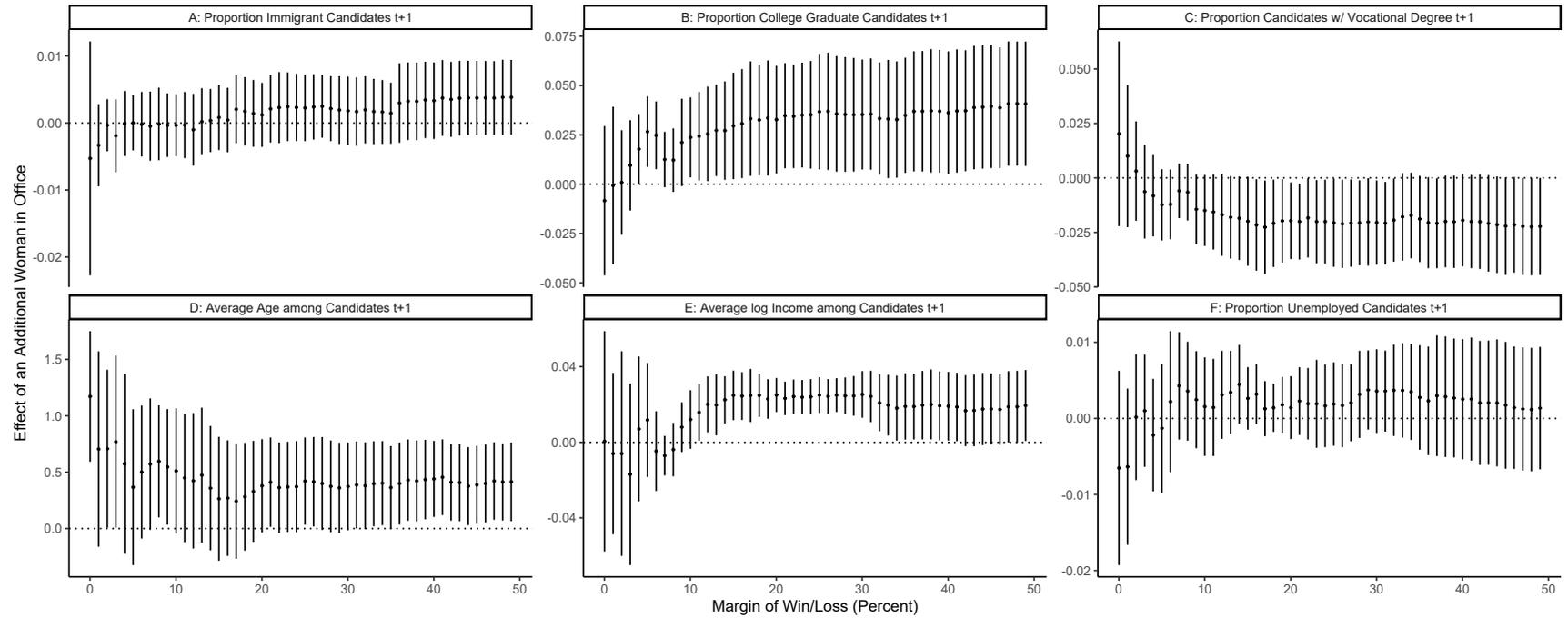


Figure 8: *Note:* The figure reports the estimated (reduced form) impact of electing women on a) the proportion of immigrant candidates, b) the proportion of candidates with a college degree, c) the proportion of candidates with a vocational degree, d) the average age among candidates, e) the average (log) income among candidates, and f) the proportion of unemployed candidates. Estimates from all bandwidths from the 1% closest elections to the 50% closest elections in the sample. Confidence intervals are 90% from robust standard errors clustered on municipality and party.