# Gender Differences in Politician Persistence*

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**Abstract**

This paper documents gender differences in the career paths of novice politicians. I use the universe of California local election returns from 1995 through 2014 and link candidates across successive election cycles to construct individual political trajectories. Using a regression discontinuity design, I find that losing an election induces substantially more attrition among female than male candidates: an electoral loss causes men to be 16 percentage points less likely to run again within the next four years, whereas the drop for women is 25 percentage points. The gender disparity in the decision to run again is robust to controls for candidate and locality characteristics. Female politicians' lesser persistence is not pervasive across institutional settings, however; it is confined to candidates without officeholding experience and candidates running for low female representation offices. These results call into question the role of behavioral explanations in women's differential attrition. I discuss the implications of the results for female representation in politics.

Keywords: elections; gender; discrimination
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# 1 Introduction

The large gains that women have experienced in many dimensions of their economic lives have not been mirrored by commensurate improvements in their political representation. In 2017, women comprised 47 percent of the U.S. labor force, and 43 percent of full-time U.S. workers (U.S. Department of Labor: Bureau of Labor Statistics, 2017). In the same year, women constituted 25 percent of U.S. state legislators and 20 percent of members of U.S. Congress. The U.S. is not an outlier among developed countries; in 2017, women held less than 30 percent of national legislative positions in OECD countries (OECD, 2018). Empirical evidence from various countries shows that the demographic composition of elected officials matters for policy objectives. Spanning local, state, and federal offices, recent work demonstrates that the extent of female representation influences the allocation of public goods, the educational and health outcomes of the electorate, and the propensity of other women to run for elective office.[1]

What explains the low representation of women in politics? A large literature explores the decision to seek elective office, citing gender differences in political ambition, political parties' treatment and recruitment of candidates, and access to campaign funding (Lawless and Fox, 2013; Pearson and Mcghee, 2013; Burrell, 1992; Beaman et al., 2009). One strand of this literature examines policy levers intended to increase women's political representation, with voter prejudice (taste-based discrimination) and voters' limited information regarding the aptitude of female politicians (statistical discrimination) as mechanisms determining the efficacy of these policies (Baskaran and Hessami, 2018; Besley et al., 2017; Casas-Arce and Saiz, 2015; Beaman et al., 2009). Fewer studies chart the political trajectories of individuals who initially express interest in running for office. As the path to political office is not characterized by electoral success alone, differential persistence of men and women in politics after an electoral attempt is a potential determinant of eventual officeholding and political representation.[2]

This paper investigates the career trajectories of novice politicians. I ask whether there is differential attrition of female candidates in response to an electoral loss, and if this gender difference helps explain the low representation of women in politics. The empirical setting is California local politics – city-, county- and school district- level offices. The focus on local elections has a few advantages. First, there are over 90,000 local governments in the U.S. – with 4,000 in California alone – implying that 96 percent of all elected officials in the U.S. are serving in local governments (U.S. Census Bureau, 1995). Furthermore, local elections

[1]See Beaman et al. (2012); Rehavi (2007); Clots-Figueras (2012); Chattopadhyay and Duflo (2004); Broockman (2014); Brollo and Troiano (2012); Bhalotra et al. (2016). Exceptions to this body of evidence are Ferreira and Gyourko (2011), which finds that the gender of a large city U.S. mayor does not have an effect on policies implemented, and Broockman (2014), which finds that electing a woman to state legislature does not increase female participation or representation in elected offices.

[2]Every president within the last 50 years experience some form of electoral failure, either in state/federal elections, gubernatorial elections, presidential elections, or failed bids for presidential nominations (Pitney, 2014).

are a common entry point to politics and often a springboard for state legislative bids. Forty percent of state legislators had elective experience prior to running for state office, the majority of which was at the local level on city councils or school boards (Francis and Kenny, 2000; Carroll and Sanbonmatsu, 2013). In addition, local elections are well suited to isolating the role of individual candidates' decisions to run for office – distinct from political parties' preferences for candidates – as these elections in California are officially nonpartisan. In practice, there is less political party involvement, particularly in smaller localities, relative to state and federal elections (Bledsoe and Welch, 1987). Differences in men's and women's capacity and willingness to solicit campaign donations are also of lesser concern in this context, as campaign fundraising activities and expenditures are more limited (Krebs, 2014; Adams, 2010).

At an accessible entry point to elected office, how do women fare? Using California local election returns from 1995 through 2014, I first document that women comprise just 31 percent of first-time candidates for local offices. Furthermore, women are concentrated among contests for school board membership, while men are more evenly split between school board and city council positions. While women are underrepresented among the candidate pool, conditional on running, women are *more* likely to win than their male counterparts.

The paper then probes whether a candidate's initial electoral experience affects the decision to continue in politics. Specifically, I estimate the effect of an electoral loss on the propensity to run again for any office at the local level, and whether this effect differs for male and female candidates. To address unobserved differences between winning and losing candidates, I employ the close election regression discontinuity design pioneered by Lee (2001). This empirical strategy confines the analysis to candidates who barely won or barely lost an election in order to isolate the effect of losing on subsequent political involvement.

The results reveal substantial heterogeneity in male and female candidates' responses to an initial electoral loss. After an electoral loss, men are 16 percentage points less likely to run in a subsequent election within the next four years, whereas women are 25 percentage points less likely to run again. This gender difference appears to be driven by the losing candidates. Among candidates who barely won, men and women have similar propensities to run again, while a large gender gap emerges among those candidates who barely lost.

Through a series of empirical tests, I rule out plausible mechanisms that could account for the 9 percentage point (56 percent) differential in men's and women's responsiveness to an electoral loss. Observable characteristics of candidates and localities do not explain the gender disparity. There is also little empirical support for the hypothesis that men's and women's differing opportunity costs of running or benefits from holding political office account for their disparate responses. I also rule out the sorting of men and women into running for different types of political offices as a potential explanation.

To interpret these findings, I consider two classes of models of candidate entry: behavioral and rational. Behavioral models are rooted in gender differences in preferences for and performance in competitive environments. This literature shows that women are less likely to enter competitions and do not perform as well when induced to compete against men (Niederle and Vesterlund, 2007). Women's reluctance to enter competitions is not completely explained by gender differences in aptitude, perceptions of aptitude, or risk aversion. Recent evidence indicates there is differential persistence of women in lab and high school math competitions. After losing or failing to meet a qualifying threshold, women are less likely to choose to compete again (Buser and Yuan, 2016; Ellison and Swanson, 2018). In a similar vein, an electoral loss could serve to disproportionately discourage women from running in another election. This differential discouragement could arise from women incorporating external feedback – particularly negative feedback – into self-evaluations to a greater extent than men (Roberts and Nolen-Hoeksema, 1989; Johnson and Helgeson, 2002).

An alternative to behavioral differences between men and women are rational models of candidate entry. In these models, candidates decide to enter a race based on the costs and benefits of running, and their expected probability of winning, where the expected probability is determined by voter preferences for candidates. Differential female persistence could arise if the costs/benefits of running or the expected probability of winning differ among male and female candidates. One way to model the expected probability of winning is through a model of statistical discrimination, based on Beaman et al. (2009). Risk averse voters have imperfect information regarding novice candidate aptitude and make their choice based on the candidates' expected aptitude for political office, where voters receive noisier information for female than for male candidates. Female candidates are thus penalized for their less precise signals. If a candidate loses, she maintains her novice status and voters continue to rely on imprecise signals of candidate aptitude in subsequent elections. When deciding to run again, losing female candidates anticipate their lower expected probability of winning relative to their male counterparts, yielding differential female deterrence.

I provide suggestive evidence to distinguish between the behavioral and rational models. First, I examine whether women's differential attrition is pervasive across institutional settings. I find the gender difference in the effect of losing is attenuated in certain offices at the local level – namely, school board – and in offices at the state legislative level. Differential female deterrence appears to be malleable based on the institutional environment, casting doubt on gender differences in internalizing negative signals as an explanation. Second, I interpret these results in the context of the rational model. If imperfect information regarding candidates' aptitude drives the female-specific voter penalty, then in settings in which the gender difference in the quality of information is attenuated, the differential attrition of women due to a loss should also be attenuated. School board is an office with higher female representation, increasing the precision of the signal of female candidate quality. Incumbent candidates for local offices and candidates for state legislature are more likely to have accrued political experience prior to running, alleviating the imperfect information regarding candidates' aptitude. Both of these settings exhibit substantially smaller gender differences in response to losing. Although there is not a definitive test to separate the rational and behavioral models, taken together, the evidence is consistent with a rational model of candidate entry: local female politicians' lesser persistence is a rational response to voters differentially penalizing inexperienced female candidates.

As a final exercise, I return to the initial motivation for investigating gender differences in response to losing: to what extent does the differential deterrence of female candidates explain the gender gap in officeholding? In order to answer this question, we require assumptions on the chances of winning among attriting candidates.[3] If one assumes the attriting candidates had chances similar to those runners-up who do run again, then female differential deterrence can account for 6 of the 15 percentage point gender gap in representation among novice officeholders. Encouraging female dropouts to run again would indeed improve the representation of women in politics. Assuming the chances of winning among dropouts are non-zero, for female differential deterrence to explain any of the gender gap in officeholding, female runners-up who dropped out require a probability of winning of at least two-thirds that of male runners-up. In other words, if women are disproportionately penalized for losing, then nudging female losing candidates to run again would not improve female representation among officeholders. Instead, addressing the root of the voter penalty would both improve women's differential response to losing and their representation in politics.

To my knowledge, this paper is the first to investigate the determinants of female representation in political offices by examining whether there is differential persistence of men and women due to an electoral loss. Ferreira and Gyourko (2011), Bhalotra et al. (2015) and Brollo and Troiano (2016) use close election RD designs to analyze the implications of a woman being voted into office for policy outcomes as well as future female participation. Focusing on a sample of large cities throughout the U.S., Ferreira and Gyourko (2011) find the incumbency advantage in mayoral elections is larger for female than for male candidates. Using Indian state legislative elections, Bhalotra et al. (2015) find that localities with female electoral victories experience increases in the female share of majority party candidates, and attributes this rise to the fact that female winners are more likely than male winners to run for re-election. With use of Brazilian mayoral elections, Brollo and Troiano (2016) find female mayors have lower re-election probabilities than their male counterparts and this is not due to gender differences in running again. An important distinction between the present paper and the extant literature is the unit of observation and its implications for causal inference. Bhalotra et al. (2015) and Brollo and Troiano (2016) use a political contest – rather than a candidate – as the unit of observation and therefore compare the subsequent behavior of male and female candidates who

[3] This is a common selection problem, similar to the inability to observe wages for individuals who are unemployed or not in the labor force.

barely won an election.[4] The present paper follows all candidates – regardless of initial election outcome – over successive election cycles and can therefore estimate the differential effects of an election outcome on subsequent political involvement for women relative to men. In addition, the comprehensive nature of the California local elections returns data allows me to estimate a candidate's propensity to run again in any local election, regardless of the office.[5]

This paper also contributes to the recent literature on gender differences in persistence in competitive environments. Buser et al. (2017) examine whether men and women differ in their propensities to enter into lab-based and math olympiad competitions after an initial loss and find differential attrition of women. Their results are not explained by gender differences in risk preferences, confidence, updating on ability, or actual ability, but are explained by whether the loss is determined randomly or through an effort-based task. The math olympiad finding is echoed in the U.S. by Ellison and Swanson (2018). In addition, the results add to recent work on gender differences in responses to signals of aptitude for a task, an academic discipline or occupation. Two papers find that women are more likely to discontinue taking classes in STEM or economics majors in response to receiving an introductory course grade of B or lower (Kugler et al., 2017; Rask and Tiefenthaler, 2008).

# 2 California local elections

## 2.1 Institutional details

California local political contests include elections for county, municipal, and school district governments. These elections have a number of important institutional features that distinguish them from state and federal elections. First, local elections in California are nonpartisan, meaning that the candidate's party affiliation appears neither on the ballot nor in other officially-sanctioned election materials.[6] Nonpartisan local elections have lower rates of political party involvement, including recruiting, endorsing and funding candidates (Streb, 2009; Bledsoe and Welch, 1987). In the absence of party affiliation, other candidate attributes may be more salient to voters, such as candidate gender (inferred from the first name), race/ethnicity (inferred from first or last name), and candidate occupation (Atkeson and Hamel, 2018). Second, the timing of local elections may not coincide with state or federal general elections. Given the nonpartisan and off-cycle nature of many local elections, these contests are characterized as low information environments, with voters often encountering

[4]Gender differences in re-election rates do not necessarily imply gender differences in incumbency advantage. To see this, consider a scenario in which there is a constant gender difference in the probability of winning the next election among all candidates, regardless of initial election outcome. This would imply a gender difference in the probability of winning re-election for incumbents, but no differential effect of incumbency for women relative to men.

[5]In the CA data, approximately 15 percent of candidates who run again contest a different office, with the rate higher among losing candidates (24 percent) than winning candidates (9 percent).

[6]As of 2003, 77 percent of cities employed nonpartisan ballots for the election of their local officials (Krebs, 2014).

candidates for the first time while filling out their ballot. Local elections that occur off-cycle also command lower turnout rates than state or federal elections (Krebs, 2014).

Another differentiating feature is there are lower barriers to entry at the local level than at the state or federal level. In order to become a candidate, an individual must satisfy basic eligibility criteria (age, residency), fill out and submit paperwork before the deadline, and submit a nominating petition comprised of a certain number of signatures from eligible voters in the voting jurisdiction and/or a modest monetary fee. The number of signatures and the fee vary across localities. For example, to run for city council in the city of Albany, CA (population 20,000), there is no filing fee and the number of signatures is 20. In San Diego (population 1.4 million), the candidate must either collect 100 signatures and pay a fee of $200, or collect 900 signatures. In contrast, to run for the lower house of the CA state legislature, candidates must either collect 1,500 signatures or pay a $950 fee. Candidates in local elections are also required to submit paperwork concerning financial conflicts of interests and campaign contributions, with monetary thresholds for reporting contributions varying by locality. Aside from the official candidacy requirements, there are more limited campaign expenditures at the local level, especially in small districts/localities (Adams, 2010).

Local officeholding may serve as a springboard for higher political offices. Almost 40 percent of individuals serving in the CA state legislature accumulated political experience at the local level prior to running for state office (Francis and Kenny, 2000). Among individuals holding state legislative seats throughout the U.S., there were similar rates of prior local elective involvement for men and women (Carroll and Sanbonmatsu, 2013).[7]

## 2.2 Data

The main data source for this paper is the California Elections Data Archive (CEDA), a joint project of the California Secretary of State and the Center for California Studies at California State University, Sacramento.[8] These data include all California local election returns from 1995 through 2014, including municipal, county, and school board elections. Election returns include candidate full name, ballot designation, office sought, incumbency status, election date/location, number of votes earned, total votes, number of individuals to be elected for a given office, whether the candidate was elected, and whether the election resulted in a runoff.

One shortcoming of these data is limited demographic information is available on candidates. I determine

[7] Prior to running for state office, women were more likely to serve on school boards while men were more likely to serve on city councils.

[8] Recent papers utilizing these data include Beach and Jones (2017). CEDA is available for download here: http://www.csus.edu/isr/Projects/CEDA.html

the gender of a candidate with use of the 1990 Census and 1940-1970 Social Security Administration (SSA) name files. For a given name, if 90 percent of individuals with this name are classified as either male or female, then the name is designated as such. The remaining names are left as unclassified. In cases where there is conflict between the Census and SSA assigned gender, a name is unclassified. Approximately 98 percent of candidates have names in either the Census or SSA name files, and 92 percent of candidates are classified as male or female. A unique aspect of California elections is the candidate ballot designation. Ballot designations include information reported by the candidate on their current/most recent occupation and other relevant identities (e.g. parent, homemaker, community activist). This information is listed on the ballot under the candidate's name and appears in official election materials, such as voter information guides. I classify the ballot designation text into 10 broad occupation categories according to the 2000 Census occupation classification.

I construct a candidate-level panel data set by linking candidates between subsequent election cycles based on a probabilistic matching algorithm using candidate full name and the county in which the candidate initially runs for office. A limitation of the matching procedure is that it excludes an individual's subsequent political participation in the event the individual moves across counties (or states). Due to this exclusion, the measure of subsequent political participation should be considered conservative estimate. I discuss below the potential biases that this exclusion could introduce in the comparison of the effects of an initial electoral loss on men and women's subsequent political participation. I define the outcome of interest as whether an individual runs again in any election within the next four years. The final election cycle under analysis is 2014, so this definition implies that I also drop candidates who appear in the data set for the first time after 2010. In some specifications, I extend the time horizon for subsequent participation to eight years.

The full sample consists of individuals who are likely running for elective office for the first time by dropping individuals who are current officeholders, as reported in their ballot designation or their incumbency status.[9] In order to implement the close election regression discontinuity design, I further limit the races to those in which the number of candidates exceeds the number of open seats. Since many of these contests are at-large elections for multi-member boards or councils, I designate the running variable for the regression discontinuity analysis as the candidate's margin of victory, defined as the difference in the vote shares of the last winner and the first loser. For example, in an election for three city council seats, the margin of victory is the difference in the vote shares of candidates ranked three (last winner) and four (first runner-up).

[9]This definition may include some individuals who have previously run and lost prior to 1995. The results are robust to dropping candidates appearing for the first time in years 1995 and 1996.

## 2.3 Descriptive statistics

Table 1 reports summary statistics for all novice candidates and the subset of novice candidates who are marginal – those candidates who are either the first runner-up or the last winner – used in the regression discontinuity analysis. Among all novice candidates for CA local offices between 1995 and 2010, 31 percent are female. In the full sample, 31 percent win their initial election, 28 percent decide to run again within the next four years, and 15 percent run again and win an election within the next four years. These figures are higher among the marginal candidates, which makes sense given that we are restricting the losing candidates to the first runner-up. When we consider these summary statistics separately for men and women, we observe that across both samples, a higher fraction of female candidates win their first election relative to male candidates. Despite the higher rates of winning among women, a lower fraction choose to run again within the next four years. These descriptive statistics provide preliminary evidence that male and female candidates could respond differently an initial electoral loss in their decisions to continue in politics. Similar fractions of men and women run again in and win another election within the next four years, implying women are positively selecting into running again relative to men based on their chances of winning.

The bottom portion of Table 1 presents the distribution of candidates across office types. For the marginal candidates, this distribution is also plotted in Figure 1. The majority of candidates run for school board and city council, with other county- and city-level offices comprising the rest. There are notable differences in female participation across offices: 58 percent of female candidates run for school board compared to 42 percent of male candidates. A higher fraction of male candidates ran for city council: 41 percent of men versus 30 percent of women. There are also slightly lower rates of female candidacy among county supervisors and mayors. Among the RD sample, there is even higher concentration of candidates in city council and school board offices but similar differentiation by gender.[10] Figure 2 plots the occupation distribution for all novice candidates for the 10 broad categories derived from the 2000 Census occupation classification. Men are more likely to come from a management/business background, while women are more likely to be professionals and homemakers.

Figure 3 plots the distributions of margin of victory for male and female candidates. We observe an approximately normal distribution for both men and women, with little evidence of jumps throughout the threshold for winning. Consistent with the summary statistics in Table 1 that indicate conditional on running, women tend to win at higher rates than men, the female distribution of margin of victory is shifted to the right of the male distribution.

[10] Even within office, conditional on running, women are at least as likely to win as their male counterparts.

# 3 Estimating the effect of losing on future political involvement

## 3.1 Econometric framework

This paper's objective is to estimate the persistence of political candidates in response to an electoral loss and document whether there are different effects for male and female candidates. A simple comparison of the subsequent political participation of election winners and losers would yield biased estimates since electoral success is likely correlated with candidate characteristics, many of which are unobserved by the econometrician. In order to isolate the effect of losing distinct from these unobservable differences between winning and losing candidates, I use a regression discontinuity design that narrows the comparison of winners and losers to candidates in close elections – elections in which the winner is arguably decided by chance. I define the running variable as the margin of victory for candidate $i$ in election year $t$ $MV_{it}$ which is the difference in the vote share of the winner with the lowest vote share (last winner) and the loser with the highest vote share (the first runner-up). The running variable defined as the margin of victory instead of the vote share in order accommodate positions for which multiple individuals are voted into office, such as members of a city council or school board. For candidates who won in election year $t$, margin of victory takes on a positive value. For those who lost, it takes on a negative value. All other candidates are excluded from the analysis. The effect of losing an initial election on subsequent political participation can be written as:

$$\tau = \lim_{MV_{it} \uparrow 0} E[Y_{i,t+4}|MV_{it}] - \lim_{MV_{it} \downarrow 0} E[Y_{i,t+4}|MV_{it}]$$

where $Y_{i,t+4}$ is an indicator variable, which takes on a value of one if candidate $i$ runs again for any office within four years of election $t$. The treatment effect $\tau$ is identified based on the discontinuous behavior of $Y_{i,t+4}$ at the margin of victory threshold, that is, the jump in $Y_{i,t+4}$ when the margin of victory approach zero from the left (among the losing candidates) and the right (among the winning candidates). Under the assumption that the attributes of candidates who barely won and barely lost are continuous throughout the threshold for winning, this empirical strategy yields unbiased estimates of the effect of losing on the propensity to run again.[11]

The goal of this paper is to investigate heterogeneity in the treatment effects of losing by candidate gender. The RD identifying assumption does not require that male and female candidates around the cutoff

[11] To be precise, the RD design estimates the local average treatment effect (LATE) of losing on subsequent political participation for candidates who are close to the cutoff for winning their first election. Since the majority of the candidates are running for multi-member entities, there is a high incidence of close elections. Among the 11,732 marginal candidates, more than half are included in the optimal bandwidth calculation.

for winning are, on average, comparable. To illustrate this, I write the gender-specific treatment effects:

$$\tau_f = \lim_{MV_{it\uparrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 1] - \lim_{MV_{it\downarrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 1]$$

$$\tau_m = \lim_{MV_{it\uparrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 0] - \lim_{MV_{it\downarrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 0]$$

where $F_i$ is an indicator taking on a value of 1 if the candidate is female and 0 if the candidate is male. Suppose that $\tau_f \neq \tau_m$, the effect of losing an election on candidates' subsequent participation is not the same for male and female candidates. The inequality could be driven by differences in the propensities to run again among male and female losing candidates:

$$\lim_{MV_{it\uparrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 1] \neq \lim_{MV_{it\uparrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 0] \tag{1}$$

Alternatively, heterogeneous treatment effects could be driven by differences in the propensities to run again among winning candidates:

$$\lim_{MV_{it\downarrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 1] \neq \lim_{MV_{it\downarrow 0}} E[Y_{i,t+4}|MV_{it}, F_i = 0] \tag{2}$$

Of course, both inequalities could hold. There is also a scenario in which treatment effects are homogeneous across men and women, but both inequalities hold, due to underlying differences between male and female candidates. To summarize, although RD relies on the continuity of candidate covariates throughout the threshold for winning, the identifying assumption does not ensure continuity across subgroups. The analysis below explores the roots of heterogeneous treatment effects by gender in two ways. First, I directly observe the entities on either side of the inequalities in equations 1 and 2. Second, I investigate whether gender differences in the observable characteristics of winning and losing candidates can explain gender differences in the effects of losing.

## 3.2 Regression specification

As a baseline, I implement parametric and non-parametric specifications of the form:

$$\mathrm{Y}_{i,t+4} = \alpha + \beta \mathrm{Lost}_{it} + f(\mathrm{MV}_{it}) + \mathrm{Lost}_{it} \times f(\mathrm{MV}_{it}) + \epsilon_{it} \tag{3}$$

where $\text{MV}_{it}$ is the margin of victory, defined above, and $\text{Lost}_{it}$ is an indicator taking on a value of one if the candidate lost the initial election, and zero otherwise. $\text{Y}_{i,t+4}$ represents the subsequent political participation, defined above. The coefficient of interest is $\beta$, which represents the effect of losing an initial election on candidates' subsequent political participation. Non-parametric RD specifications use local linear regressions and an optimal bandwidth selector from Calonico et al. (2014) to test the sensitivity of the results by varying the bandwidth around the margin of victory threshold. I also implement parametric RD specifications with a second-order polynomial in margin of victory on the sample of all marginal candidates. In every specification, I include county fixed effects and election year fixed effects as controls. I cluster standard errors at the county level for each of the 58 counties in California.

The second specification formalizes the paper's contribution of estimating differential effects for men and women of an initial electoral loss on candidates' subsequent political participation. I estimate the following specification:

$$\begin{aligned}\text{Y}_{i,t+4} \quad = \quad & \alpha + \beta\text{Lost}_{it} + \gamma(\text{Female}_i \times \text{Lost}_{it}) + \delta\text{Female}_i + \\ & f(\text{MV}_{it}) + \text{Lost}_{it} \times f(\text{MV}_{it}) + \\ & \text{Female}_i \times f(\text{MV}_{it}) + \text{Female}_i \times \text{Lost}_{it} \times f(\text{MV}_{it}) + \epsilon_{it}\end{aligned} \tag{4}$$

where $\text{Female}_i$ is an indicator variable that takes a value of one if the candidate is female, and it is interacted with the running variable $MV_{it}$, as well as the indicator $\text{Lost}_{it}$. The coefficient $\beta$ now represents the effect of losing for men, and $\delta$ represents the difference in subsequent political participation between male and female close winners. The coefficient $\gamma$ represents the differential effect of losing, for women relative to men. The above specification permits investigation of differences between men and women in the effects of losing an election on their subsequent participation. In addition, examination of $\beta$ indicates whether the differential effects of losing are driven by gender differences in the outcomes of the close losers or the close winners – the contrasts represented in equations 1 and 2. Recent econometric work has drawn attention to the possibility of over-rejection in RD when investigating heterogeneous treatment effects, particularly when using a parametric specification with interaction terms (Hsu and Shen, 2017). For this reason, I also report estimates of the parametric and non-parametric specifications separately for men and women, with tests of equality of the male and female treatment effects.

## 3.3 Pooled results

Figure 4 presents graphical evidence of the effect of losing on subsequent political involvement. The graph plots candidates' probability of running in another election within four years of $t$ on the y-axis against their margin of victory in election in time $t$ on the x-axis, for bins of width equal to 0.0125 percentage points. The dotted vertical line at zero represents the winning threshold. Candidates to the right of the zero threshold won their elections in $t$, while to the left of zero, candidates lost their elections in $t$. A local polynomial is fit on each side of the zero threshold. To the left of the threshold, we observe a relatively smooth, increasing relationship between candidates' margin of victory in $t$ and their likelihood of running again. To the right of the threshold, the winners, we observe a somewhat noisier and slightly downward sloping relationship between margin of victory and the likelihood of running again. A clear discontinuity is present at the threshold, with a magnitude of the jump nearly 20 percentage points. The jump represents the deterrence effect of losing.

Table 2 panel A reports the results from the estimation of equation 3. Columns 1 through 4 use a local linear regression with a first order polynomial in the running variable, margin of victory, and the sample restricted by various bandwidths around the cutoff for winning. The first column uses the optimal bandwidth computed from Calonico et al. (2014), and the second and third columns use twice and half the optimal bandwidth, respectively. The fourth column uses the sample of all marginal candidates, imposing no restriction on the range of margin of victory. I show this specification for completeness, but discuss below its failure to satisfy the identifying assumption of covariate smoothness. The fifth column uses a second order polynomial in margin of victory on the full sample. Across all specifications, there is a negative and statistically significant effect of losing an election on the propensity to run again for any office during the next four years. The estimates range from 19 to 25 percentage points. Given that among the winning candidates, on average, 50 percent run again within the next four years, 19 percentage points represents a nearly 40 percent deterrence effect of losing.

## 3.4 Gender heterogeneity

The baseline estimates document a substantial effect of losing an initial election on subsequent political involvement. Next I examine whether there is heterogeneity in these effects by the gender of the candidate. Starting with the graphical analysis, Figure 5 is a bin scatter of candidates' probability of running in an election within four years of $t$ on the y-axis against their margin of victory in election $t$ on the x-axis, separately for men and women. The female bin scatter is represented by solid diamonds while the male bin scatter is denoted by hollow circles. We observe that, for both men and women, there is a discontinuity at the threshold for winning. Furthermore, it is visually evident that the effect of losing an initial election on the propensity to run again is larger in magnitude for women than it is for men.

Table 3 presents the results of the estimation of equation 4, with the first four columns using local linear regressions (polynomial order one) and varying the bandwidth around the margin of victory threshold. The final column uses a second order polynomial on the full sample. Panel A confirms the graphical evidence from Figure 5. For men, losing an initial election causes a 16 to 19 percentage point decline in the probability of running in another election within the next four years. The coefficient on the interaction term $\text{Female}_i \times \text{Lost}_{it}$ indicates that female candidates are an additional 7 to 11 percentage points less likely to run again due to an initial electoral loss, relative to male candidates.[12] Taking the estimates from the first column with the local linear specification and the optimal bandwidth (0.096 percentage points), the 9 percentage point differential deterrence of female candidates due to an initial loss is substantial; it represents a 56 percent increase over the male deterrence effect.

Are female candidates differentially deterred by losing? The graphical and regression analysis provides robust evidence that the answer is yes. As discussed in Section 3.1, heterogeneous treatment effects could be driven by gender differences in the propensities to run again among close winners or close runners-up. By considering the subsequent political involvement of the close winning and close losing candidates, represented in equations 2 and 1, respectively, we can provide suggestive evidence of the provenance of the gender differences in responsiveness to a loss. Figure 5 shows the rates of running again among candidates who barely won in election $t$ are nearly identical for men and women.[13] This comparison is confirmed by the negligible and statistically insignificant coefficient on $\text{Female}_i$ in the regression results. In contrast, considering candidates who barely lost their initial contests, Figure 5 shows that nearly 40 percent of male candidates but less than 30 percent of female candidates run again within the next four years.[14] The differential responsiveness of men and women appears to stem from differences in the behavior of the losing candidates.

[12] In this discussion, I omit the full sample local linear specification due to its failure to satisfy covariate smoothness.

[13] Note that male and female close winners also win subsequent elections with similar probabilities. This result will be discussed in Section 5.

[14] From Figure 5, it is interesting to note that as margin of victory increases, there is a declining propensity of female winning candidates to run again. I attribute this declining pattern to the fact that women are more likely to run for school board, and among all winning school board candidates there is declining subsequent participation in margin of victory (Figure 6).

### 3.5 Testing identifying assumptions

The validity of the regression discontinuity design depends on the assumption that assignment to losing status is not correlated with candidate characteristics. I test the validity of this assumption by estimating equation 3 with various candidates characteristics as dependent variables. Specifically, I use candidates' occupation, office and number of votes as the dependent variables. Table 4 reports coefficients on $\text{Lost}_{it}$ for the pooled sample of male and female candidates. Panel A shows the results for candidates' occupational categories. Every joint test of significance for the coefficients on $\text{Lost}_{it}$ cannot reject zero. Panel B reports the results for candidates' offices. With the exception of the linear specification on the full sample, the joint tests of significance for candidate offices cannot reject zero. Panel C replaces the dependent variable with the actual number of votes each candidate receives in their first election, and again the only specification that shows discontinuities at the cutoff is the linear specification on the full sample. For this reason, I exclude the linear specification on the full sample from the above discussion of the main results. The covariate balance results further emphasizes the importance of the RD empirical strategy in isolating the effect of a loss distinct from differences in candidate characteristics.

Appendix Tables A.1 and A.2 report the results for the samples of male and female candidates, respectively. Focusing on the optimal bandwidth and second-order polynomial specifications, there is little evidence of discontinuities in candidate-level covariates throughout the threshold for winning. The one exception is the joint test of significance for occupations for men. Overall, the results of this exercise lend validity to the identifying assumption of the regression discontinuity design, as well as the causal interpretation of the findings. Recall that, in testing the validity of the RD design, it does not require that men and women are comparable on either side of the threshold. Instead, it requires *within gender* covariate continuity through the threshold for winning. Gender differences in the covariates of close winning and/or losing candidates are relevant for mechanisms generating heterogeneity in the deterrence effect of losing.

Recall that when linking candidates across successive election cycles, I consider only future races that are in the same county as the initially observed election. This restriction implies that the outcome analyzed in this paper is a conservative measure of political involvement, since involvement outside of a candidate's initially observed county is excluded. As long as the measurement of male and female candidates' political involvement is equally affected by this restriction, the estimates of gender differences in the effect of losing remain unbiased. Suppose women are more likely than men to migrate counties or change their last names (after marriage) in response to losing their initial election. This would bias the gender heterogeneity estimates in the direction of women differentially attriting. For a few reasons, I think this source of bias is unlikely. First, I randomly select 100 individuals from the sample and attempt to find these individuals on the professional network LinkedIn. Almost thirty percent of candidates have profiles on the website, with equal percentages across male and female candidates. Among losing candidates, women were more likely to be found than men, suggesting that last name changes in response to losing do not differentially affect matching women across election cycles. Second, I examine whether the individuals with profiles moved counties since their initial election. Of the 29 individuals found, only two had moved, with equal rates across men and women. Given the low propensity to move, it is unlikely that differential female migration biases the estimates of gender differences in the effects of losing.

# 4 Understanding women's differential attrition

In this section, I explore what accounts for the differential responsiveness of female candidates to an electoral loss. First, I examine a number of plausible explanations regarding gender differences in the costs and benefits of running, the role of political parties, and the nature of competition in close political contests with female candidates. Additionally, I discuss whether the four-year time horizon is sufficient to capture subsequent political involvement. After discussing the limited role of these mechanisms, I outline rational and behavioral models that could account for women's differential attrition. There is suggestive evidence in line with a rational model in which voters have imperfect information regarding candidates, leading to statistical discrimination impeding the persistence of female candidates.

## 4.1 Costs and benefits of running, party involvement, nature of competition

**Office sorting**: It is possible that the differential response of men and women to an electoral loss is due to the fact that men and women tend to run for different types of offices, as documented in Figure 1. As discussed above, female representation tends to be higher on school boards than on city councils. If the propensity to run again after an initial loss varies by political office and men and women run for different types of offices, then this sorting could explain the patterns discussed above. In order to probe this hypothesis, I modify equation 4 to include office fixed effects, their interactions with margin of victory on either side of the threshold, and their interactions with $\text{Lost}_{it}$:

$$\begin{aligned} \text{Y}_{i,t+4} &= \alpha + \beta\text{Lost}_{it} + \gamma(\text{Female}_i \times \text{Lost}_{it}) + \delta\text{Female}_i + \\ &\quad f(\text{MV}_{it}) + \text{Lost}_{it} \times f(\text{MV}_{it}) + \\ &\quad \text{Female}_i \times f(\text{MV}_{it}) + \text{Female}_i \times \text{Lost}_{it} \times f(\text{MV}_{it}) + \\ &\quad \text{Office}_i + \text{Office}_i \times \text{Lost}_{it} + \text{Office}_i \times f(\text{MV}_{it}) + \text{Office}_i \times \text{Lost}_{it} \times f(\text{MV}_{it}) + \epsilon_{it} \end{aligned} \tag{5}$$

Table 5 reports the results of this exercise. In comparison to the main results in column 1, the inclusion of these additional controls for office type in column 2 does not attenuate the differential effect of losing an election on female political persistence relative to male political persistence. Although female representation among candidates for various political offices does substantially vary, this variation does not account for the differential attrition of women in response to a loss.

**Candidate outside option**: A second hypothesis concerns the costs and benefits of running for office. Suppose men's and women's opportunity costs of running differ, and are driven by their occupational and/or family status. Alternatively, the benefits of holding political office could differ for men and women, and these differences could account for the disparate responses of men and women to losing an election. I investigate whether the occupation of a candidate helps to explain the gender difference in politician persistence by utilizing candidates' ballot designation. The ballot designation is a field on the ballot in which candidates describe their profession/vocation, community standing, parental status, and whether they are a current officeholder, including incumbent status. Candidates are not required to fill out this field, but over 95 percent of individuals do. I classify the content of this field into 10 broad occupational categories based on the Census 2000 occupation classification[15] and estimate a modified version of equation 4 that includes candidate-level controls for occupation, their interactions with margin of victory, and their interactions with $\text{Lost}_{it}$:

$$\begin{aligned} \text{Y}_{i,t+4} &= \alpha + \beta\text{Lost}_{it} + \gamma(\text{Female}_i \times \text{Lost}_{it}) + \delta\text{Female}_i + \\ &\quad f(\text{MV}_{it}) + \text{Lost}_{it} \times f(\text{MV}_{it}) + \\ &\quad \text{Female}_i \times f(\text{MV}_{it}) + \text{Female}_i \times \text{Lost}_{it} \times f(\text{MV}_{it}) + \\ &\quad \text{Occ}_i + \text{Occ}_i \times \text{Lost}_{it} + \text{Occ}_i \times f(\text{MV}_{it}) + \text{Occ}_i \times \text{Lost}_{it} \times f(\text{MV}_{it}) + \epsilon_{it} \end{aligned} \tag{6}$$

[15] These categories are: Management/business, Professional, Service, Sales/office, Construction/maintenance, Production/transportation, Parent/homemaker, Retired, Not classified, None listed. The Parent/homemaker classifications stems from ballot designations that exclusively list this information and no other occupation.

This specification flexibly controls for occupational differences between men and women and also permits occupation-specific effects of losing. The results of this exercise are found in Table 5 panels A and B, column 3. The coefficient on the interaction term $\text{Female}_i \times \text{Lost}_{it}$ is invariant to the inclusion of these additional controls. To the extent that men and women have differing outside options of running again, these differences are not a primary driver of the differential attrition of women in response to an electoral loss. In addition, if we thought that occupations produced differential benefits from holding political office, then these results would provide little support for that hypothesis.

**Nature of competition:** Another possibility is the nature of competition in close elections differs for male and female candidates. In particular, contests with female challengers and male incumbents could be more contentious than contests with male challengers and male incumbents. I test this hypothesis in two ways. First, I restrict the sample to those elections in which both the close winner and close runner-up are non-incumbents. The results are report in Table 5 column 4. We observe that the differential effect for women increases a bit in magnitude relative the main specification. Second, in Appendix Table A.3 columns 4 and 8 I analyze only those elections in which one marginal candidate is male and the other is female. The greater responsiveness of female candidates to losing is robust to this sample restriction, though the coefficient is not precisely estimated. These two tests provide little support to the nature of competition driving the differential response of male and female candidates. The analysis cannot rule out, however, that close elections between a male and female candidate could be more vitriolic than other elections, and female losing candidates could be reacting to this experience.[16]

**Political party involvement**: As discussed in the Introduction, one of the advantages of focusing on California local politics is the elections are officially non-partisan. Although there is more limited involvement of political parties in local elections than in state or federal elections, it is possible that there is heterogeneity in party involvement by city size (Bledsoe and Welch, 1987). For example, elections for city council in large cities likely entail more intervention from the local affiliates of national political parties, including the vetting and endorsement of candidates . If political parties, rather than individual candidates, are driving the different responses of men and women to a loss, then we would expect attenuation of the differential female response in smaller municipalities. I assess the validity of this hypothesis, by restricting

[16] In Appendix Table A.3 , I also test the role of opponent gender and find the largest (in magnitude) effect of losing when female candidates lose to a male candidate and the smallest effects of losing when male candidates lose to another male candidate. The lab experimental literature has mixed results on whether the gender of a competitor influences women's decision to compete. See Niederle and Vesterlund (2011) for a summary of this research. Competition does not enhance women's performance when competing against men, but does improve their performance when competing against other women (Apicella et al., 2017; Gneezy et al., 2003).

the sample to city council elections and exploring heterogeneity in the results by city size. I classify cities according to whether their population is above or below the median population of cities in the sample, which is equivalent to a cutoff of about 25,600 individuals. Table 6 reports the results of this exercise. Female differential deterrence does not consistently vary with city size. The local linear specifications show some heterogeneity, while the quadratic specifications do not. I interpret these results as further evidence that the differential responsiveness is driven by candidate decision-making, rather than the combination of candidates and political parties, or political parties alone.

**Time horizon**: It is possible that the four-year time horizon for running again is not sufficient to capture subsequent political involvement. For example, suppose that women who lose their first election take more time than men to plan their next electoral bid. This would imply that female differential deterrence is a fleeting phenomenon and would attenuate as these women eventually run for office. In order to assess this hypothesis, I re-estimate equation 4 using whether a candidate runs again within eight years as the dependent variable. The results are reported in Appendix Table A.4 and are almost identical to the main results. If anything, the deterrence effect of both men and women is slightly larger than the estimates using the four-year horizon.

## 4.2 Behavioral and rational models of candidate entry

The above analysis presents evidence that women's differential responsiveness cannot be explained by gender differences in office sorting, the costs/benefits of running, or by political party involvement. Below I discuss two classes of models – behavioral and rational – that yield predictions of differential female attrition in response to an electoral loss.

A large behavioral literature documents gender differences in preferences for and reactions to competitive environments. Results from lab and field experiments show that women tend to opt out of competition and settings in which their remuneration depends on competitive outcomes (Niederle and Vesterlund, 2007; Flory et al., 2015; Buser et al., 2014). With regard to politics, Kanthak and Woon (2014) examine whether women are "election-averse" through a series of lab experiments. They find that when a candidate is chosen at random for a position, women and men are equally are likely to volunteer for candidacy, whereas when a candidate is chosen by an election for a position, women become substantially less likely than men to volunteer.[17] Competition or election aversion could explain the lower propensity of women to initially run

[17] The gender gap in the willingness to run in the election setting persists when controlling for candidate ability, beliefs regarding the ability of others, and risk aversion.

for office, but could be harder to account for differential persistence among individuals who have already opted into competitive environments.

Recent evidence shows that, conditional on entering a competitive setting, women are disproportionately deterred by losing. Buser and Yuan (2016) use lab experiments and Dutch math competitions in order to analyze gender differences in response to losing. They find evidence that women are less likely than men to enter a competitive environment again after having lost the first time and are able to rule out differences in ability, updating on ability, and risk aversion driving the differential responsiveness of women to losing.[18] The finding of differential female attrition is echoed by Ellison and Swanson (2018) using U.S. high school math tournaments. A micro-foundation for a female-specific discouragement effect could be stereotype threat, where stereotyped individuals fear conforming to the stereotype and may accordingly exhibit poor performance or reluctance to engage in such situations in which they may risk conforming to stereotypes Steele (1997). Stereotyped individuals may place more weight on confirmation of the stereotype, that is, when a woman loses an election, she may be differentially discouraged by the loss since women are not known to be adept politicians and the loss confirms this stereotype.

Rational models of candidate entry assume candidates choose to enter a race based on the costs and benefits of running as well as their expected probability of winning.[19] In these models, voters face incomplete information regarding candidate quality and must make inferences based on noisy signals. If the costs of running again are higher or the benefits are lower for female losing candidates, then they would be less likely to run again. Another possibility is there are gender differences in the the expected probability of winning, if female losing candidates are differentially penalized by the electorate, political parties, or campaign funders. There are different ways to generate this penalty. One possibility is related to the model of statistical discrimination presented in Aigner and Cain (1977), as adapted to the political setting in Beaman et al. (2009). In this model, the precision of signal of candidates quality differs for male and female candidates due to a lower number of women in elective offices. If voters are risk averse, then even if men and women have the same underlying distribution of candidate competence, female candidates will incur a penalty due to the additional noise in their signal. Female candidates anticipate this penalty and have a lower expected probability of winning. It is this penalty that causes fewer female candidates to initially run, and after an electoral loss, induces disproportionate attrition of losing female candidates. Note that this penalty persists as long as a candidate remains a novice due to imperfect information; it is not a penalty stemming from the act of losing per se.[20]

[18] Buser and Yuan (2016) find no differential response of women to losing when the loss is allocated at random instead of through an effort-based task.

[19] Dal Bó and Finan (2017) provides a review of such models.

[20] Another possibility is the penalty stems from a greater tolerance for losses among members of the same gender. This would be consistent with evidence that female physicians experience a differential reduction in referrals after a patient death

### 4.3 Assessing the models: institutional settings

A key difference between the rational and behavioral models is whether candidates respond to gender differences in extrinsic stimuli or whether there is a gender difference in the response the same experience. In the above analysis of candidate occupations, I have already ruled out gender differences in the costs and benefits of running again as an explanation for the differential attrition of women. To further probe whether the estimated differential deterrence of women is a behavioral phenomenon, I build on the lab experimental literature that shows women's behavior in competitive environments is influenced by the institutional setup (e.g. gender composition, competitiveness). . In the analysis below, I test whether female differential deterrence is pervasive across institutional settings (Niederle and Vesterlund, 2011; Gneezy et al., 2003). The two institutional features I consider are the female representation among officeholders and the experience level of candidates.

To analyze whether female differential deterrence depends on the female representation of officeholders, I split the sample into the two most common political offices in the sample: city council and school board. Female representation among city council candidates is 26 percent while for school board it is 39 percent. Among winning candidates, the representation is more differentiated by gender. I estimate equation 4 separately for each of these offices. The results of this analysis are reported in Table 7, with Panel I presenting the coefficients for city council candidates and Panel II presenting the coefficients for school board candidates. Due to splitting the sample, the standard errors associated increase considerably. From examination of the magnitudes of the coefficients on the interaction term $\text{Female}_i \times \text{Lost}_{it}$ , it is evident that candidates for city council – the office with lower female representation – are the primary driver of the differential attrition of women in the combined sample. The deterrence effect for female candidates for city council is between 10 and 18 percentage points greater than the effect for male candidates. The comparable estimate for school board candidates is 4 percentage points. These results are confirmed by the graphical analysis presented in Figure 6.

The second institutional feature I consider is the elective experience of candidates. I test whether differential attrition is present among more experienced politicians in two different settings: candidates running for local offices who are incumbents and candidates running for state legislative offices. I contrast these results with the main analysis that is restricted to novice politicians. To analyze experienced CA local politicians, I construct a sample of (1) candidates who appear for the first time in the data between 1995 and 1999 and are designated as incumbents and (2) candidates who are observed in the data winning their first election

and female financial advisors experience differential rates of firing after misconduct (Egan et al., 2017; Sarsons, 2017). In the voter setting, it is harder to rationalize how a same-gender bias among voters could result in differential attrition of female candidates, unless there are different turnout rates among male and female voters.

between 1995 and 2006 and who run again for office within four years.[21] I repeat the estimation of equation 4 on this sample and report the results in Table 8. From these specifications, it is clear that among candidates with prior elected experience, the effect of losing on continuing in politics is similar for women and men. Note that these individuals are still deterred by a loss; there remains a main effect of losing for this sample of between 8.6 and 14 percentage points.

I additionally test whether female differential deterrence depends on elected experience by analyzing candidates for U.S. state legislative offices. Forty percent of state legislators had elective experience prior to running for state office (Carroll and Sanbonmatsu, 2013). Using the 1967-2010 state legislature election returns data compiled by Klarner et al. (2013), I analyze the effect of losing an election on the propensity to run again for state legislature. The sample is limited to non-incumbents who run in the general election for state legislature against at least one other candidate. Again, I consider the marginal candidates. In this setting, only one seat is filled per election, so the marginal candidates are those ranked one and two. The results are presented in Figure 7 and Table 9. It is evident from the regression results and the graphical analysis that there is no differential attrition of male and female candidates vying for state legislative offices in response to an electoral loss. While the overall deterrence effect is substantially larger among state politicians, the attrition of candidates after an electoral loss is of the same magnitude for both men and women. Considering the local incumbent and the state legislature candidates in tandem, the evidence suggests that among political candidates with prior experience in elected offices, there is no differential responsiveness of men and women.

The above results can also be interpreted in the context of the rational model outlined in Section 4.2. Recall that candidates decide whether to run again based on their expected probability of winning, which differentially erodes for women relative to men post-loss. For offices with higher female representation, we would expect a narrower difference in the precision of the male and female signals, which would attenuate the differential attrition of women after a loss. The finding of similar effects of losing for male and females candidates for school board (a high female representation office) relative to city council (a low female representation office) is in line with this prediction. With regard to the more experienced candidates, individuals holding elective office have had the opportunity to reveal their competence to voters. As voters gain additional information regarding candidate competence, the imperfect information underlying the differential penalty for female candidates diminishes, yielding similar responses of male and female candidates to a loss. The results for more experienced candidates show exactly that.

[21] Incumbents can be either elected or appointed and this sample restriction excludes those incumbents who were likely appointed. In theory, if an incumbent is elected, then she should not appear for the first time in the data after 1999, since terms are at most four years. I further limit the 1995-1999 incumbents to those who do not indicate they were appointed in their ballot designation.

Of course, there are alternative interpretations of each of these tests. For the school board and city council contrast, it is possible that the content of school board membership is better aligned with that of K-12 educators – a highly feminized profession – and therefore losses are more immune to discouragement stemming from stereotype threat.[22] In addition, the heterogeneity by experience level could stem from the selection of different types of individuals into these settings, who may be less likely to experience discouragement in the wake of a loss. To summarize, the evidence demonstrates that the differential effect of losing on female candidates' subsequent political involvement exhibits substantial heterogeneity across institutional settings and shows patterns consistent with predictions from the rational model. These results call into question the role of behavioral models in explaining differential female attrition, but cannot definitively rule out such models.

## 5 Implications for the gender gap in officeholding

As a final exercise, I return to the initial motivation of the paper: to what extent does the differential attrition of women in the wake of a loss account for the gender gap in officeholding? In the sample of CA novice politicians who are marginal candidates, 35 percent of those who win are female.[23] The effect of deterrence on officeholding depends on (a) how individuals who run again for office fare in their next electoral attempt and (b) whether the individuals induced to drop out due to losing would have won had they run again. While it is not possible observe win rates for candidates who do not run again, I can bound the effects on officeholding by making assumptions regarding their win behavior.

To construct a lower bound, suppose that candidates who do not run again would have lost had they run. Under this assumption, I estimate the implications of losing for officeholding. I repeat the above estimation of equation 4 on the novice candidate sample, with the dependent variable the unconditional probability of winning the next election. A candidate is coded as winning if she wins her next electoral attempt, and is coded as losing if she loses the next electoral attempt or does not run at all within four years. The results are reported in Table 10 with the graphical analysis in Figure 8. The effect of an initial loss on winning the next election is between 18 and 19 percentage points. Furthermore, the effect is similar for male and female candidates.[24] The large gender gap in the effect of losing on running again does not translate into a gender

[22] The gender connotation of a job position's task set is an important determinant of women's willingness to apply for a position (Flory et al., 2015).

[23] Not conditioning on the marginal candidates, women are 37 percent of all CA novice politicians who win.

[24] These estimates are substantially smaller in magnitude than the estimates of candidate-level incumbency advantage in Ferreira and Gyourko (2011) and Trounstine (2011) of large city mayors and councilors and Lee (2001) of members of the U.S. House of Representatives. There are a couple reasons this could be the case. First, their goal of estimating incumbency advantage for a particular office confines the subsequent participation of candidates to the same office in the following election

gap in the effect of losing on officeholding.[25] From Figure 8 it is apparent that the convergence in male and female outcomes stems from the runners-up. Among those who barely win their first election, the rates of running again and the probabilities of winning the next election are similar for men and women. In contrast, among those who barely lose, there is a gender gap in the propensity to run again, which dissipates when considering the unconditional probability of winning. Thus, under the lower bound assumption, there would be no change in the representation of women among officeholders if losing candidates were encouraged to run again.

As an upper bound, suppose that candidates induced to drop out due to losing have chances of winning their next election equivalent to that of the runners-up who did indeed run. If this were the case, then the male runner-up win rate would be 0.08 higher and the female runner-up win rate would be 0.14 higher.[26] In this scenario, losing would be less punitive for women than for men, which would be consistent with a behavioral model of candidate entry. If attriting candidates were to run again, it would raise female representation among officeholders by 6 percentage points, or 17 percent. Underlying the boost to female representation is the fact that conditional on running, female losing candidates are *more likely* to win than male losing candidates.

Finally, I compute that for female differential deterrence to explain any of the gender gap in officeholding, among those induced to drop out due to losing, female runners-up require a probability of winning of at least two-thirds that of male runners-up. Based on this calculation, if women who dropped out have substantially lower chances of winning relative to men who dropped out, nudging those who drop out to run again would not improve female representation among officeholders.

# 6 Conclusion

This paper empirically assesses whether there is differential attrition of female relative to male candidates in response to an initial electoral loss. Using local election returns from California and a regression discontinuity design that exploits the quasi-random assignment of losing an election, I find that an initial electoral loss reduces the propensity for men to run again within the next four years by 16 percentage points, whereas

year. The participation of losing candidates who choose to run for a different office is not counted. Second, large municipality and state races could generate larger incumbency effects. To test whether it is the presence of small municipalities and elective offices other than city council that is driving the difference in the magnitudes of the effects, I restrict my sample to elections of city councilors in above median population cities in California and find the effect on winning rises (in absolute value) to 26 percentage points.

[25] An alternative is to examine whether the candidate wins *any* office within the next four years, instead of whether she win on the next electoral attempt. I examine this in Appendix Table A.5 and find similar results.

[26] I compute this number by multiplying the RD effect of losing on running again by the win rate among losing candidates who run again. For men, this is $0.16 \times 0.50 = 0.08$ and for women this is $0.25 \times 0.57 = 0.14$.

it reduces the propensity for women to run again by an additional 9 percentage points, a difference of over 50 percent. In exploring mechanisms underlying the differential responsiveness of men and women, I find little empirical support for office sorting, candidate occupation, party involvement or the nature of competition as explanatory factors. Based on these findings, I discuss rational and behavioral models of candidate entry. The empirical evidence shows that the differential attrition of women does not appear to be a pervasiveness phenomenon across institutional settings, which suggests that this phenomenon is not attributed to a behavioral feature of female candidates. I provide suggestive evidence that women's quitting behavior converges towards men's in high female representation settings as well as among more experienced candidates, consistent with a rational model of candidate entry.

If the differential attrition of women in response to an electoral loss can explain the low representation of women in elective offices, it is likely not due to differences in individual decision-making among male and female candidates. The paper's findings instead suggest that women and men are behaving similarly: in their decision to enter a subsequent race, female runners-up candidates are anticipating their lower chances of winning relative to their male counterparts. Policies that address the imperfect information voters possess about candidates could help alleviate the initial reluctance of women to enter politics, as well as their differential attrition in response to an electoral loss. In addition, policies that mandate a higher level of female representation in political offices could trigger a virtuous cycle by alleviating the imperfect information voters face when considering candidates.

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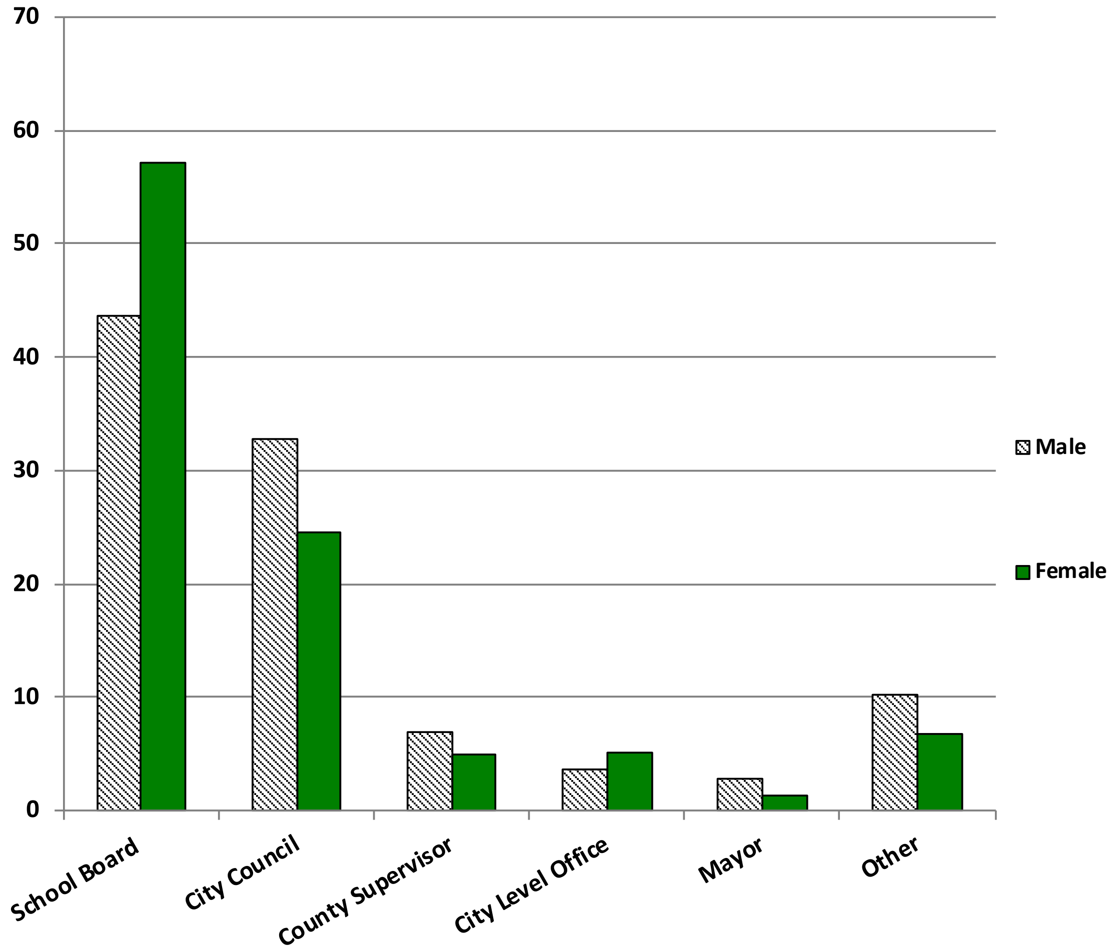
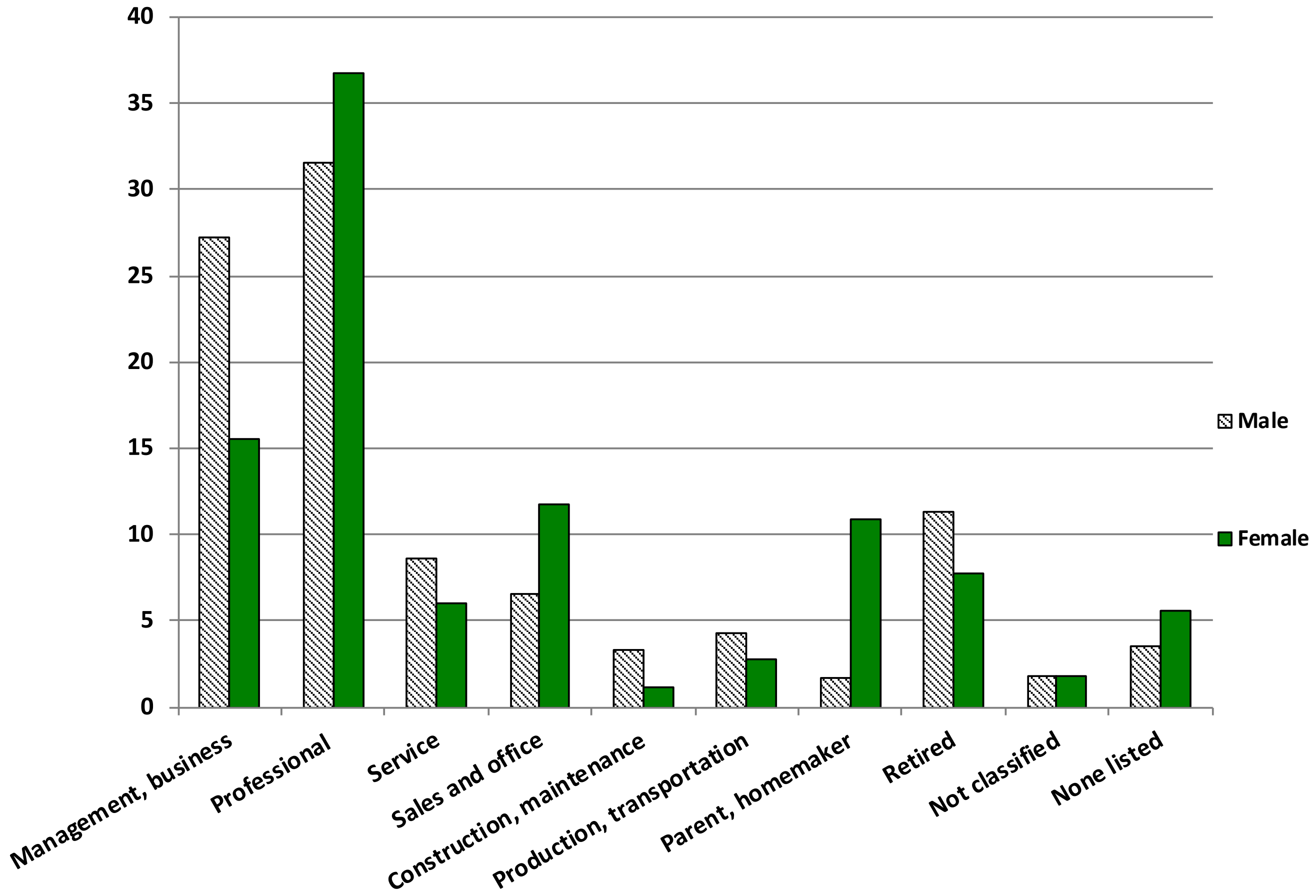
Figure 1: Distribution of Offices Contested, By Gender



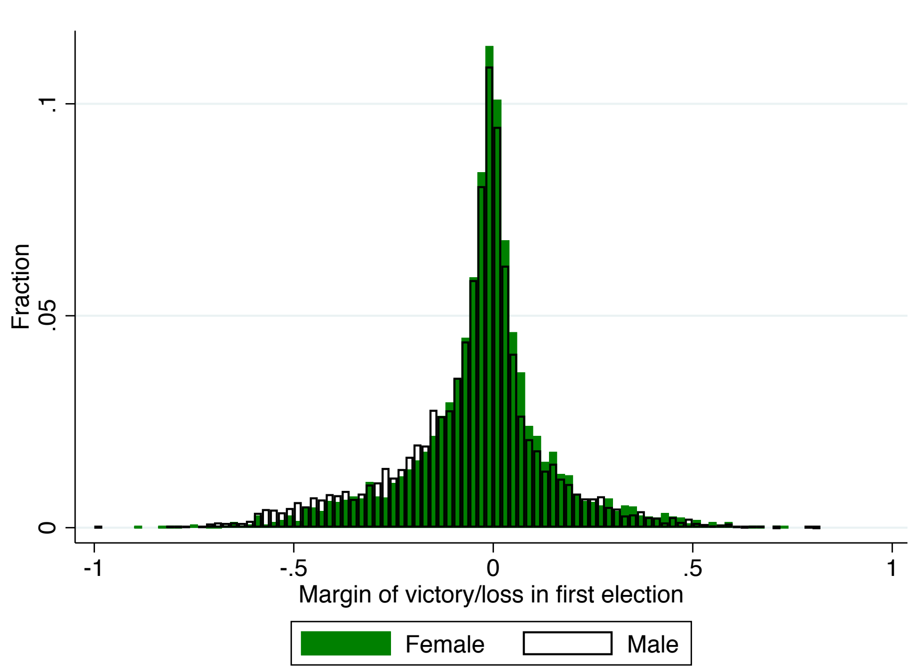

Note: This figure plots the office distribution for male and female novice candidates for CA local elective offices, 1995-2010. 'Other' offices include law enforcement, community planning boards, and judges.

Figure 2: Distribution of Candidates' Occupations, By Gender



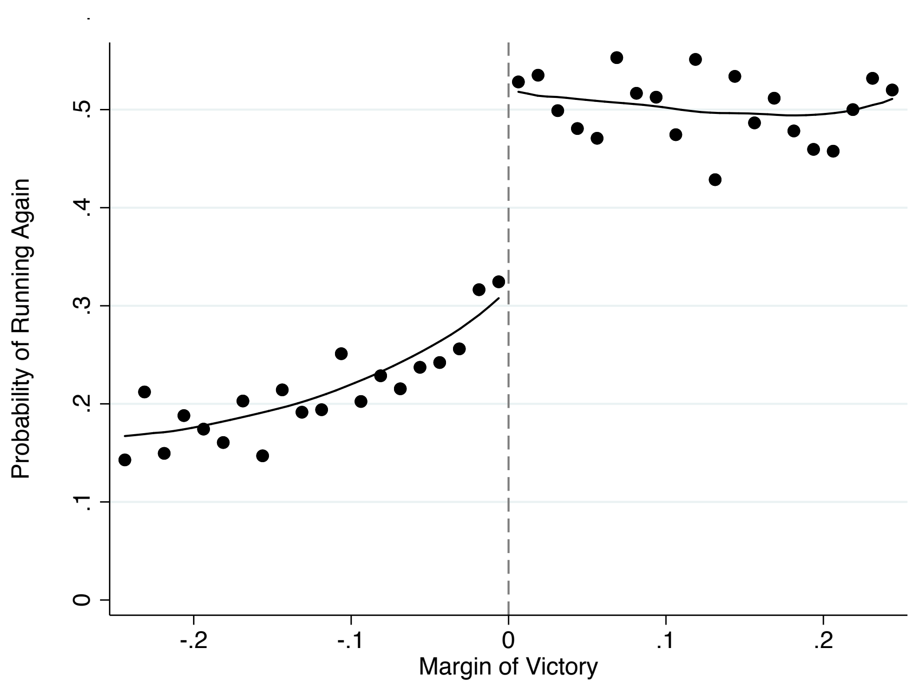

Note: This figure plots the occupational distribution for male and female novice candidates for CA local elective offices, 1995-2010. The 2000 Census occupation classification scheme is used to map text descriptions of occupations in the ballot designation to the 10 broad categories.

Figure 3: Distribution of Election Margin of Victory, By Gender



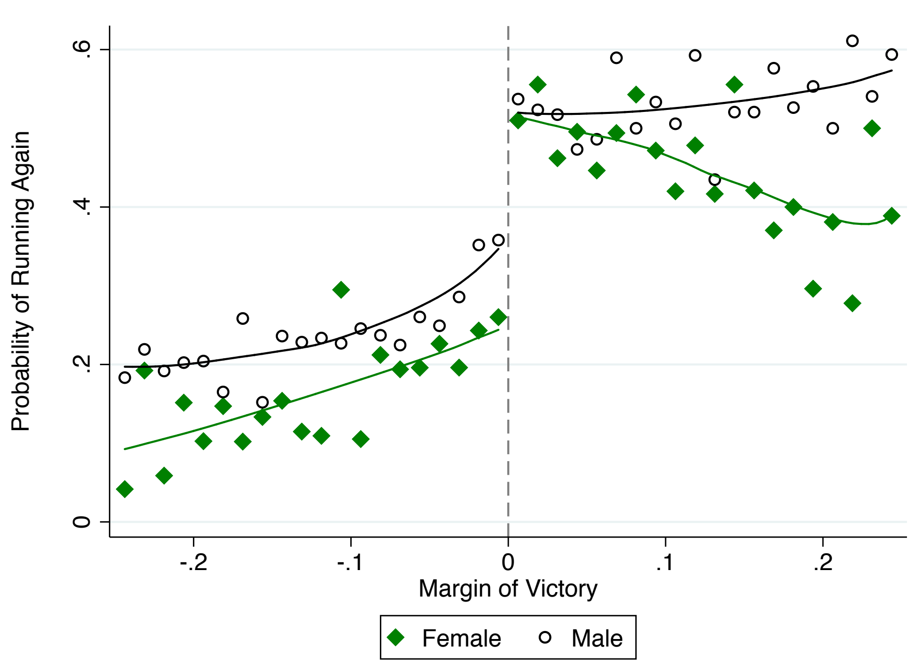

Note: This figure plots the distribution of margin of victory for novice candidates for CA local elective offices, 1995-2010. Each candidate appears at most one time in the sample. Margin of victory takes on a positive value if the candidate won, and a negative value if the candidate lost.

Figure 4: Relationship between Margin of Victory and Subsequent Political Participation



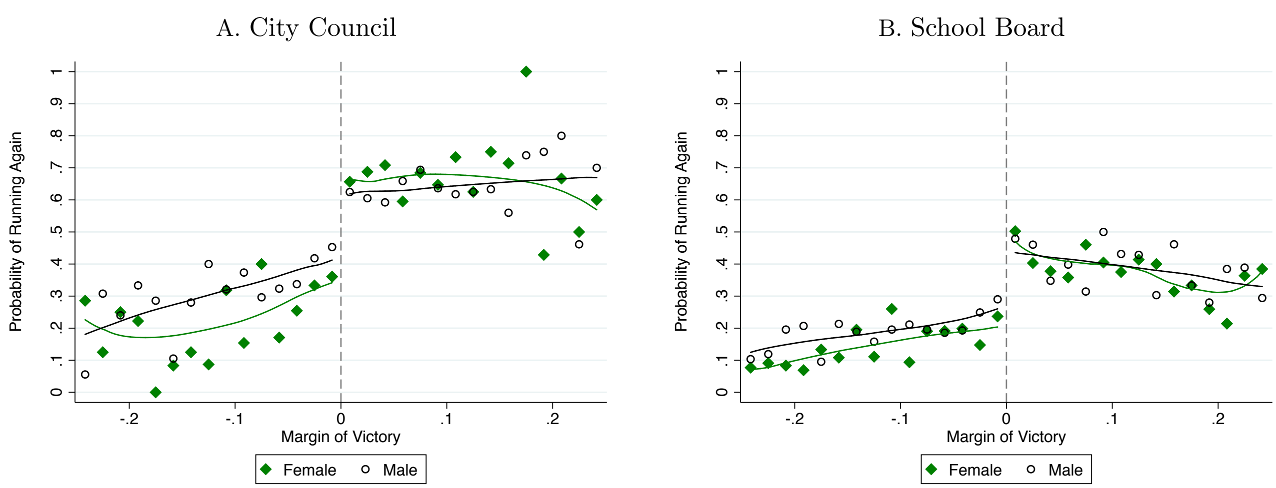

Note: This figure is a bin scatter of the probability candidates run again for office within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.0125. A local polynomial fit is plotted on either side of the winning threshold. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office.

Figure 5: Relationship between Margin of Victory and Subsequent Political Participation, by Gender



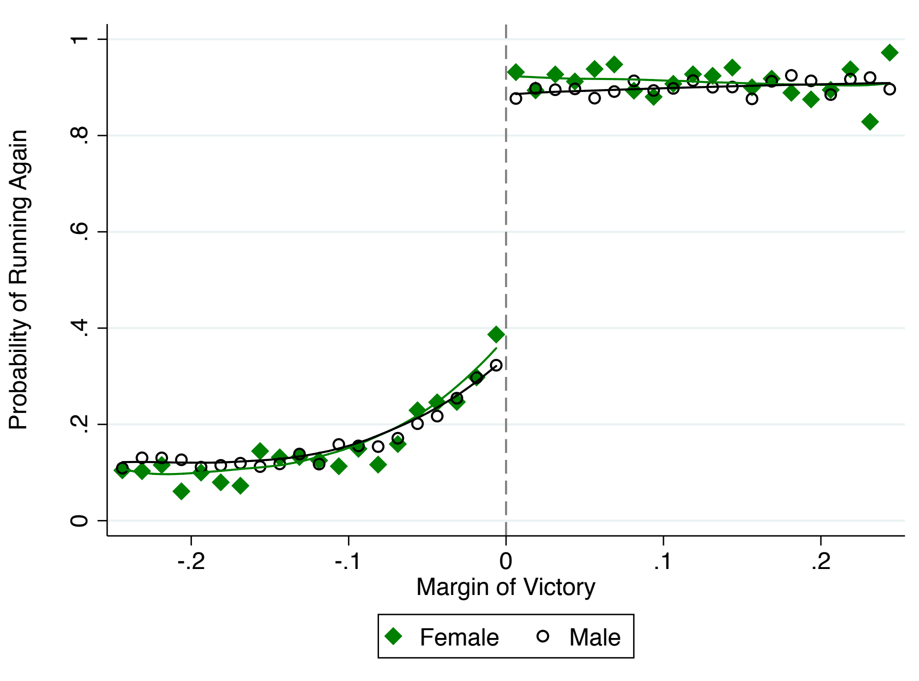

Note: This figure is a bin scatter of the probability candidates run again for office within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.0125. A local polynomial fit is plotted on either side of the winning threshold. There are separate bin scatters and local polynomial fits for male and female candidates. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office.

Figure 6: Relationship between Margin of Victory and Probability of Running Again, by Gender and Elective Office



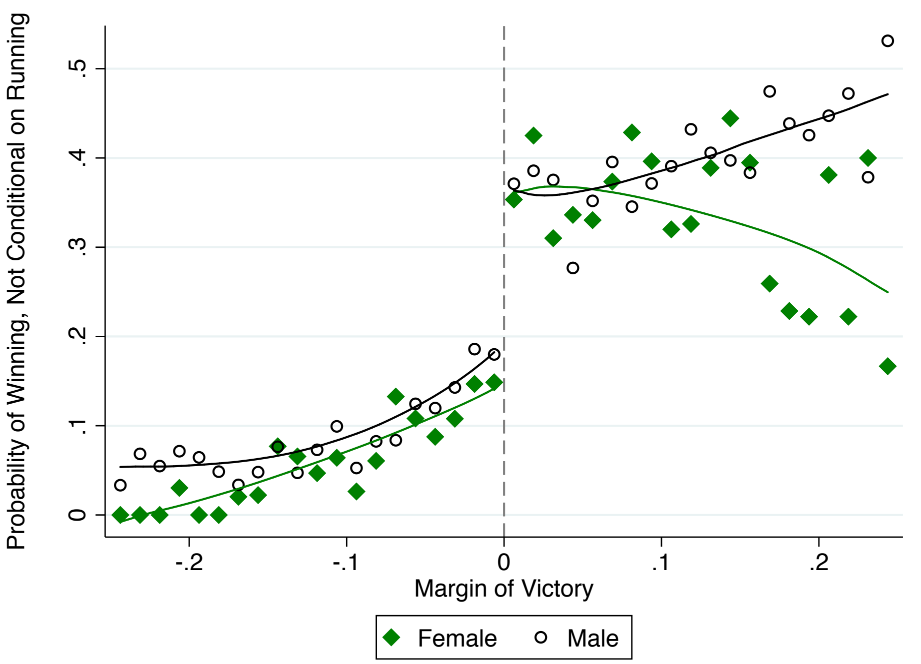

Note: This figure is a bin scatter of the probability candidates run again for office within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.01. A local polynomial fit is plotted on either side of the winning threshold. Panel A plots city council candidates and Panel B plots school board candidates. In each plots, there are separate bin scatters and local polynomial fits for male and female candidates. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office.

Figure 7: Relationship between Margin of Victory and Probability of Running Again, State Legislative Candidates




Note: This figure is a bin scatter of the probability candidates run again for office within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.01. A local polynomial fit is plotted on either side of the winning threshold. There are separate bin scatters and local polynomial fits for male and female candidates. Each candidate appears at most one time in the sample. The sample is state legislative candidates who run between 1976 and 2010, are not incumbents, and are running in the general election for a single seat.

Figure 8: Relationship between Margin of Victory and Probability of Winning Next Election, by Gender




Note: This figure is a bin scatter of the probability candidates run again for office and wins within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.0125. A local polynomial fit is plotted on either side of the winning threshold. There are separate bin scatters and local polynomial fits for male and female candidates. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office.

Table 1: Summary Statistics for CA Novice Politicians

| | All Candidates | | | All Marginal Candidates | | |
|---|---|---|---|---|---|---|
| | All | Men | Women | All | Men | Women |
| Female | 30.90 | | | 32.32 | | |
| Elected in *t* | 30.98 | 28.15 | 37.31 | 39.57 | 38.07 | 42.70 |
| Run again within *t+4* | 28.31 | 28.84 | 27.12 | 33.53 | 34.91 | 30.64 |
| Run again & win within *t+4* | 15.27 | 14.82 | 16.28 | 20.30 | 20.55 | 19.78 |
| *Office Type* | | | | | | |
| School Board Member | 44.23 | 39.06 | 55.79 | 47.99 | 43.58 | 57.23 |
| City Council | 37.70 | 41.10 | 30.10 | 30.09 | 32.77 | 24.50 |
| County Supervisor | 5.29 | 5.91 | 3.88 | 6.32 | 6.96 | 4.96 |
| City Level Office | 2.41 | 2.09 | 3.13 | 4.09 | 3.59 | 5.14 |
| Mayor | 2.57 | 3.08 | 1.41 | 2.39 | 2.87 | 1.40 |
| Other (Law Enforcement; Rent Control Board; etc.) | 7.81 | 8.76 | 5.69 | 9.11 | 10.23 | 6.78 |
| Unique Races | 11,466 | 9,587 | 5,787 | 9,189 | 6,772 | 3,498 |
| Observations | 26,375 | 18,225 | 8,150 | 11,733 | 7,941 | 3,792 |

Note: This table presents summary statistics for the full sample of novice candidates for CA local elections, 1995-2010, and the sample of marginal candidates. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office.

Table 2: Effect of Electoral Loss on Subsequent Political Participation: Baseline Specification

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| | | | A. All Candidates | | |
| Lost | -0.196*** | -0.214*** | -0.195*** | -0.246*** | -0.217*** |
| | (0.023) | (0.017) | (0.033) | (0.014) | (0.016) |
| Winner mean | 0.514 | 0.510 | 0.517 | 0.505 | 0.505 |
| Bandwidth | 0.096 | 0.192 | 0.048 | - | - |
| Observations | 6,737 | 8,959 | 4,619 | 11,732 | 11,732 |
| R-squared | 0.091 | 0.098 | 0.083 | 0.110 | 0.113 |
| | | | B. Female Candidates | | |
| Lost | -0.250*** | -0.271*** | -0.259*** | -0.279*** | -0.262*** |
| | (0.034) | (0.026) | (0.044) | (0.018) | (0.024) |
| Winner mean | 0.502 | 0.486 | 0.510 | 0.476 | 0.476 |
| Bandwidth | 0.10 | 0.20 | 0.05 | - | - |
| Observations | 2,321 | 3,047 | 1,582 | 3,792 | 3,792 |
| R-squared | 0.134 | 0.138 | 0.137 | 0.142 | 0.144 |
| | | | C. Male Candidates | | |
| Lost | -0.164*** | -0.186*** | -0.158*** | -0.230*** | -0.194*** |
| | (0.027) | (0.020) | (0.039) | (0.017) | (0.019) |
| Winner mean | 0.522 | 0.522 | 0.520 | 0.520 | 0.520 |
| Bandwidth | 0.094 | 0.188 | 0.047 | - | - |
| Observations | 4,416 | 5,916 | 3,038 | 7,940 | 7,940 |
| R-squared | 0.087 | 0.095 | 0.083 | 0.108 | 0.111 |
| p-value from M=F | 0.026 | 0.006 | 0.038 | 0.023 | 0.014 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Main Results

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw =0.096 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.093** | -0.081** | -0.106* | -0.050** | -0.069** |
| | (0.038) | (0.030) | (0.055) | (0.022) | (0.027) |
| Lost | -0.165*** | -0.187*** | -0.160*** | -0.230*** | -0.194*** |
| | (0.026) | (0.020) | (0.038) | (0.017) | (0.019) |
| Female | -0.004 | 0.006 | -0.009 | -0.019 | -0.005 |
| | (0.034) | (0.025) | (0.042) | (0.020) | (0.023) |
| Winner mean | 0.514 | 0.510 | 0.517 | 0.505 | 0.505 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 6,737 | 8,959 | 4,619 | 11,732 | 11,732 |
| R-squared | 0.094 | 0.101 | 0.087 | 0.116 | 0.117 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Covariate Balance

| | Optimal bw value | (1) Polynomial order one: Optimal bw | (2) Polynomial order one: 2×Optimal bw | (3) Polynomial order one: 0.5×Optimal bw | (4) Polynomial order one: Full sample | (5) Polynomial order two: Full sample |
|---|---|---|---|---|---|---|
| A. Occupation | | | | | | |
| Management, business & financial | 0.107 | 0.002 | 0.003 | 0.030 | 0.005 | 0.001 |
| | | (0.016) | (0.011) | (0.021) | (0.011) | (0.011) |
| Professional & related | 0.093 | -0.009 | -0.014 | -0.027 | -0.017 | -0.019 |
| | | (0.016) | (0.015) | (0.020) | (0.013) | (0.014) |
| Service | 0.070 | -0.008 | 0.002 | -0.010 | 0.004 | 0.007 |
| | | (0.012) | (0.010) | (0.013) | (0.007) | (0.008) |
| Sales and office | 0.083 | 0.011 | 0.005 | 0.009 | 0.006 | 0.009 |
| | | (0.010) | (0.008) | (0.016) | (0.005) | (0.008) |
| Nat. resource, construction & maintenance | 0.097 | -0.004 | 0.002 | -0.011 | -0.001 | -0.003 |
| | | (0.007) | (0.006) | (0.009) | (0.004) | (0.006) |
| Production, transportation & material moving | 0.092 | -0.004 | -0.003 | -0.006 | -0.000 | -0.002 |
| | | (0.009) | (0.008) | (0.012) | (0.006) | (0.008) |
| Parent/homemaker | 0.124 | 0.013 | 0.010 | 0.005 | 0.005 | 0.010 |
| | | (0.010) | (0.008) | (0.013) | (0.006) | (0.008) |
| Retired | 0.144 | -0.012 | -0.013 | -0.016 | -0.011 | -0.012 |
| | | (0.015) | (0.012) | (0.017) | (0.010) | (0.012) |
| Not classified | 0.098 | 0.005 | 0.002 | 0.004 | -0.001 | 0.002 |
| | | (0.005) | (0.004) | (0.008) | (0.004) | (0.004) |
| None listed | 0.080 | 0.004 | 0.003 | 0.002 | 0.009* | 0.007 |
| | | (0.008) | (0.007) | (0.011) | (0.005) | (0.006) |
| p-value from joint test of significance | | 0.867 | 0.916 | 0.524 | 0.370 | 0.593 |
| B. Office | | | | | | |
| County supervisor | 0.065 | -0.000 | -0.000 | 0.001 | -0.003 | -0.007* |
| | | (0.005) | (0.004) | (0.006) | (0.004) | (0.004) |
| Mayor | 0.051 | -0.002 | 0.001 | 0.005* | -0.010*** | 0.000 |
| | | (0.002) | (0.003) | (0.003) | (0.003) | (0.003) |
| City council | 0.136 | 0.010 | -0.001 | 0.012 | -0.007 | -0.005 |
| | | (0.014) | (0.011) | (0.015) | (0.009) | (0.012) |
| Other city position | 0.053 | 0.003 | 0.004 | 0.005 | -0.003 | -0.000 |
| | | (0.003) | (0.003) | (0.004) | (0.003) | (0.003) |
| School board / superintendent | 0.082 | -0.006 | 0.004 | -0.023 | 0.031*** | 0.019 |
| | | (0.017) | (0.015) | (0.022) | (0.010) | (0.014) |
| Public attorneys / judges | 0.056 | -0.002 | -0.004* | 0.001 | -0.004 | -0.003 |
| | | (0.003) | (0.002) | (0.004) | (0.003) | (0.003) |
| Rent control / community planning | 0.155 | -0.002 | -0.002 | -0.004 | -0.001 | -0.003 |
| | | (0.003) | (0.003) | (0.004) | (0.002) | (0.004) |
| Law enforcement | 0.056 | -0.001 | -0.000 | 0.002 | -0.003* | 0.000 |
| | | (0.002) | (0.002) | (0.003) | (0.002) | (0.002) |
| Advisory council | 0.116 | -0.001 | -0.002 | -0.002 | 0.000 | -0.001 |
| | | (0.006) | (0.004) | (0.008) | (0.003) | (0.003) |
| p-value from joint test of significance | | 0.690 | 0.528 | 0.278 | 0.001 | 0.520 |
| C. Number of votes | | | | | | |
| Number of votes | 0.015 | -9.658 | -15.967 | 20.834 | -1,427.579** | 918.721 |
| | | (20.105) | (38.737) | (15.530) | (706.094) | (596.436) |
| Polynomial Order | | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | | X | X | X | X | X |
| County FE | | X | X | X | X | X |

Note: This table presents the results of the estimation of a specification with a candidate's occupation (Panel A), office type (Panel B), or number of votes (Panel C) as the dependent variables. The independent variables are an indicator for whether the candidate lost their initially observed election and various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Mechanisms

| | A. Optimal Bandwidth, Polynomial=1 | | | | B. Full Sample, Polynomial=2 | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| | Main Result | Office × Lost Controls | Occ × Lost Controls | Races with Only Non-incumbents | Main Result | Office × Lost Controls | Occ × Lost Controls | Races with Only Non-incumbents |
| Female × Lost | -0.093** | -0.086** | -0.091** | -0.124** | -0.069** | -0.065** | -0.069** | -0.097** |
| | (0.038) | (0.037) | (0.040) | (0.060) | (0.027) | (0.027) | (0.030) | (0.043) |
| Female | -0.004 | 0.014 | -0.008 | 0.040 | -0.005 | 0.013 | -0.001 | 0.039 |
| | (0.034) | (0.035) | (0.037) | (0.049) | (0.023) | (0.023) | (0.026) | (0.032) |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| Year of First Election FE | X | X | X | X | X | X | X | X |
| County FE | X | X | X | X | X | X | X | X |
| Observations | 6,737 | 6,737 | 6,737 | 2,880 | 11,732 | 11,732 | 11,732 | 5,088 |
| R-squared | 0.094 | 0.141 | 0.101 | 0.122 | 0.117 | 0.175 | 0.124 | 0.132 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Column 1 reports the main results from Table 3 with the optimal bandwidth, column 2 controls for office contested, column 3 controls for candidate ballot designation, and column 4 restricts the sample to elections in which only non-incumbents are the marginal candidates. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Effect of Electoral Loss on Subsequent Political Involvement, by Gender: By City Size

| | A. All City Councils | | B. Cities with Population >25,600 | | C. Cities with Population <=25,600 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (1) | (2) | (1) | (2) |
| | Optimal bw | Full Sample | Optimal bw | Full Sample | Optimal bw | Full Sample |
| Female × Lost | -0.180*** | -0.104** | -0.202** | -0.107 | -0.084 | -0.120 |
| | (0.064) | (0.051) | (0.090) | (0.065) | (0.119) | (0.076) |
| Lost | -0.117*** | -0.186*** | -0.150*** | -0.229*** | -0.089 | -0.132** |
| | (0.040) | (0.030) | (0.054) | (0.036) | (0.060) | (0.049) |
| Female | 0.091* | 0.038 | 0.130** | 0.035 | 0.066 | 0.041 |
| | (0.049) | (0.044) | (0.056) | (0.055) | (0.074) | (0.057) |
| Winner mean | 0.637 | 0.640 | 0.716 | 0.722 | 0.564 | 0.561 |
| Observations | 2,223 | 3,531 | 1,084 | 1,960 | 1,066 | 1,523 |
| R-squared | 0.122 | 0.155 | 0.133 | 0.191 | 0.145 | 0.160 |
| Polynomial Order | 1 | 2 | 1 | 2 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X | X |
| County FE | X | X | X | X | X | X |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. The sample is further restricted to candidates for city council. Panel A examines all city council candidates, while Panels B and C examine heterogeneity in the effect of losing by city size, with cities split according to whether they are above/below the median population of cities in the sample. Standard errors are clustered at the county level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Effect of Electoral Loss on Subsequent Political Participation, by Gender: By Elective Office

| | A. City Council | | B. School Board | |
|---|---|---|---|---|
| | (1) | (2) | (1) | (2) |
| | Optimal bw | Full Sample | Optimal bw | Full Sample |
| Female × Lost | -0.180*** | -0.104** | -0.043 | -0.039 |
| | (0.064) | (0.051) | (0.049) | (0.035) |
| Lost | -0.117*** | -0.186*** | -0.195*** | -0.204*** |
| | (0.040) | (0.030) | (0.033) | (0.027) |
| Female | 0.091* | 0.038 | -0.013 | -0.002 |
| | (0.049) | (0.044) | (0.042) | (0.030) |
| Winner mean | 0.637 | 0.640 | 0.432 | 0.407 |
| Observations | 2,223 | 3,531 | 3,601 | 5,631 |
| R-squared | 0.122 | 0.155 | 0.097 | 0.103 |
| Polynomial Order | 1 | 2 | 1 | 2 |
| Year of First Election FE | X | X | X | X |
| County FE | X | X | X | X |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. The sample is further restricted to candidates for city council and school board. Panel A examines candidates who run for city council, while Panel B examines candidates who run for school board. Standard errors are clustered at the county level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Effect of Electoral Loss on Subsequent Political Participation, by Gender: CA Incumbents

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw =0.07 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.009 | -0.042 | -0.005 | -0.043 | -0.037 |
| | (0.078) | (0.062) | (0.098) | (0.042) | (0.047) |
| Lost | -0.116*** | -0.140*** | -0.086 | -0.135*** | -0.128*** |
| | (0.036) | (0.035) | (0.061) | (0.029) | (0.036) |
| Female | -0.029 | 0.002 | -0.039 | -0.030 | -0.040 |
| | (0.055) | (0.042) | (0.066) | (0.025) | (0.031) |
| Winner mean | 0.457 | 0.454 | 0.457 | 0.480 | 0.480 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 1,644 | 2,235 | 1,113 | 3,458 | 3,458 |
| R-squared | 0.094 | 0.082 | 0.102 | 0.084 | 0.085 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to (1) non-appointed incumbent candidates who are observed for the first time in the data set between 1995 and 1999 and (2) candidates who are observed in the data winning their first election between 1995 and 2006 and running again for office within four years. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 9: Effect of Electoral Loss on Subsequent Political Participation, by Gender: State Elections

| | Polynomial order one | | | | Polynomial order two |
|---|---|---|---|---|---|
| | Optimal bw =0.054 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.004 | -0.002 | 0.032 | -0.029** | -0.023 |
| | (0.036) | (0.027) | (0.056) | (0.013) | (0.016) |
| Lost | -0.538*** | -0.569*** | -0.551*** | -0.695*** | -0.645*** |
| | (0.014) | (0.011) | (0.019) | (0.011) | (0.012) |
| Female | 0.022 | 0.034** | 0.021 | 0.019** | 0.025** |
| | (0.020) | (0.015) | (0.022) | (0.009) | (0.010) |
| Winner mean | 0.895 | 0.896 | 0.888 | 0.901 | 0.901 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 12,339 | 24,278 | 6,260 | 56,442 | 56,442 |
| R-squared | 0.401 | 0.448 | 0.359 | 0.461 | 0.465 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. The sample is state legislative candidates who run between 1976 and 2010, are not incumbents, and are running in the general election for a single seat. Each candidate appears at most one time in the sample. Standard errors are clustered at the state level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Effect of Electoral Loss on Winning Next Election, by Gender

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw =0..102 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.021 | -0.043 | -0.042 | -0.024 | -0.034 |
| | (0.033) | (0.028) | (0.044) | (0.021) | (0.025) |
| Lost | -0.176*** | -0.183*** | -0.192*** | -0.224*** | -0.193*** |
| | (0.025) | (0.024) | (0.034) | (0.019) | (0.023) |
| Female | -0.016 | 0.018 | 0.002 | 0.001 | 0.011 |
| | (0.029) | (0.023) | (0.039) | (0.019) | (0.023) |
| Winner mean | 0.364 | 0.369 | 0.361 | 0.375 | 0.375 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 6,913 | 9,159 | 4,808 | 11,732 | 11,732 |
| R-squared | 0.098 | 0.117 | 0.084 | 0.140 | 0.142 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office and wins within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the state level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

# Appendix Tables

Table A.1: Covariate Balance: Men

| | | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|
| | | Polynomial order one | | | | Polynomial order two |
| | Optimal bw value | Optimal bw | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| | | A. Occupation | | | | |
| Management, business & financial | 0.122 | -0.001 | -0.004 | 0.020 | 0.009 | 0.004 |
| | | (0.019) | (0.016) | (0.025) | (0.016) | (0.016) |
| Professional & related | 0.099 | -0.018 | -0.018 | -0.024 | -0.021 | -0.017 |
| | | (0.022) | (0.019) | (0.027) | (0.016) | (0.019) |
| Service | 0.080 | -0.009 | -0.006 | 0.001 | 0.004 | 0.001 |
| | | (0.015) | (0.013) | (0.017) | (0.009) | (0.012) |
| Sales and office | 0.097 | 0.015 | 0.009 | 0.001 | 0.012* | 0.015* |
| | | (0.013) | (0.009) | (0.016) | (0.007) | (0.009) |
| Nat. resource, construction & maintenance | 0.096 | -0.003 | 0.000 | -0.007 | -0.001 | -0.006 |
| | | (0.009) | (0.008) | (0.012) | (0.006) | (0.007) |
| Production, transportation & material moving | 0.095 | -0.004 | -0.002 | -0.006 | -0.002 | -0.002 |
| | | (0.012) | (0.010) | (0.014) | (0.007) | (0.010) |
| Parent/homemaker | 0.127 | 0.009 | 0.009 | 0.009 | 0.007 | 0.009 |
| | | (0.007) | (0.006) | (0.009) | (0.005) | (0.006) |
| Retired | 0.131 | -0.012 | -0.018 | -0.013 | -0.019 | -0.019 |
| | | (0.018) | (0.014) | (0.023) | (0.013) | (0.015) |
| Not classified | 0.108 | 0.007 | 0.005 | 0.013 | 0.001 | 0.005 |
| | | (0.006) | (0.005) | (0.008) | (0.005) | (0.005) |
| None listed | 0.113 | 0.012 | 0.005 | 0.007 | 0.010* | 0.012** |
| | | (0.008) | (0.007) | (0.007) | (0.006) | (0.006) |
| p-value from joint test of significance | | 0.712 | 0.178 | 0.888 | 0.092 | 0.089 |
| | | B. Office | | | | |
| County supervisor | 0.062 | 0.001 | 0.001 | -0.000 | -0.001 | -0.008 |
| | | (0.007) | (0.007) | (0.008) | (0.005) | (0.006) |
| Mayor | 0.054 | -0.003 | 0.000 | 0.006 | -0.012** | -0.002 |
| | | (0.005) | (0.004) | (0.006) | (0.005) | (0.004) |
| City council | 0.129 | 0.035* | 0.017 | 0.026 | -0.001 | 0.017 |
| | | (0.021) | (0.016) | (0.023) | (0.014) | (0.017) |
| Other city position | 0.058 | 0.000 | -0.002 | 0.002 | -0.005 | -0.004 |
| | | (0.003) | (0.003) | (0.004) | (0.005) | (0.004) |
| School board / superintendent | 0.091 | -0.028 | -0.017 | -0.037 | 0.025* | 0.000 |
| | | (0.023) | (0.017) | (0.030) | (0.013) | (0.016) |
| Public attorneys / judges | 0.054 | -0.007 | -0.004 | 0.002 | -0.005 | -0.004 |
| | | (0.005) | (0.005) | (0.007) | (0.004) | (0.004) |
| Rent control / community planning | 0.127 | -0.004 | -0.002 | -0.008 | -0.001 | -0.004 |
| | | (0.005) | (0.004) | (0.008) | (0.002) | (0.005) |
| Law enforcement | 0.056 | 0.003 | 0.002 | 0.009** | -0.002 | 0.003 |
| | | (0.003) | (0.003) | (0.004) | (0.003) | (0.003) |
| Advisory council | 0.109 | 0.007 | 0.001 | 0.016 | 0.003 | 0.001 |
| | | (0.008) | (0.005) | (0.011) | (0.004) | (0.005) |
| p-value from joint test of significance | | 0.250 | 0.883 | 0.178 | 0.048 | 0.308 |
| | | C. Number of votes | | | | |
| Number of votes | 0.018 | 42.633 | -50.331 | 41.945 | -2,085.945** | 1,146.031 |
| | | (54.957) | (31.362) | (27.836) | (990.461) | (849.487) |
| Polynomial Order | | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | | X | X | X | X | X |
| County FE | | X | X | X | X | X |

Note: This table presents the results of the estimation of a specification with a candidate's occupation (Panel A), office type (Panel B), or number of votes (Panel C) as the dependent variables. The independent variables are an indicator for whether the candidate lost their initially observed election and various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to male candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.2: Covariate Balance: Women

| | | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|
| | | Polynomial order one | | | | Polynomial order two |
| | Optimal bw value | Optimal bw | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| | | A. Occupation | | | | |
| Management, business & financial | 0.89 | 0.004 | -0.016 | 0.028 | -0.012 | -0.008 |
| | | (0.026) | (0.020) | (0.031) | (0.016) | (0.020) |
| Professional & related | 0.084 | 0.007 | 0.003 | -0.060 | -0.005 | -0.022 |
| | | (0.033) | (0.030) | (0.042) | (0.022) | (0.028) |
| Service | 0.072 | -0.004 | 0.010 | -0.008 | 0.003 | 0.024* |
| | | (0.017) | (0.015) | (0.017) | (0.011) | (0.013) |
| Sales and office | 0.072 | 0.020 | 0.004 | 0.067* | -0.005 | -0.004 |
| | | (0.023) | (0.021) | (0.034) | (0.013) | (0.019) |
| Nat. resource, construction & maintenance | 0.053 | -0.010 | -0.002 | -0.001 | -0.001 | 0.003 |
| | | (0.009) | (0.006) | (0.012) | (0.004) | (0.005) |
| Production, transportation & material moving | 0.110 | -0.008 | -0.007 | -0.010 | 0.005 | -0.002 |
| | | (0.011) | (0.009) | (0.016) | (0.007) | (0.010) |
| Parent/homemaker | 0.124 | 0.026 | 0.021 | 0.003 | 0.011 | 0.019 |
| | | (0.024) | (0.019) | (0.033) | (0.015) | (0.020) |
| Retired | 0.098 | -0.018 | -0.014 | 0.002 | 0.001 | -0.002 |
| | | (0.027) | (0.021) | (0.026) | (0.015) | (0.019) |
| Not classified | 0.112 | -0.001 | -0.005 | -0.005 | -0.006 | -0.005 |
| | | (0.009) | (0.007) | (0.014) | (0.006) | (0.007) |
| None listed | 0.092 | -0.006 | 0.006 | 0.000 | 0.010 | -0.003 |
| | | (0.018) | (0.012) | (0.022) | (0.009) | (0.011) |
| p-value from joint test of significance | | 0.810 | 0.899 | 0.605 | 0.710 | 0.477 |
| | | B. Office | | | | |
| County supervisor | 0.060 | 0.004 | 0.001 | 0.013 | -0.006 | -0.004 |
| | | (0.009) | (0.007) | (0.011) | (0.007) | (0.008) |
| Mayor | 0.059 | -0.000 | 0.002 | -0.000 | -0.007 | 0.006 |
| | | (0.006) | (0.005) | (0.008) | (0.005) | (0.005) |
| City council | 0.115 | -0.035 | -0.049** | -0.014 | -0.030 | -0.054** |
| | | (0.030) | (0.022) | (0.033) | (0.018) | (0.024) |
| Other city position | 0.071 | 0.005 | 0.005 | 0.001 | -0.002 | 0.006 |
| | | (0.007) | (0.008) | (0.010) | (0.007) | (0.009) |
| School board / superintendent | 0.098 | 0.042 | 0.065** | 0.032 | 0.056*** | 0.059** |
| | | (0.031) | (0.024) | (0.037) | (0.020) | (0.026) |
| Public attorneys / judges | 0.082 | -0.006 | 0.001 | 0.008 | 0.002 | 0.000 |
| | | (0.007) | (0.006) | (0.011) | (0.005) | (0.006) |
| Rent control / community planning | 0.167 | 0.000 | -0.001 | 0.003 | -0.002 | -0.002 |
| | | (0.001) | (0.001) | (0.002) | (0.001) | (0.002) |
| Law enforcement | 0.076 | -0.006 | -0.004 | -0.010 | -0.004* | -0.004* |
| | | (0.005) | (0.003) | (0.007) | (0.002) | (0.003) |
| Advisory council | 0.132 | -0.015* | -0.008 | -0.033** | -0.007 | -0.007 |
| | | (0.009) | (0.009) | (0.013) | (0.008) | (0.009) |
| p-value from joint test of significance | | 0.405 | 0.156 | 0.118 | 0.009 | 0.220 |
| | | C. Number of votes | | | | |
| Number of votes | 0.027 | 22.942 | 453.968 | 139.304 | 384.304 | 257.758 |
| | | (64.506) | (402.116) | (105.105) | (411.693) | (377.181) |
| Polynomial Order | | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | | X | X | X | X | X |
| County FE | | X | X | X | X | X |

Note: This table presents the results of the estimation of a specification with a candidate's occupation (Panel A), office type (Panel B), or number of votes (Panel C) as the dependent variables. The independent variables are an indicator for whether the candidate lost their initially observed election and various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to female candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.3: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Elections with Male-Female Marginal Candidates

| | A. Optimal Bandwidth, Polynomial=1 | | | | | B. Full Sample, Polynomial=2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MM | MF | FM | FF | MF FM | MM | MF | FM | FF | MF FM |
| Lost | -0.175*** | -0.202*** | -0.233*** | -0.206*** | -0.174*** | -0.186*** | -0.242*** | -0.250*** | -0.226*** | -0.207*** |
| | (0.031) | (0.041) | (0.046) | (0.057) | (0.052) | (0.020) | (0.026) | (0.035) | (0.048) | (0.043) |
| Female × Lost | | | | | -0.117 | | | | | -0.081 |
| | | | | | (0.073) | | | | | (0.061) |
| Female | | | | | 0.040 | | | | | 0.039 |
| | | | | | (0.052) | | | | | (0.040) |
| Winner mean | 0.530 | 0.526 | 0.496 | 0.459 | 0.511 | 0.532 | 0.492 | 0.484 | 0.438 | 0.455 |
| Polynomial Order | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Year of First Election FE | X | X | X | X | X | X | X | X | X | X |
| County FE | X | X | X | X | X | X | X | X | X | X |
| Observations | 2,868 | 1,368 | 1,289 | 770 | 2,793 | 5,087 | 2,496 | 2,104 | 1,275 | 4,600 |
| R-squared | 0.094 | 0.135 | 0.154 | 0.167 | 0.112 | 0.118 | 0.124 | 0.151 | 0.164 | 0.123 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. The sample is split according to the gender of the marginal candidates. 'MM' is the sample in which both the loser and the winner are male. 'MF' is the sample of candidates in which the loser is male and the winner is female. 'FM' is the sample of candidates in which is the loser is female and the winner is male. 'FF' is the sample in which both the loser and the winner are female. Standard errors are clustered at the county level. Statistical significance levels are the following: *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Eight Year Horizon

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw =0.107 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.114*** | -0.112*** | -0.132* | -0.072*** | -0.091*** |
| | (0.042) | (0.030) | (0.068) | (0.022) | (0.028) |
| Lost | -0.198*** | -0.218*** | -0.213*** | -0.254*** | -0.221*** |
| | (0.025) | (0.019) | (0.035) | (0.019) | (0.019) |
| Female | 0.008 | 0.024 | 0.033 | -0.010 | 0.002 |
| | (0.036) | (0.027) | (0.050) | (0.022) | (0.026) |
| Winner mean | 0.592 | 0.587 | 0.590 | 0.586 | 0.586 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 5,573 | 7,321 | 3,882 | 9,248 | 9,248 |
| R-squared | 0.113 | 0.121 | 0.103 | 0.132 | 0.135 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again for office within 8 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the county level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.5: Effect of Electoral Loss on Officeholding, by Gender

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Polynomial order one | | | | Polynomial order two |
| | Optimal bw =0.103 | 2×Optimal bw | 0.5×Optimal bw | Full sample | Full sample |
| Female × Lost | -0.035 | -0.047* | -0.062 | -0.023 | -0.038 |
| | (0.034) | (0.027) | (0.046) | (0.020) | (0.025) |
| Lost | -0.169*** | -0.177*** | -0.179*** | -0.222*** | -0.188*** |
| | (0.025) | (0.023) | (0.035) | (0.018) | (0.022) |
| Female | -0.011 | 0.016 | 0.007 | -0.004 | 0.010 |
| | (0.032) | (0.024) | (0.041) | (0.019) | (0.023) |
| Winner mean | 0.371 | 0.378 | 0.369 | 0.383 | 0.383 |
| Polynomial Order | 1 | 1 | 1 | 1 | 2 |
| Year of First Election FE | X | X | X | X | X |
| County FE | X | X | X | X | X |
| Observations | 6,948 | 9,182 | 4,832 | 11,732 | 11,732 |
| R-squared | 0.095 | 0.115 | 0.083 | 0.139 | 0.141 |

Note: This table presents the results of the estimation of a specification with the dependent variable whether a candidate runs again wins any office within 4 years of their initial election. The independent variables are an indicator for whether the candidate lost their initially observed election, the interaction of this indicator and whether the candidate is female, as well as various degrees of polynomials in margin of victory. Each candidate appears at most one time in the sample. The sample is restricted to candidates who are observed for the first time in the data set and are not currently holding an elective office. Standard errors are clustered at the state level. Statistical significance levels are the following: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.