Gender Differences in Politician Persistence[*]

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Abstract

This paper documents gender differences in the career paths of novice politicians. Using trajectories of over 11,000 candidates for California local offices and a regression discontinuity approach, I investigate the persistence of candidates after they win or lose elections. Losing an election causes over 50 percent more attrition among female than male candidates. Yet the gender gap in persistence depends on the setting: there is a smaller gap among candidates for high female representation offices and among candidates with prior elective experience. I discuss how the expected costs and benefits of running again potentially explain the gender gap in persistence.

Keywords: elections; gender; discrimination

JEL Codes: J16; D72; J71; J24

1   Introduction

The large economic gains that women have experienced have not been mirrored by commensurate improvements in their political representation. In 2018, women comprised 43 percent of full-time U.S. workers, but only 29 percent of U.S. state legislators and 24 percent of members of Congress (U.S. Department of Labor: Bureau of Labor Statistics, 2019). Empirical evidence demonstrates that female representation among elected officials matters for policy objectives. Spanning local, state, and federal offices, an increased share of female officeholders improves 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 and voters' limited information regarding the aptitude of female politicians 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). Few 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.

This paper investigates 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

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[1]See Chattopadhyay and Duflo (2004); Rehavi (2007); Clots-Figueras (2012); Beaman et al. (2012); Broockman (2014); Brollo and Troiano (2016); Bhalotra et al. (2018). Exceptions to this include Ferreira and Gyourko (2014), which finds that the gender of a large city U.S. mayor does not impact policies implemented, and Broockman (2014), which finds that electing a woman to U.S. state legislature does not increase female participation or representation in elected offices.

politics. The setting is California local politics—city-, county-, and school district-level offices—which has several advantages. First, with over 90,000 local governments in the U.S.—and 4,000 in California alone—local elections are a common and accessible entry point to politics (U.S. Census Bureau, 1995). Furthermore, local politics often serve as a springboard for higher political offices; 40 percent of California state legislators held local elective office prior to running for state office (Francis and Kenny, 2000; Carroll and Sanbonmatsu, 2013). In addition, since local elections in California are nonpartisan, they are well suited to isolate candidates' decisions to run for office, distinct from political parties' preferences for candidates. In practice, there is less political party involvement, particularly in smaller localities, relative to state and federal elections (Bledsoe and Welch, 1987; Crowder-Meyer, 2013). 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? By linking candidates across California local election cycles from 1995 through 2014, I document a number of descriptive facts about novice politicians. First, women comprise just 31 percent of first-time candidates for local offices. Second, women are concentrated among contests for school board membership, while men are more evenly split between school board and city council positions. Third, while women are underrepresented among the candidate pool, conditional on running, women are more likely to win than their male counterparts. The low representation of women among candidates paired with their higher conditional probability of winning suggests that female candidates are positively selected relative to male candidates. Fourth, based on detailed information on candidate occupations, the candidate pool overall appears to be positively selected relative to the California population eligible to run for office. Last, I find substantial path dependence among office-seekers, regardless of initial election outcome or candidate gender. Among those who run for office twice, 83 percent run for the exact same office on both attempts, with the percentage higher among winning candidates (89 percent) than among losing candidates (77 percent).

Next, I investigate whether a candidate's initial electoral outcome affects the decision to con-

tinue in politics. In particular, 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, which contrasts the behavior of candidates who barely won to the behavior of those who barely lost an election in order to isolate the effect of losing on subsequent political involvement (Lee, 2008). The analysis relies on local variation around the victory threshold in order to identify the causal effect of losing. Of the 11,451 races with a novice candidate, 9,185 races include sufficient candidates to be part of the sample and 5,125 races (45 percent) fall within the optimal bandwidth for the RD analysis.

The results reveal substantial heterogeneity in male and female candidates' responses to an initial electoral loss. Due to an electoral loss, men are 16 percentage points less likely to run in a subsequent election within the next four years, whereas women are 26 percentage points less likely to run again, a difference of over 50 percent. The differential attrition of women is robust to varying the bandwidth around the victory threshold and to using different functional forms of the running variable in the regression. Furthermore, the gender difference in persistence 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 evaluate plausible mechanisms that could account for the 10 percentage point differential in men's and women's responsiveness to an electoral loss. The identification assumptions for the regression discontinuity analysis ensure covariate continuity *within* gender, that is, within female (male) candidates, the attributes of individuals who win/lose in close elections are, on average, similar. Among candidates who barely lost, however, there could remain gender differences in candidate and election attributes. I assess whether men's and women's differing selection of offices accounts for their disparate responses to a loss. In addition, I test whether gender differences in the characteristics of opponents and the timing of running again explain the gender gap in persistence. Based on these analyses, I conclude that observable gender

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differences among losing candidates do not contribute to the differential persistence of women.

While gender differences in observable characteristics do not explain the gender gap in persistence, I find that the gender gap varies based on the electoral environment. Specifically, men's and women's propensities to run again after a loss are similar when the sample is restricted to offices with higher female representation. This result is consistent with prior evidence documenting that discriminatory treatment of female politicians attenuates as female representation increases (Beaman et al., 2009; Gagliarducci and Paserman, 2011). In addition, the gender gap in persistence dissipates among candidates who have accrued some local elective experience, consistent with other papers that find less discrimination toward—and even advantageous treatment of—more experienced female professionals (Bohren et al., 2019; Sarsons, 2019).

With these results in mind, I discuss the decision to run again in the context of candidates weighing the expected costs and benefits of running. I provide suggestive evidence that the time and monetary costs of running again are unlikely to be a main driver of the differential attrition of women. Due to data constraints, I cannot directly test whether psychic costs such as competition aversion or feedback aversion explain the gender gap in persistence. It is interesting to note, however, that every individual in the sample has already selected into a competitive environment in which he or she will receive feedback on their relative performance. For psychic costs to generate female differential attrition, preferences for competition or feedback would have to differentially evolve for women post-loss.

The expected benefits of running again encompass the benefits from officeholding and the probability of winning. The probability of winning could differentially evolve for female losing candidates due to the way that candidates or voters interpret the loss. With regard to candidate behavior, the lab experimental literature finds that, in response to performance feedback, women update their beliefs regarding their aptitude more conservatively than men, which is inconsistent with the larger response of female losing candidates found in this paper (Mobius et al., 2014). Other lab experiments show that women attribute negative performance to ability, whereas men attribute it to luck (Shastry et al., 2020), a pattern that could account for the differential dropout of women

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post-loss. With regard to voter behavior, consistent with voters penalizing female candidates for losing, the literature finds that women incur a greater penalty than do men for mistakes and misconduct in professional settings (Egan et al., forthcoming; Sarsons, 2019). If the female-specific voter penalty is due to belief-based (rather than taste-based) discrimination, then the penalty should dissipate as the candidate accrues experience (Bohren et al., 2019). The heterogeneity in the gender gap in persistence mirrors this pattern, lending some support to voter updating regarding candidate competence explaining the gender gap in persistence.

As a final exercise, I return to the motivating question: to what extent does the differential deterrence of female candidates explain the gender gap in officeholding? Under the assumption that all candidates who do not run again would have lost had they run, I calculate that the gender gap in persistence cannot explain any of the gender gap in officeholding. In other words, if women are disproportionately penalized due to losing, then encouraging them to run again would not improve female representation among officeholders. If one instead assumes that the candidates induced to drop out due to losing had chances of winning similar to those who do run again, then closing the gender gap in persistence would increase female representation among novice officeholders by 3 percentage points, or by 9 percent.

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. Bhalotra et al. (2018), Brollo and Troiano (2016), and Ferreira and Gyourko (2014) analyze the implications of a woman being voted into office for policy outcomes as well as future female participation at the locality level. Using Indian state legislative elections, Bhalotra et al. (2018) find that localities with female electoral victories experience increases in the female share of majority party candidates, and attribute 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 contribution of the present

paper is the unit of observation is a candidate, rather than a locality.[2] By following all candidates over successive election cycles, I examine whether individual decisions to run again are responsive to initial experiences of success or failure, and if this response differs for men and women. This analysis is related to Ferreira and Gyourko's (2014) estimation of gender differences in incumbency advantage among U.S. large city mayors. I focus, however, on a key component of incumbency advantage: the decision to run again. Furthermore, the comprehensive nature of the California local elections returns data allows me to capture all subsequent political involvement at the local level, regardless of the office contested.[3]

This paper also contributes to the literature on gender differences in preferences for and performance in competitive environments. A recent strand of this literature focuses on gender gaps in persistence using laboratory and academic settings (Rask and Tiefenthaler, 2008; Kugler et al., 2021; Buser and Yuan, 2019; Ellison and Swanson, 2018; Kolev et al., 2019). In lab experiments, high school math olympiads, and grant applications, women are more likely than men to drop out after losing or being rejected (Buser and Yuan, 2019; Ellison and Swanson, 2018; Kolev et al., 2019). A strength of the present paper is its extension of the literature on gender differences in responses to losing to novice participants in a professional setting with ramifications for public good provision and public policy.

2 California local elections

2.1 Institutional details

California local political contests include elections for county, municipal, and school district governments that represent its population of almost 40 million individuals. These elections generally

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[2]Bhalotra et al. (2018) and Brollo and Troiano (2016) use a locality, rather than a candidate, as the unit of observation and therefore compare the subsequent behavior of male and female candidates who barely won an election.

[3]In the CA data, 17 percent of candidates who run again contest a different office, with the rate higher among losing candidates (23 percent) than winning candidates (11 percent).

take place once every two years, and can occur in even or odd years. In a given local election, voters cast votes for a variety of municipal, city, county, and school district offices. Most offices are directly elected by plurality vote.[4] Certain offices are part of multi-member councils, such as city councils or school boards. Members of such councils may be voted into office by an entire locality (e.g. city) or a subdivision within the locality (e.g. districts within a city). For councils whose members are selected at-large by entire localities, voters are charged with voting multiple members into office in a given election. For example, in an at-large election for a five-member city council, voters may select up to five candidates on the ballot. The five members are elected based on the top five vote-getters. For councils whose members each represent a subdivision within a locality, voters in that subdivision select only one candidate to represent their subdivision.[5]

Local 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 candidates for the first time while filling out their ballot. Local elections that occur

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[4]San Francisco (2004), Oakland (2010), San Leandro (2010), and Berkeley (2010) use ranked-choice voting, as of the year indicated in parentheses.

[5]A few localities, such as Los Angeles, use primaries and run-off elections. In this scenario, a candidate wins only if they obtain a majority of the votes. A run-off election occurs in the event no candidate in the primary obtains at least 50 percent of the votes.

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

off-cycle also have 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, but are substantially lower than state and federal requirements. 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 the limited demographic information is available on candidates. I determine the gender of a candidate with use of the 1990 Census and 1940-1970 Social

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[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]CEDA is available for download here: http://csus-dspace.calstate.edu/handle/10211.3/210187

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Security Administration (SSA) name files. For a given name, if at least 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.[9] Approximately 98 percent of candidates have names in either the Census or SSA name files, and 93 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). Candidates are not required to fill out this field, but over 95 percent do. 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 30 broad occupation categories with use of the 2010 U.S. Census occupation classification.[10]

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, in order to limit the incidence of false positive matches, it excludes an individual's subsequent political participation in the event the individual moves across counties (or states). Thus, the measure of subsequent political participation should be considered a 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's 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

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[9]If there is a conflict between the Census and SSA assigned gender, a name is unclassified.

[10]To classify ballot designations into occupational categories, I rely on the 2010 Census index of occupations, which lists over 31,000 occupational titles. The index is found here: https://www.census.gov/topics/employment/industry-occupation/guidance/indexes.html. See the data appendix for additional details.

for subsequent participation to eight years, in which case candidates who appear for the first time after 2006 are excluded (see data appendix for additional details).

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. Since this definition may include some individuals who have previously run and lost prior to 1995, I also test the sensitivity of the results to further restricting the sample to candidates who are first observed running from 1998 onward, which limits the possibility of previous runs for office. In order to implement the close election regression discontinuity design, I limit the races to those in which the number of candidates exceeds the number of open seats and limit the candidates to those who are marginally elected, that is, who are the last winner or first runner-up. 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. For winning candidates, margin of victory is defined as the difference in the vote shares of the last winner and the first runner-up. For losing candidates, it is the difference in the vote shares of the first runner-up and the last winner. For example, in an election for three city council seats, the last winner's margin of victory is the difference in the vote shares of candidates ranked three (last winner) and four (first runner-up).

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, with the percentage consistent throughout the sample period. 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.

Considering these 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.[11] Indeed, when moving from the candidate pool to officeholders, the fraction female rises: women comprise 35 to 37 percent of novice local officeholders.[12] 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 to 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, meaning that conditional on running, women have higher chances of winning relative to men in both the initial and second run for office. This pattern suggests that female candidates are positively selected relative to male candidates based on their chances of winning, consistent with evidence at the federal level (Anzia and Berry, 2011).

The bottom portion of Table 1 presents the distribution of candidates across office types. For all novice candidates, this distribution is also plotted in Appendix Figure A.1. The majority of candidates run for school board and city council. There are notable differences in female participation across offices: 56 percent of female candidates run for school board compared to 39 percent of male candidates. A higher fraction of male candidates run 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. In the RD sample, there is similar differentiation by gender.

Appendix Figure A.2 Panel A plots the occupation distribution for all novice candidates for 30 broad categories derived from the 2010 Census occupation classification. Men are more likely to come from a business owner or management background, while women are more likely work in education or office/administrative support, or to be parents/homemakers. In order to understand the nature of political selection, I additionally contrast the occupation distribution to that of the CA

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[11]Within offices, women are also at least as likely to win as their male counterparts.

[12]This is consistent with other evidence on local politics, which shows that women make up 20 to 30 percent of city council members and 44 percent of school board members (Holman, 2017).

population eligible to run for office. Appendix Figure A.2 Panel B uses the 2000 Census to plot the occupation distribution for California residents age 18 and older. We observe that candidates are more likely to come from a legal or business/management/financial background than the overall CA population. These occupations have the highest median earnings, suggesting positive selection of individuals into running for office (U.S. Census Bureau, 2003). This pattern of positive selection on the basis of occupational status and income is consistent with the findings of Dal Bó et al. (2017) for Swedish politicians.

For novice politicians who run for office multiple times, I document their transitions among local offices in Appendix Table A.1 and Appendix Figure A.3. There is substantial path dependence among office-seekers, regardless of initial election outcome: 83 percent of candidates run for the exact same office when they decide to run again and 87 percent of candidates run for the same office category (city council, school board, other). Candidates who win on their first attempt are more likely to run for the same office than those who lose: 89 percent and 77 percent, respectively. Considering the patterns by gender, female and male candidates transition offices at similar rates, conditional on running twice. The only gender difference worth noting is among the losing candidates. Conditional on losing, women are more likely to run again for school board, while men are more likely to run again for city council.

Figure 1 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.

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. As discussed above, I define the running variable as the margin of victory for candidate i in election year t as MV_{it}, which for winning (losing) candidates is the difference in the vote share of the last winner (first runner-up) and the first runner-up (last winner). 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 initial election year t. The treatment effect τ 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 approaches 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.[13]

The goal of this paper is to investigate heterogeneity in the effect of losing by candidate gender. The RD identifying assumption does not require that male and female candidates around the cutoff for winning are, on average, comparable. To illustrate this, I write the gender-specific treatment effects:

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[13]Since the majority of the candidates are running for multi-member entities, there is a high incidence of close elections. Among the 11,736 marginal candidates, more than half are included in the optimal bandwidth calculation.

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

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

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. Although RD relies on the continuity of candidate covariates throughout the threshold for winning, the identifying assumption does not ensure covariate continuity across subgroups. This means that among close losing candidates, men and women may have different characteristics that can potentially contribute to their divergent responses. 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 (losing) candidates can explain gender differences in the effects of losing.

3.2 Regression specification

The baseline regression specification is the following:

$$Y_{i,t+4} = \alpha + \beta \text{Lost}_{it} + f(\text{MV}_{it}) + \text{Lost}_{it} \times f(\text{MV}_{it}) + \varepsilon_{it} \tag{3}$$

where Lost_{it} is an indicator taking on a value of one if the candidate i lost in initial election year t, and zero otherwise. All other variables are defined as above. The coefficient of interest is β, 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.[14] 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:

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

where the new terms are Female_i, an indicator variable that takes a value of one if the candidate is female, its interaction with the running variable MV_{it}, and its interaction with the indicator Lost_{it}. The coefficient β now represents the effect of losing for men, and δ represents the difference in subsequent political participation between male and female close winners. The coefficient γ 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 β indicates whether the differential

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[14]The results are insensitive to the inclusion of these controls.

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, 2019). 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. In addition, I have also computed bias-corrected standard errors using the Calonico et al. (2014) method, which yield standard errors similar to those reported here.

3.3 Pooled results

Figure 2 Panel A 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 year 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 but flat 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, which is described in Lee (2008) as a component of incumbency advantage.[15]

Table 2 panel A reports the results from the estimation of equation 3. Columns 1 through 4 use

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[15]In U.S. House of Representative elections, the deterrence effect is 43 percentage points, substantially larger than at the local level. The smaller deterrence effect at the local level could arise from more numerous opportunities to run for office, smaller gains from officeholding (e.g. visibility), or lower costs associated with running for office.

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 24 percentage points. Given that among the winning candidates, on average, 51 percent run again within the next four years, 19 percentage points represents a 37 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 2 Panel B splits the sample by candidate gender. The female bin scatter is represented by solid diamonds and 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 reports the results of the estimation of equation 4, which confirms the graphical evidence. 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 7.6 to 10.1 percentage points less likely to run again due to an initial electoral loss, relative to male candidates.[16] Taking the estimates from the first column with the local linear specification and the optimal bandwidth

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[16]I omit discussion of the full sample local linear specification due to its failure to satisfy co-

(0.093), the 10.1 percentage point differential deterrence of female candidates due to an initial loss is substantial; it represents a 63 percent increase over the male deterrence effect. Table 2 panels B and C report the results of the estimation of separate regressions for men and women, and produce similar findings. The effect of losing on running again is 16.0 percentage points for men, and 25.2 percentage points (or 58 percent larger) for women.

Are female candidates differentially deterred by losing? The graphical and regression analyses provide 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 runners-up or winners. By considering the subsequent political involvement of the close losing and close winning candidates, represented in equations 1 and 2, respectively, I provide suggestive evidence of the provenance of the gender differences in responses to a loss. Figure 2 shows the rates of running again among candidates who barely won in election t are nearly identical for men and women. This comparison is confirmed by the negligible and statistically insignificant coefficient on Female$_i$ in the regression results. In contrast, considering candidates who barely lost their initial contests, Figure 2 shows that nearly 40 percent of male candidates but less than 30 percent of female candidates run again within the next four years. The differential responsiveness of men and women appears to stem from differences in the behavior of the losing candidates. In Figure 2, it is interesting to note that as margin of victory increases, there is a declining propensity of female winning candidates to run again. This trend is due to the fact that women are more likely to run for school board, and among *all* winning school board candidates, subsequent participation declines in margin of victory (see Figure 3).

3.5 Robustness

Covariate smoothness: I test the validity of the assumption that assignment to losing status is uncorrelated with candidate characteristics by estimating equation 3 with the following dependent variables: candidates' office and number of votes. The coefficients on Lost$_{it}$ are reported in Ap-
variate smoothness.

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pendix Table A.2 for the pooled sample, and Appendix Tables A.3 and A.4 for the samples of male and female candidates, respectively. Only the samples inclusive of observations far away from the cutoff show discontinuities at the cutoff, further emphasizing the importance of focusing on candidates close to the cutoff for isolating the effect of a loss distinct from differences in candidate characteristics. 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.

Manipulation of the running variable: I examine whether there are discontinuities in the distribution of margin of victory at the winning threshold using the test developed by McCrary (2008).[17] The female and male distributions show no evidence of statistically significant discontinuities at the threshold for winning. The graphs for men and women are displayed in Appendix Figure A.4 panels A and B, respectively.

Definition of novice: A candidate is defined as a novice if not holding an office when first observed in the data. For candidates who run for office in the early years of the sample, it is possible that they have previously held office or have run for office and lost. I test whether the definition of novice is legitimate in two ways. First, I investigate the prevalence of prior running by pretending the sample starts in 1998 rather than 1995. Among those defined as "novices" when the sample starts in 1998, fewer than 6 percent were observed running in 1995 through 1997. Second, I re-run the main results using the sample of candidates who are first observed from 1998 onwards, limiting the possibility of prior running. The main results are robust to this alternative sample restriction and are reported in Appendix Table A.5.

Metric of future participation: When linking candidates across election cycles, I limit the possible matches to races that are in the same county as the initially observed election. If 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 dropping out. To investigate this source of bias, I randomly selected 300

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[17]I use the Stata .ado file posted on Justin McCrary's website and follow his sample code in order to implement this test: https://eml.berkeley.edu/~jmccrary/DCdensity/.

individuals from the sample and attempted to find these individuals on the professional network LinkedIn. Female candidates were more likely to be found than male 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. In addition, there was a low propensity to move across counties and women were less likely to move than men.

3.6 Heterogeneity in the persistence gap

I examine whether the gender gap in persistence varies with characteristics of the office and the candidate, focusing on the level of female representation in offices and the extent of candidate experience.

Heterogeneity based on female representation: First, I provide a case study based on the two most common political offices in the sample: city council and school board. Among all individuals elected to office 1995-2014, female representation among city councillors is 30 percent while for school board members it is 47 percent. I estimate equation 4 separately for each of these offices with the results reported in Table 4 columns 1 and 4. 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 11 to 17 percentage points greater than the effect for male candidates. The comparable estimate for school board candidates is 5 to 6 percentage points. Due to splitting the sample, the standard errors increase considerably. These results are confirmed by the graphical analysis presented in Figure 3.

Of course, there are many other differences between school board and city council, aside from female representation. For instance, the content of school board membership is more aligned with that of K-12 educators—a highly feminized profession—and therefore losses may be less subject to discouragement stemming from stereotype threat. Prior research shows that the gender connotation of task is an important determinant of women's willingness to enter a competition, apply for a job, contribute ideas, and respond to feedback (Shurchkov, 2012; Baldiga Coffman, 2014; Flory

et al., 2015; Coffman et al., 2019). Due to gender stereotypes that could vary across offices, the second test uses all offices and—within an office—classifies a particular county based on its prior female representation. Using the full election returns data for 1995-1997, I compute the fraction of officeholders who are female for each office category within a county. Then I split the main RD sample into high (low) female representation environments based on whether county-office female representation is higher (lower) than the office-specific median. The results are reported in Table 4 columns 2, 3, 5, and 6. Overall, the gender gap in persistence is concentrated in low female representation settings. The contrast is less apparent for the parametric RD specifications, however.

Heterogeneity based on candidate experience: Next I test whether differential attrition is present among more experienced politicians: candidates running for local offices who are prior officeholders. To analyze experienced politicians, I construct a sample of (a) candidates who appear for the first time in the data between 1995 and 1999 and are designated as a current officeholder and (b) candidates who are observed in the data winning their first election between 1995 and 2006 and who run again for office within four years. I repeat the estimation of equation 4 on this sample and report the results in Table 4 column 7. From these specifications, it is clear that among candidates with prior experience, the effect of losing on continuing in politics is similar for women and men.[18] A limitation of this analysis pertains to the selection of this sample: individuals who have accrued officeholding experience may be less likely to drop out either due to their accrued experience or their underlying characteristics. Note, however, that even these experienced candidates are deterred by a loss; there remains a main effect of losing for this sample of 12 percentage points. The key distinction in the results is the absence of differential deterrence of female candidates.

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[18] Wasserman (2021) similarly finds no gender difference in the effects of an electoral loss among state politicians, who often have elective experience prior to running.

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4 Understanding women's differential attrition

4.1 Gender differences in candidate and election attributes

It is possible that the differential dropout of women in response to an electoral loss is due to differences in observable characteristics of the men and women who barely lost. Recall that the validity of the RD design rests on the assumption that, within candidate gender, those who barely won and lost are otherwise equivalent. On either side of the victory threshold, gender differences in candidate characteristics could still account for the estimated gender differences in persistence. If the propensity to run again after an initial loss varies by political office, then gender differences in office selection could explain the gender gap in persistence. 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 Lost_{it}:

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

Table 5 reports the results. 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 gender gap in persistence.

Another possibility is the characteristics of opponents in close elections differ for male and female candidates. I test this hypothesis in two ways. First, I restrict the sample to those elections where both the close winner and close runner-up are novices. This restriction eliminates elections in which novice challengers run against incumbents, which could be more prevalent or more contentious settings for female novices. The results are report in Table 5 column 3. We observe that the differential effect for women increases a bit in magnitude relative the main specification. Second, in Appendix Table A.6 columns 5 and 10, I analyze only mixed-gender contests, that is, 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 on

the interaction term is not precisely estimated. These two tests provide little support that gender differences in the characteristics of opponents drive 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 contentious or vitriolic than other elections, and female losing candidates could be reacting to this experience.[19]

There could also be gender differences in the timing of when candidates run again. 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 the gender gap in persistence is a fleeting phenomenon and would attenuate as time progresses and 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.7 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   Gender differences in the costs and benefits of running again

There is limited empirical evidence that gender differences in observable candidate and election characteristics account for the differential attrition of women. In standard models of candidate entry, individuals decide whether to run for office based on the expected costs and benefits of running (Dal Bó and Finan, 2018). In this section I discuss the potential role of each of these parameters in explaining gender differences in politician persistence.

Expected costs of running again

The costs of running again encompass the time and money required for campaigning, opportunity costs, and psychic costs. For gender differences in time/monetary costs of running again to con-

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[19]Appendix Table A.6 shows that the largest (in magnitude) effect of losing is when female candidates lose to a male candidate and the smallest effect of losing is when male candidates lose to another male candidate. I do not emphasize these results since the subsequent political participation of *both* winners and losers may shift with the gender of the opponent.

tribute to gender differences in persistence, the costs must differentially evolve for female relative to male losing candidates. If fundraising opportunities or political networks differentially contract for women relative to men after an electoral loss, then female candidates could bear an additional financial or time cost associated with running again (Casas-Arce and Saiz, 2015; Esteve-Volart and Bagues, 2012). Although there is more limited involvement of political parties in local elections than in state or federal elections, political parties do publicly endorse and financially support candidates (Crowder-Meyer, 2013). If lack of support from political networks after a loss drives the differential dropout of women, we would expect that in areas with greater political party involvement, the gender gap in persistence would be amplified. To my knowledge, there does not exist data on the extent of partisan involvement in nonpartisan elections. There is evidence, however, that elections for city council in large cities likely entail more intervention from the local affiliates of national political parties (Bledsoe and Welch, 1987). I classify cities according to whether their population is above or below the median population ($\sim 25,400$ individuals) of cities in the sample, and estimate the gender gap in persistence for each sub-sample. Appendix Table A.8 reports the results of this exercise. The gender gap in persistence does not consistently vary with city size. Of course, locality size may be correlated with other locality attributes, including attitudes toward female candidates. While I cannot definitively rule out the role of other characteristics, I interpret these results as suggestive evidence that political networks do not drive the gender gap in persistence.

Gender differences in opportunity costs deal with alternative uses of the candidates' time spent running for office. If women who lose have a more attractive outside option relative to men who lose, then these gender differences could explain women's differential dropout. I investigate whether gender differences in candidate occupations—a proxy for candidate outside option—helps to explain the gender difference in politician persistence with use of candidates' ballot designations, classified into 30 broad occupational categories. I estimate a modified version of equation 4 that includes candidate-level controls for occupation, their interactions with margin of victory, and

their interactions with Lost_{it}:

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

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 4. The coefficient on the interaction term $\text{Female}_i \times \text{Lost}_{it}$ is invariant to the inclusion of these additional controls. A remaining possibility is that female losing candidates' opportunity costs differentially evolve *due to* the election outcome, which I cannot test with the available data.

   With regard to psychic costs, a large literature documents that women are more competition averse, that is, more likely to opt out of settings in which their remuneration depends on competitive outcomes. Women's reluctance to enter competitions remains even when controlling for overconfidence, feedback aversion, and risk aversion (Niederle and Vesterlund, 2007; Flory et al., 2015; Buser et al., 2014; Kanthak and Woon, 2013). Another psychic cost is feedback aversion. Women might be more inclined to avoid situations like elections in which they receive feedback on their relative performance in order to preserve their self-perceptions of ability and worth. Although I cannot directly disentangle these mechanisms, I note that for these psychic costs to explain the gender gap in persistence, women's aversion to competition or feedback would have to differentially increase post-loss.

Expected benefits of running again

The expected benefits of running again can be decomposed into the the benefits of holding office and the probability of winning. It is unlikely that the benefits of holding office differentially change for female relative to male candidates who lost. There are two possibilities for gender differences in the probability of winning to drive the gender gap in persistence: (a) after a close loss, female

candidates update more negatively about their probability of winning relative to male candidates; and/or (b) after a close loss, *voters* update more negatively regarding female candidates' aptitude. In either scenario, if female candidates perceive lower chances of winning when deciding to run again, this could produce the differential dropout of women.

It is important to note that conditional on observing vote shares, the loss itself provides no additional information regarding the aptitude of candidates who narrowly won or lost. In other words, the identifying assumption in the regression discontinuity design ensures that close winning and losing candidates receive the *same* signal of their aptitude from voters. If voters or candidates exhibit inattention to vote shares, or think that conditional on vote shares, there is information in the loss, then the loss could serve as signal of aptitude.

Previous evidence provides mixed support that candidate beliefs regarding their aptitude or belief updating could contribute to the differential drop out of women post-loss. Several papers find that women update their beliefs regarding their own aptitude more conservatively than do men in response to both negative and positive feedback (Roberts and Nolen-Hoeksema, 1989; Johnson and Helgeson, 2002; Mobius et al., 2014; Buser and Yuan, 2019; Shastry et al., 2020). Both men and women update their beliefs more, primarily by placing more weight on positive feedback, in gender-congruent domains (Coffman et al., 2019). Women's inclination to update more conservatively or weight positive feedback more heavily in gender-congruent domains cannot explain the greater responsiveness of female candidates after receiving the negative feedback of an electoral loss. In support of this interpretation, Buser and Yuan (2019) find that women are more likely to drop out after losing in a lab experiment-based competition, and the differential response is not due to gender differences in beliefs about relative ability or the updating of beliefs. Recent work shows that women are more likely to attribute negative performance to ability and positive performance to luck, while men do the opposite (Shastry et al., 2020). If female candidates attribute the loss to ability and male candidates attribute it to luck, this attribution bias may contribute to the gender gap in persistence.

A remaining explanation for the gender gap in persistence is that voters may differentially pe-

nalize female candidates for losing. Evidence from physicians and financial advisors shows that women are differentially penalized for making mistakes or engaging in professional misconduct (Egan et al., forthcoming; Sarsons, 2019). The nature of the voter penalty could be belief-based, that is, stemming from beliefs regarding the relative aptitude of men and women for office. Alternatively, the voter penalty could be taste-based, stemming from animus toward female politicians. The observed heterogeneity in the gender gap in persistence based on candidate experience suggests taste-based discrimination is likely not an operative mechanism. As outlined in the dynamic model in Bohren et al. (2019), taste-based discrimination should not be influenced by the extent of candidate experience. Rather, only a scenario in which the voter penalty arises from statistical discrimination should candidate experience affect voters' belief updating. I find that the differential attrition of female candidates dissipates once women gain electoral experience, which is consistent with the theoretical prediction that belief-based discrimination attenuates (and can even reverse) as women gain domain-specific experience.

5   Implications for the gender gap in officeholding

As a final exercise, I return to the motivating question from the Introduction: to what extent does the gender gap in persistence contribute to the gender gap in officeholding? In the sample of CA novice politicians who run again and win, 33 percent are women. The effect of female attrition 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. Since it is not possible to observe win rates for candidates who do not run again, I construct bounds on the implications of female attrition for officeholding by making assumptions regarding the chances of those who drop out. I assume throughout this analysis that there are no candidates induced to drop out due to winning (a form of defiers), that is, there are no individuals who do not run again if they win, but do run again if they lose (Lee, 2009; Anagol and Fujiwara, 2016).

To construct a lower bound, I assume that candidates who do not run again would have lost

had they run. 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 6 with the graphical analysis in Figure 4. The effect of an initial loss on winning the next election is between 17 and 19 percentage points. Furthermore, the effect is similar for male and female candidates.[20] The large gender gap in persistence does not translate into a gender gap in officeholding.[21] From Figure 4 it is apparent that the convergence in male and female outcomes stems from the runners-up: 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, a policy that encourages losing candidates to run again would not change the representation of women among officeholders.

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 do indeed run. If this were the case, then the male runner-up win rate would be 0.075 percentage points higher and the female runner-up win rate would be 0.14 higher.[22] If candidates who drop out were to run again, it would raise female representation among those who run again and win by 3 percentage points, or 9 percent. Underlying the boost to female representation is the fact that, among those who run again, women who lost the first time around are *more likely* to win than similarly situated

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[20]These estimates are smaller in magnitude than the estimates of candidate-level incumbency advantage of large city mayors/councillors and members of Congress (Ferreira and Gyourko, 2014; Trounstine, 2011; Lee, 2008). This difference could be due incumbency advantage omitting participation of losing candidates if they run for a different office or due to the size of the locality.

[21]Appendix Table A.9 examines whether the candidate wins *any* office within the next four years and finds similar results.

[22]I multiply the RD effect of losing on running again by the win rate among candidates who barely lost and run again (those within the optimal bandwidth for each gender). For men, this is $0.16 \times 0.47 = 0.075$ and for women this is $0.26 \times 0.54 = 0.14$.

men. Finally, I compute that for the gender gap in persistence to explain any of the gender gap in officeholding, female losing candidates induced to drop out need a probability of winning at least two-thirds that of their male counterparts. 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.[23]

6 Conclusion

This paper investigates whether an initial electoral loss differentially shapes the subsequent political involvement of male and female candidates. Using local election returns from California and a close election regression discontinuity design, I find that an initial loss reduces the propensity for men to run again within the next four years by 16 percentage points, whereas it reduces the propensity for women to run again by 26 percentage percentage points, a difference of over 50 percent. Gender differences in observable characteristics—such as the office contested, candidate outside option, or the attributes of opponents—do not explain the gender gap in persistence. While the data do not allow me to determine the precise mechanism underlying the differential dropout of female candidates, I discuss how female candidates may incur a greater penalty for losing due to the way that voters or candidates update regarding women's aptitude for politics post-loss. If female candidates drop out due to underestimating their chances of winning, then encouraging these candidates to run again would lead to a substantial increase in female representation among officeholders. If instead female candidates' attrition is in response to voters penalizing women for losing, such encouragement would not alter women's representation in politics. In future work, it is of considerable interest to pinpoint which of these mechanisms—candidate or voter beliefs—lead to the differential attrition of women at accessible entry point to the political pipeline.

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[23]Anagol and Fujiwara (2016) provide a similar calculation in their analysis of the effect of being a runner-up candidate (relative to a losing non-runner-up) on chances of winning, conditional on candidacy.

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Figure 1: Distribution of Election Margin of Victory, By Gender
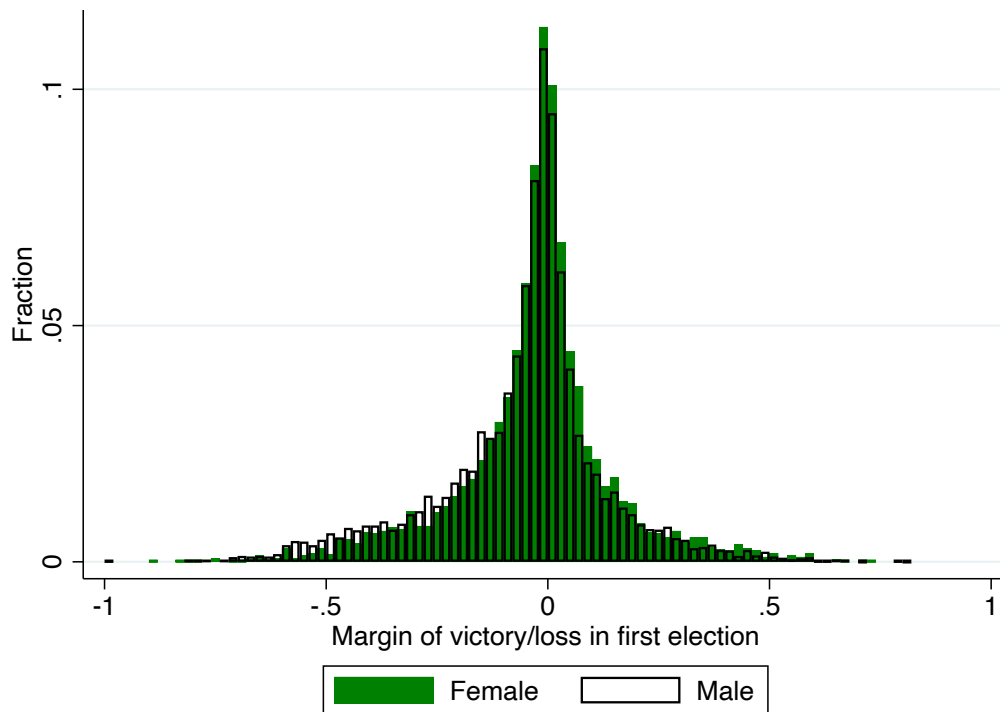
Note: This figure plots the distribution of margin of victory for novice candidates for CA local elective offices, 1995-2010. Each candidate appears at most one time in the sample. Margin of victory takes on a positive value if the candidate won, and a negative value if the candidate lost.

Figure 2: Relationship between Margin of Victory and Subsequent Political Participation
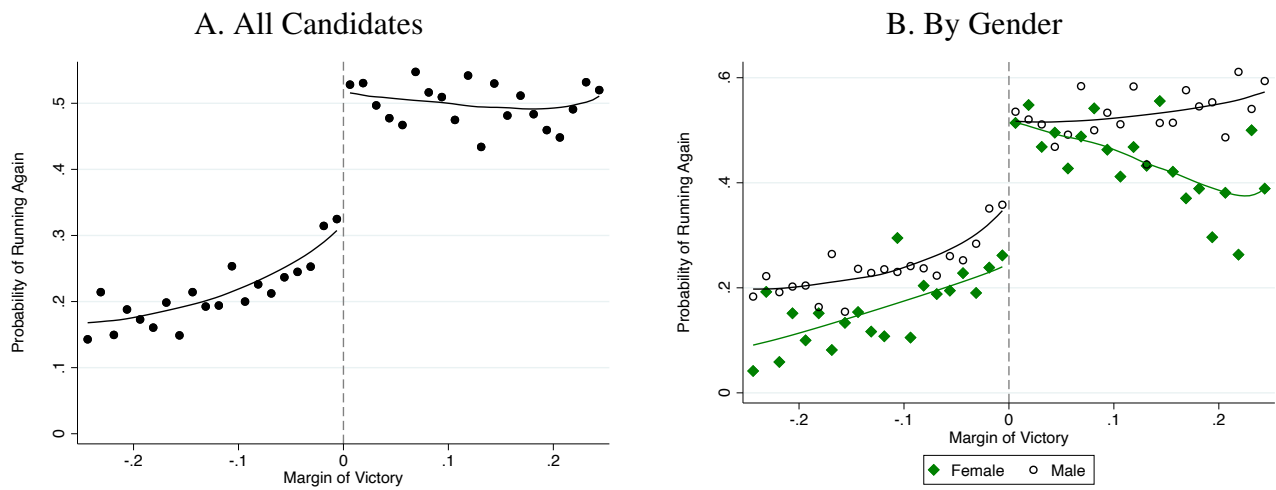
A. All Candidates

B. By Gender

Note: This figure is a bin scatter of the probability CA novice 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. Panel A pools all candidates. Panel B plots separate bin scatters and local polynomial fits for male and female candidates.

Figure 3: Relationship between Margin of Victory and Probability of Running Again, by Gender
and Elective Office
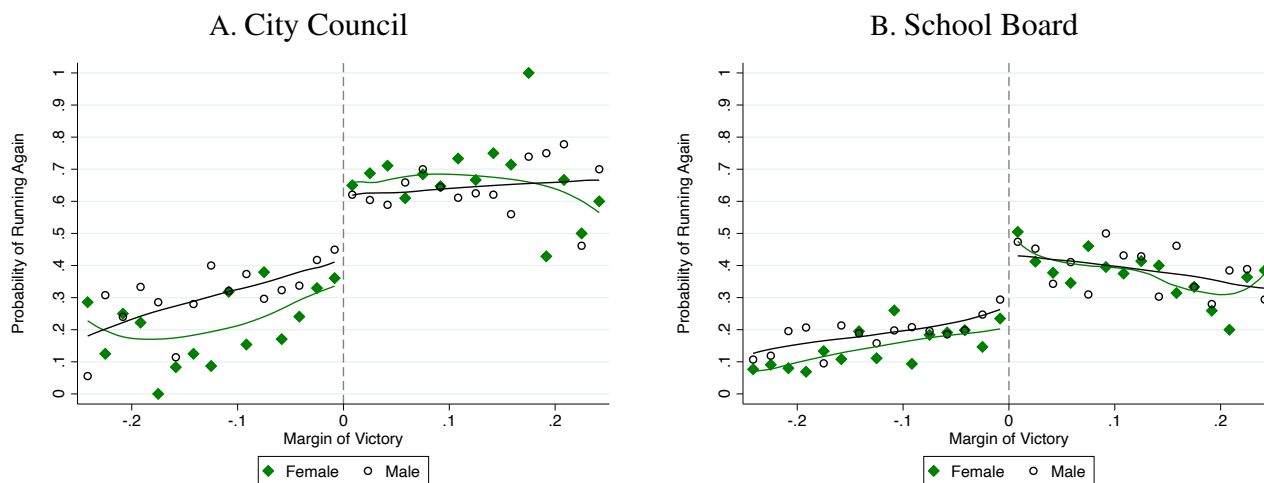
Note: This figure is a bin scatter of the probability CA novice candidates run again for office within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.01. A local polynomial fit is plotted on either side 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 4: Relationship between Margin of Victory and Probability of Winning Next Election, by Gender
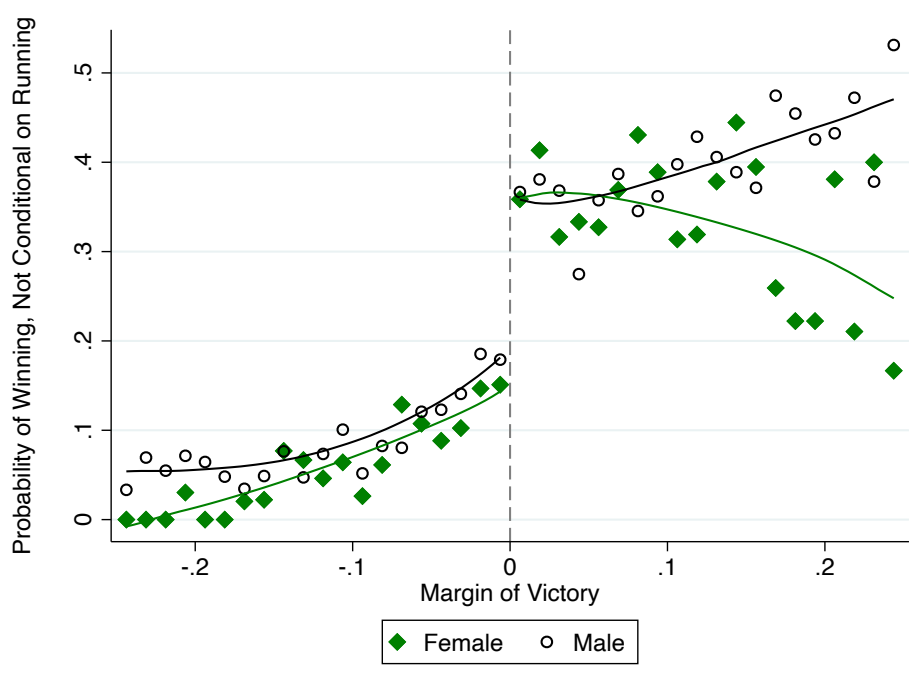
Note: This figure is a bin scatter of the probability CA novice candidates run again for office and win within 4 years of their initial election (on the y-axis) against candidates' margin of victory in the initial election (on the x-axis), for bins of width 0.0125. A local polynomial fit is plotted on 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	30.98			32.52		
Elected in t	30.94	28.10	37.24	39.64	38.09	42.85
Run again within $t+4$	28.20	28.74	27.00	33.42	34.84	30.48
Run again & win within $t+4$	15.20	14.73	16.23	20.19	20.40	19.76
Office Type						
School Board Member	44.31	39.14	55.83	48.10	43.67	57.29
City Council	37.67	41.12	29.97	30.04	32.82	24.27
County Supervisor	5.18	5.81	3.78	6.13	6.78	4.80
City Level Office	2.49	2.12	3.32	4.28	3.66	5.56
Mayor	2.52	3.03	1.37	2.29	2.77	1.31
Other (Law Enforcement; Rent Control Board; etc.)	7.84	8.79	5.73	9.16	10.30	6.79
Unique Races	11,451	9,570	5,784	9,185	6,759	3,511
Observations	26,329	18,172	8,157	11,736	7,920	3,816

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. A marginal candidate is defined as the last winner or the first runner-up in an election. 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 two
		Polynomial order one			
	Optimal bw	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
			A. All Candidates		
Lost	-0.195***	-0.212***	-0.190***	-0.244***	-0.216***
	(0.023)	(0.017)	(0.033)	(0.013)	(0.016)
Winner mean	0.512	0.508	0.517	0.503	0.503
Bandwidth	0.093	0.186	0.047	-	-
Observations	6,657	8,849	4,529	11,736	11,736
R-squared	0.090	0.097	0.084	0.110	0.112
			B. Female Candidates		
Lost	-0.252***	-0.267***	-0.252***	-0.276***	-0.266***
	(0.036)	(0.028)	(0.050)	(0.018)	(0.024)
Winner mean	0.500	0.486	0.513	0.474	0.474
Bandwidth	0.097	0.194	0.049	-	-
Observations	2,295	3,028	1,557	3,816	3,816
R-squared	0.136	0.138	0.140	0.142	0.145
			C. Male Candidates		
Lost	-0.160***	-0.183***	-0.158***	-0.228***	-0.191***
	(0.027)	(0.021)	(0.038)	(0.017)	(0.019)
Winner mean	0.519	0.520	0.517	0.518	0.518
Bandwidth	0.094	0.188	0.047	-	-
Observations	4,412	5,905	3,032	7,920	7,920
R-squared	0.087	0.095	0.082	0.108	0.110
p-value from test of M=F	0.021	0.009	0.073	0.024	0.007
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 CA 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 =0.093	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
Female × Lost	-0.101**	-0.088***	-0.096*	-0.049**	-0.076***
	(0.041)	(0.031)	(0.053)	(0.022)	(0.028)
Lost	-0.161***	-0.183***	-0.157***	-0.228***	-0.191***
	(0.027)	(0.020)	(0.038)	(0.017)	(0.019)
Female	0.007	0.008	-0.009	-0.022	0.000
	(0.036)	(0.026)	(0.041)	(0.020)	(0.024)
Winner mean	0.512	0.508	0.517	0.503	0.503
Observations	6,657	8,849	4,529	11,736	11,736
R-squared	0.094	0.101	0.088	0.113	0.116
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, 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 CA 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: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Heterogeneity by Female Representation and Candidate Experience

I. Optimal Bandwith, Polynomial=1

	A. Low Female Representation			B. High Female Representation			C. Prior Officeholders
	City Council	All Offices	All Offices Post-1997	School Board	All Offices	All Offices Post-1997	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female × Lost	-0.165**	-0.224***	-0.160**	-0.057	-0.036	-0.018	-0.027
	(0.065)	(0.052)	(0.063)	(0.051)	(0.068)	(0.064)	(0.082)
Lost	-0.126***	-0.136***	-0.167***	-0.185***	-0.181***	-0.209***	-0.119***
	(0.040)	(0.038)	(0.043)	(0.033)	(0.045)	(0.044)	(0.036)
Female	0.087*	0.107***	0.072*	-0.002	-0.028	-0.041	-0.019
	(0.047)	(0.038)	(0.042)	(0.042)	(0.059)	(0.064)	(0.059)
Winner mean	0.633	0.543	0.529	0.431	0.495	0.496	0.461
Observations	2,203	2,902	2,349	3,599	2,690	2,198	1,639
R-squared	0.121	0.117	0.114	0.096	0.110	0.116	0.093
Year of First Election FE	X	X	X	X	X	X	X
County FE	X	X	X	X	X	X	X

II. Full Sample, Polynomial=2

	A. Low Female Representation			B. High Female Representation			C. Prior Officeholders
	City Council	All Offices	All Offices Post-1997	School Board	All Offices	All Offices Post-1997	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female × Lost	-0.106**	-0.101**	-0.073	-0.052	-0.074**	-0.056	-0.058
	(0.051)	(0.040)	(0.044)	(0.035)	(0.035)	(0.045)	(0.050)
Lost	-0.186***	-0.194***	-0.206***	-0.196***	-0.186***	-0.207***	-0.122***
	(0.030)	(0.024)	(0.030)	(0.027)	(0.036)	(0.035)	(0.037)
Female	0.037	0.040	0.019	0.008	0.006	0.007	-0.033
	(0.043)	(0.030)	(0.034)	(0.030)	(0.033)	(0.043)	(0.035)
Winner mean	0.640	0.529	0.517	0.406	0.472	0.467	0.483
Observations	3,525	4,771	3,693	5,645	4,469	3,431	3,494
R-squared	0.154	0.135	0.133	0.103	0.127	0.129	0.083
Year of First Election FE	X	X	X	X	X	X	X
County FE	X	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. In Panels A and B, the sample is restricted to CA candidates who are observed for the first time in the data set and are not currently holding an elective office. Columns 1 and 4 examine candidates who run for city council and school board, respectively. Columns 2, 3, 5, and 6 split the sample based on the previous female representation at the county-office level, including all offices. At the county level, an office is classified as high (low) female representation if it is above (below) the office-specific median female representation in years 1995-1997. Columns 5 and 6 further restrict the sample to candidates who run for the first time after 1997. Panel C restricts the sample to CA candidates who are (1) non-appointed officeholders 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 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	Races with Only Novices	Occ × Lost Controls	Main Result	Office × Lost Controls	Races with Only Novices	Occ × Lost Controls
Female × Lost	-0.101**	-0.095**	-0.124**	-0.103**	-0.076***	-0.072**	-0.101**	-0.084***
	(0.041)	(0.041)	(0.061)	(0.044)	(0.028)	(0.027)	(0.043)	(0.031)
Female	0.007	0.025	0.038	0.004	0.000	0.019	0.039	0.014
	(0.036)	(0.037)	(0.050)	(0.040)	(0.024)	(0.024)	(0.032)	(0.026)
Winner mean	0.512	0.512	0.502	0.512	0.503	0.503	0.490	0.503
Observations	6,657	6,657	2,874	6,657	11,736	11,736	5,086	11,736
R-squared	0.094	0.139	0.122	0.114	0.116	0.174	0.131	0.138
Year of First Election FE	X	X	X	X	X	X	X	X
County FE	X	X	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 CA 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 restricts the sample to elections in which only novices are the marginal candidates, and column 4 controls for candidate ballot designation. 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 Winning Next Election, by Gender

	(1)	(2)	(3)	(4)	(5)
	Polynomial order one				Polynomial order two
	Optimal bw =0.112	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
Female × Lost	-0.041	-0.048*	-0.057	-0.023	-0.041
	(0.029)	(0.026)	(0.042)	(0.021)	(0.025)
Lost	-0.171***	-0.183***	-0.182***	-0.220***	-0.188***
	(0.024)	(0.024)	(0.035)	(0.019)	(0.023)
Female	0.006	0.027	0.025	-0.000	0.019
	(0.027)	(0.022)	(0.036)	(0.019)	(0.023)
Winner mean	0.361	0.366	0.357	0.373	0.373
Observations	7,207	9,423	5,107	11,736	11,736
R-squared	0.097	0.116	0.082	0.139	0.141
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 and wins the next election, 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 CA 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: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Online Appendix Figures

Figure A.1: Office Distribution of Candidates, By Gender
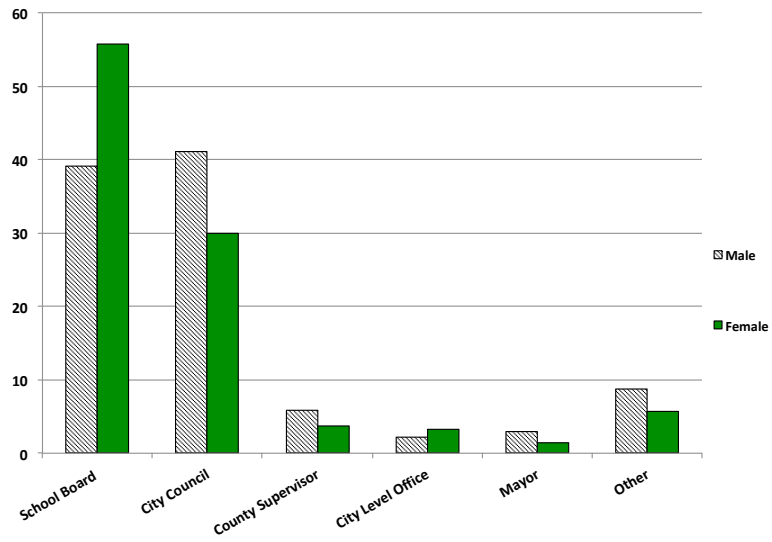
Note: This figure plots the office distribution for male and female novice candidates for CA local elective offices, 1995-2010. 'Other' offices include law enforcement, community planning boards, and judges. School board includes school district superintendents.

Figure A.2: Occupational Distribution of Candidates and CA Population, By Gender

A: Novice Politicians

B. California Population
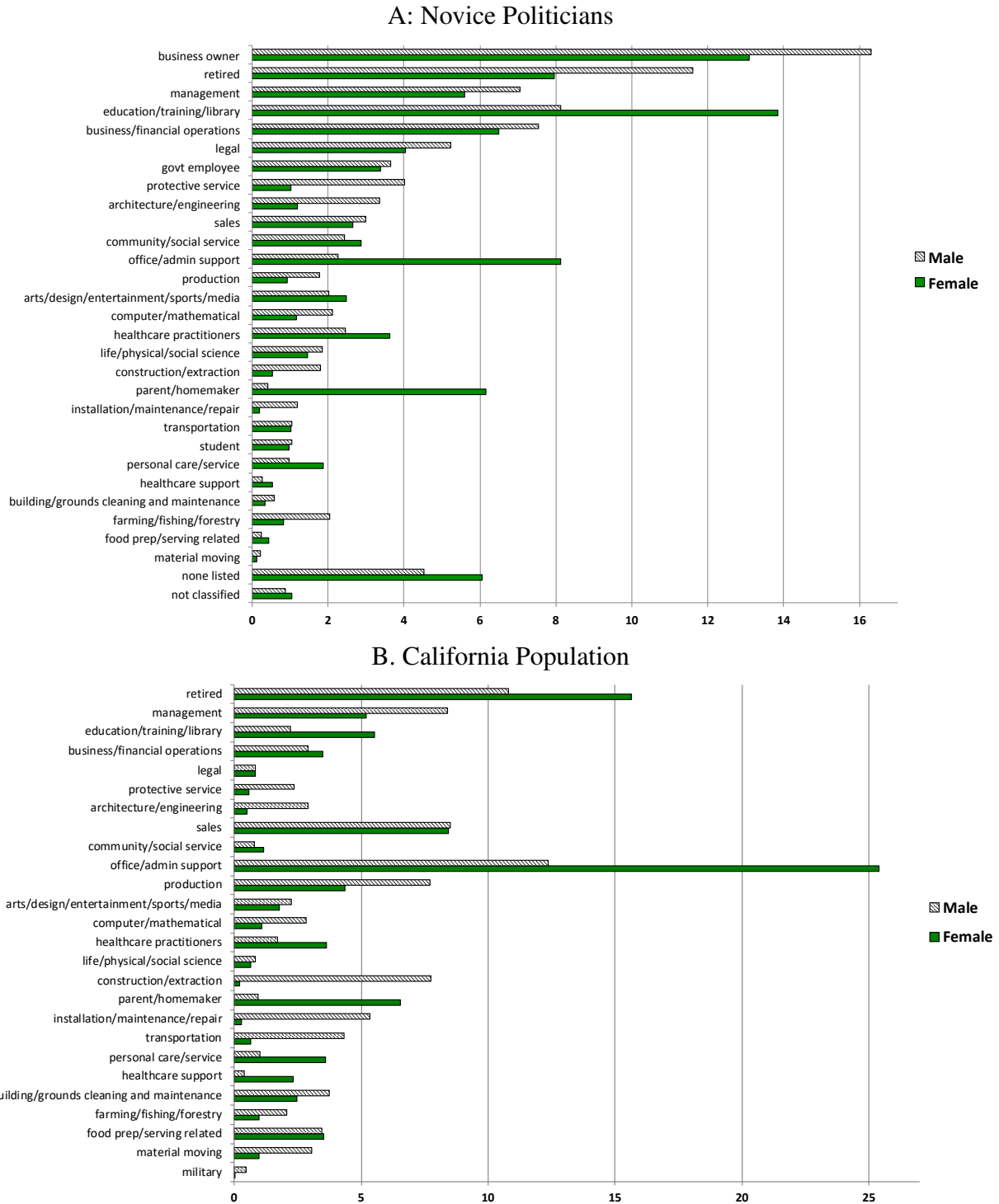
Note: Panel A of this figure plots the occupational distribution for male and female novice candidates for CA local elective offices, 1995-2010. The 2010 Census occupation classification scheme is used to map text descriptions of occupations in the ballot designation to 23 broad categories. The remaining categories of business owner, parent/homemaker, government employee, student, and retired are defined based on information provided in the ballot designation. The categories of not classified and none listed are used for individuals who list an occupation that does not fit in any of the previous categories or do not list one at all, respectively. Panel B of this figure plots the occupational distribution for male and female California residents who are 18 or older using the 2000 Census. Individuals are assigned to an occupational category regardless of labor force status. Individuals 65 and older who are not in the labor force are designated retired. Individuals not in the labor force who live with their own children under 18 are designated as parent/homemakers.

Figure A.3: Office Category Transitions among Candidates who Run Twice

A. All

B. Candidates who Won their First Election

C. Candidates who Lost their First Election
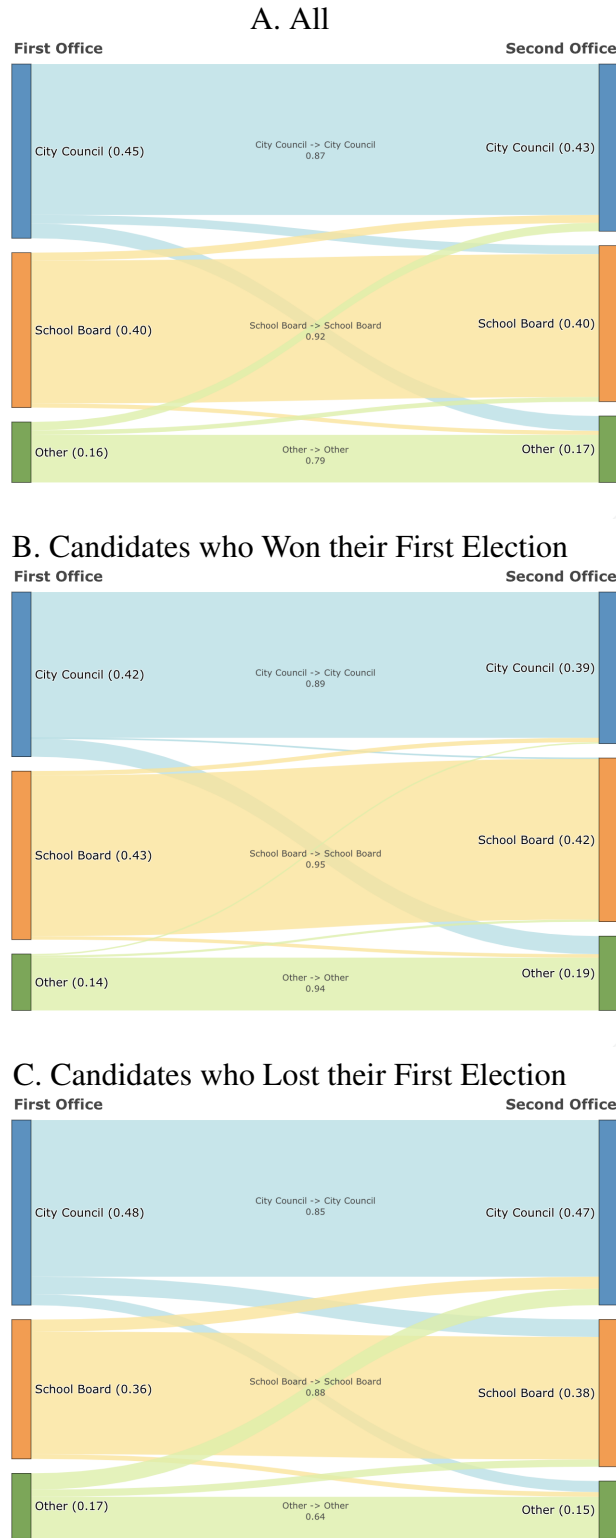
Note: This figure plots office transitions for the sample of novice candidates for CA local elections, 1995-2010, who run for office again within four years of initially running. Panel A uses all candidates, Panel B uses those candidates who won their first election, and Panel C uses those candidates who lost their first election. Each plot depicts on the left x-axis the fraction of candidates who initially run for a given office category (city council, school board, other) and on the right x-axis the fraction of candidates who run for a given office category on their next attempt. Transitions between office categories are depicted through the flows in the plots' inner region.

Figure A.4: Distribution of Margin of Victory for McCrary Density Test, by Gender

A. Male
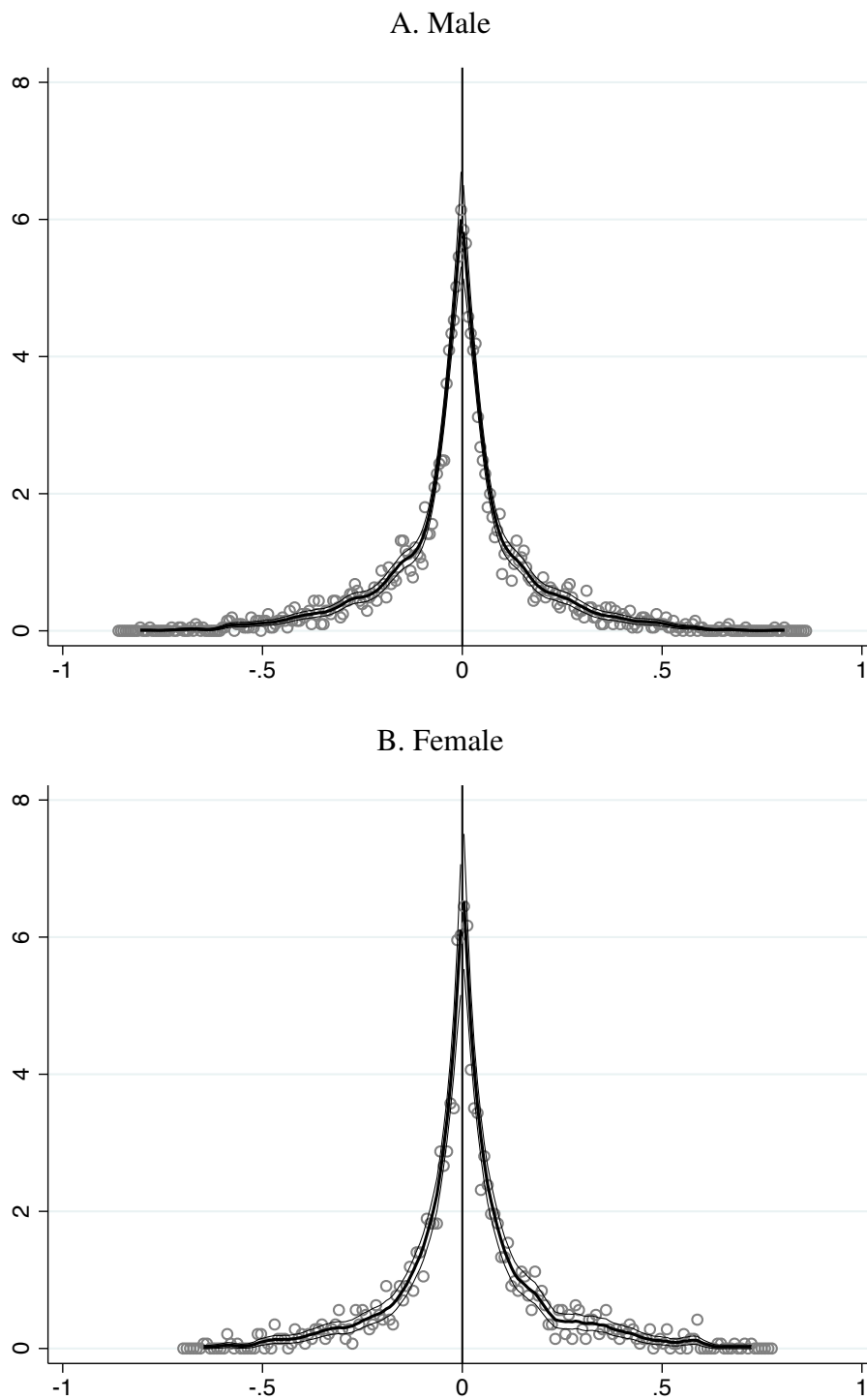
B. Female

Note: This figure plots the distribution of margin of victory for male (Panel A) and female (Panel B) novice CA 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.

Online Appendix Tables

Table A.1: Percentage of Candidates who Run Again for the Exact Same Office

		A. All Novice Candidates					
		Won First Election			Lost First Election		
	All	All	Men	Women	All	Men	Women
Office type							
All	83.4	89.4	88.9	90.4	76.6	76.1	78.4
City Council	85.4	87.4	87.3	87.5	83.5	84.1	81.1
School Board	85.1	91.0	89.4	92.9	77.1	74.8	82.1
Other	73.4	90.5	92.1	87.0	56.1	56.1	56.2
		B. Marginal Candidates					
		Won First Election			Lost First Election		
	All	All	Men	Women	All	Men	Women
Office type							
All	85.7	90.0	90.3	89.3	79.4	78.6	82.0
City Council	87.3	87.6	88.2	86.2	86.9	87.6	83.9
School Board	86.4	90.4	89.1	92.2	80.4	77.2	87.1
Other	81.4	93.7	96.1	86.9	60.5	60.9	58.9

Note: This table presents summary statistics for the sample of novice candidates for CA local elections, 1995-2010 (Panel A), and the sample of marginal candidates (Panel B) who run for office at least twice within four years of initially running. The columns denote different subsamples. Each cell reports the percentage of candidates who initially run for a given office type (city council, school board, other) that run for the same office in the same place on their second attempt.

Table A.2: Testing Covariate Balance

		(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. Office			
County supervisor	0.061	0.002	0.001	0.002	-0.003	-0.006
		(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
Mayor	0.051	-0.001	0.001	0.007**	-0.010***	0.000
		(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
City council	0.161	0.007	-0.004	0.012	-0.008	-0.005
		(0.013)	(0.010)	(0.014)	(0.009)	(0.012)
Other city position	0.055	0.002	0.004	0.003	-0.000	-0.002
		(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
School board / superintendent	0.085	-0.002	0.009	-0.015	0.032***	0.021
		(0.016)	(0.014)	(0.022)	(0.010)	(0.013)
Other office	0.080	-0.014*	-0.011**	-0.001	-0.011**	-0.008
		(0.008)	(0.005)	(0.011)	(0.005)	(0.006)
p-value from joint test of significance		0.536	0.207	0.277	0.001	0.360
			B. Number of votes			
Number of votes	0.056	503.709	52.824	559.066	-1,096.611*	1,078.894
		(1,232.308)	(467.341)	(918.811)	(602.976)	(917.383)
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 office type (Panel A), or number of votes (Panel B) 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 CA 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: Testing 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. Office		
County supervisor	0.063	0.000	0.002	-0.000	-0.000	-0.006
		(0.006)	(0.006)	(0.007)	(0.005)	(0.005)
Mayor	0.049	-0.001	0.003	0.011	-0.011**	-0.002
		(0.005)	(0.005)	(0.007)	(0.005)	(0.004)
City council	0.123	0.029	0.016	0.021	-0.004	0.014
		(0.021)	(0.016)	(0.024)	(0.014)	(0.017)
Other city position	0.059	0.000	-0.002	0.004	-0.005	-0.004
		(0.003)	(0.003)	(0.004)	(0.005)	(0.004)
School board / superintendent	0.088	-0.028	-0.014	-0.031	0.028**	0.004
		(0.023)	(0.018)	(0.030)	(0.013)	(0.016)
Other office	0.080	-0.006	-0.010	0.009	-0.007	-0.006
		(0.015)	(0.009)	(0.020)	(0.008)	(0.009)
p-value from joint test of significance		0.891	0.721	0.296	0.025	0.479
				B. Number of votes		
Number of votes	0.063	-1,105.066	-665.953	2,648.683	-911.005	1,483.468
		(950.472)	(937.305)	(2,450.568)	(966.308)	(1,590.224)
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 office type (Panel A) or number of votes (Panel B) 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 CA 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.4: Testing Covariate Balance: Women

	Optimal bw value	(1) Optimal bw	(2) 2×Optimal bw	(3) 0.5×Optimal bw	(4) Full sample	(5) Full sample
		Polynomial order one				Polynomial order two
A. Office						
County supervisor	0.076	0.011	0.002	0.009	-0.007	-0.004
		(0.009)	(0.007)	(0.011)	(0.007)	(0.007)
Mayor	0.068	0.001	0.001	-0.003	-0.008*	0.006
		(0.006)	(0.005)	(0.008)	(0.004)	(0.005)
City council	0.124	-0.038	-0.040*	-0.017	-0.027	-0.049**
		(0.028)	(0.024)	(0.032)	(0.018)	(0.024)
Other city position	0.058	0.001	0.010	0.002	0.005	0.000
		(0.008)	(0.009)	(0.012)	(0.008)	(0.010)
School board / superintendent	0.089	0.044	0.065**	0.018	0.052**	0.059**
		(0.032)	(0.027)	(0.037)	(0.020)	(0.027)
Other office	0.131	-0.020*	-0.014	-0.032*	-0.015	-0.013
		(0.012)	(0.010)	(0.018)	(0.010)	(0.010)
p-value from joint test of significance		0.203	0.062	0.478	0.038	0.322
B. Number of votes						
Number of votes	0.108	2,306.989	-857.524	3,445.900	-1,290.814	399.101
		(1,868.880)	(1,489.322)	(4,613.873)	(1,013.231)	(1,222.104)
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 office type (Panel A) or number of votes (Panel B) 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 CA 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.5: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Start Year 1998

	(1)	(2)	(3)	(4)	(5)
	Polynomial order one				Polynomial order two
	Optimal bw =0.116	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
Female × Lost	-0.091**	-0.073**	-0.124***	-0.025	-0.061*
	(0.037)	(0.031)	(0.044)	(0.025)	(0.031)
Lost	-0.179***	-0.194***	-0.164***	-0.236***	-0.197***
	(0.023)	(0.023)	(0.036)	(0.018)	(0.021)
Female	0.004	0.011	0.010	-0.033	-0.003
	(0.033)	(0.025)	(0.036)	(0.023)	(0.025)
Winner mean	0.502	0.498	0.504	0.493	0.493
Observations	5,765	7,496	4,121	9,293	9,293
R-squared	0.091	0.099	0.089	0.110	0.113
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, 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 CA 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 who are first observed in 1998 onwards. 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.6: Effect of Electoral Loss on Subsequent Political Participation, by Gender: Analyzing the Role of Opponent Gender

	A. Optimal Bandwidth, Polynomial=1				B. Full Sample, Polynomial=2			
	MM	MF	FF	MF FM	MM	MF	FF	MF FM
Lost	-0.176***	-0.207***	-0.208***	-0.158***	-0.186***	-0.236***	-0.238***	-0.193***
	(0.030)	(0.040)	(0.056)	(0.049)	(0.021)	(0.026)	(0.046)	(0.043)
Female × Lost				-0.142**				-0.094
				(0.067)				(0.061)
Female				0.063				0.046
				(0.046)				(0.041)
Winner mean	0.529	0.523	0.460	0.505	0.531	0.490	0.440	0.485
Observations	3,128	1,390	849	2,962	5,076	2,493	1,289	4,605
R-squared	0.098	0.128	0.170	0.111	0.118	0.123	0.167	0.122
Year of First Election FE	X	X	X	X	X	X	X	X
County FE	X	X	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 CA 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 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.7: 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 =0.106	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
Female × Lost	-0.113**	-0.110***	-0.137*	-0.071***	-0.093***
	(0.046)	(0.032)	(0.069)	(0.023)	(0.029)
Lost	-0.199***	-0.216***	-0.208***	-0.253***	-0.219***
	(0.026)	(0.020)	(0.034)	(0.019)	(0.020)
Female	0.006	0.019	0.030	-0.015	0.001
	(0.037)	(0.028)	(0.049)	(0.022)	(0.027)
Winner mean	0.589	0.584	0.589	0.583	0.583
Observations	5,549	7,305	3,862	9,248	9,248
R-squared	0.113	0.121	0.104	0.132	0.134
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 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 CA candidates who are observed for the first time in the data set and are not currently holding an elective office in years 1995-2006. 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.8: Effect of Electoral Loss on Subsequent Political Involvement, by Gender: By City Size

	A. All City Councils		B. Cities with Population >25,400		C. Cities with Population <=25,400	
	(1) Optimal bw	(2) Full Sample	(1) Optimal bw	(2) Full Sample	(1) Optimal bw	(2) Full Sample
Female × Lost	-0.165**	-0.106**	-0.196**	-0.109	-0.089	-0.122
	(0.065)	(0.051)	(0.093)	(0.066)	(0.116)	(0.076)
Lost	-0.126***	-0.186***	-0.150***	-0.230***	-0.088	-0.129**
	(0.040)	(0.030)	(0.053)	(0.037)	(0.059)	(0.049)
Female	0.087*	0.037	0.131**	0.035	0.052	0.037
	(0.047)	(0.043)	(0.052)	(0.053)	(0.072)	(0.056)
Winner mean	0.633	0.640	0.718	0.721	0.561	0.561
Observations	2,203	3,525	1,090	1,952	1,065	1,525
R-squared	0.121	0.154	0.136	0.190	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 A.9: Effect of Electoral Loss on Officeholding, by Gender

	(1)	(2)	(3)	(4)	(5)
		Polynomial order one			Polynomial order two
	Optimal bw =0.106	2×Optimal bw	0.5×Optimal bw	Full sample	Full sample
Female × Lost	-0.040	-0.053*	-0.061	-0.022	-0.046*
	(0.033)	(0.027)	(0.044)	(0.020)	(0.025)
Lost	-0.167***	-0.175***	-0.182***	-0.218***	-0.183***
	(0.025)	(0.023)	(0.033)	(0.019)	(0.022)
Female	-0.005	0.022	0.015	-0.005	0.018
	(0.030)	(0.023)	(0.039)	(0.019)	(0.023)
Winner mean	0.369	0.375	0.364	0.381	0.381
Observations	7,023	9,263	4,913	11,736	11,736
R-squared	0.093	0.113	0.079	0.138	0.140
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 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 CA 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.

For Online Publication: Data Appendix

Preparing the data for merging

I start with the election return files provided by the California Election Data Archive for years 1995 through 2014. Before these data are ready to be merged, I check the following:

1. *Consistency of vote totals and candidate ranks:* The consistency of vote totals and candidate ranks within a given race are checked. A few races have many inconsistencies and are dropped. The candidate rank within a race based on their vote total is confirmed.

2. *Multi-county races:* These are races that span multiple counties, and are often for community college boards and some K-12 school boards. Since I link individuals across election cycles based in part on county, I drop multi-county races from the sample. In each election year, these comprise 2 percent to 12 percent of candidates.

3. *Within election year duplicates:* First I assess whether there are duplicate observations within a given election year based on candidate first name, last name, and county. These duplicate can be erroneous observations, they can represent a given candidate running multiple times within an election year, or they can represent distinct candidates with the same name running in a given election year.

    (a) Erroneous observations: True duplicates are deleted.

    (b) Same candidate running multiple times within an election year: Candidates may run multiple times within a given election year for various reasons.

        i. Runoff elections: This occurs when a candidate is required to reach a certain vote share threshold to win. If this doesn't occur, then a runoff election takes place. For both the initial electoral attempt and subsequent political participation, when the candidate is observed multiple times within a given year, I consider only elections whose outcome results in a win or a loss, i.e. the effective runoff.

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ii. Different-date distinct runs: This occurs when a candidate runs for distinct offices within a given year. In this scenario, I keep the election that occurs first.

iii. Same-date distinct runs: In very few instances, a candidate is recorded as running for multiple offices on the same date. In these scenarios, I take the outcome with the higher margin of victory.

(c) Distinct candidates with the same first and last names and county running in a given election year: After the previous process is implemented, fewer than 5 observations in each election year are not unique based on candidate first and last name, and county of election. These observations are dropped.

Merging the data

In order to construct longitudinal political trajectories of politicians, I merge candidates in each election year based on first and last name, and county in which they ran for office. I block based on county. First and last names are probabilistically merged using the Stata command *reclink*. Starting with candidates who run for office in 1995, I merge each election year sequentially. Candidates from subsequent election years who do not match any candidate in the original sample are appended to the data set before the next year is merged.

Gender assignment

Gender is assigned based on candidate first name. I use the U.S. Census 1990 and Social Security Administration name files for 1940-1970 for this process. For a given first name, each of these files reports the fraction of individuals with this name who are male and female. If a name is 90 percent or higher male (female), then it is designated as male (female). There are eight observations for which the Census and SSA disagree in their gender assignment; these are recoded to gender ambiguous. Candidates whose names are gender ambiguous or are not present in the Census/SSA name files are dropped. This restriction drops 7 percent of candidates.

Defining the initial run: I define a candidate's initial run as the first time they are observed in the data set.

Defining subsequent political participation

I define a candidate's subsequent political participation within a 4 year window of when they are initially observed running for office. Both primary and general elections are included in measures of subsequent political participation. When determining whether a candidate wins on their next electoral attempt, I use the election outcome that determines whether the candidate assumes office. For example, in the case of primary election for a county district attorney attorney seat, if no candidate garners a majority of the votes, and the candidate in question does not make the top two, then I use the primary election outcome. If the candidate in question instead is in the top two, then I use the election outcome from the general election.

Defining the sample of novice candidates

The sample of novice candidates is defined as candidates who are observed running for the first time who are not (a) incumbents or (b) currently holding another office (either through election or appointment).

Defining the sample of experienced CA candidates

The sample of incumbent candidates is defined as candidates who are either (1) observed in the sample winning on their initial run or (2) indicate that they are an incumbent on the election returns or (3) indicate that they are an incumbent or current officeholder in their ballot designation.

Classifying occupations based on ballot designations

To classify ballot designations into occupational categories, I rely on the 2010 Census index of occupations, which lists over 31,000 occupational titles. The index is found here: https://www.census.gov/topics/emp occupation/guidance/indexes.html. A few categories were created to supplement the Census oc-

cupations: parent/homemaker, business owner, government employee, and student. The parent/homemaker classification stems from ballot designations that exclusively list this information and no other occupation. The business owner designation stems from ballot designations that indicate the candidate is a business owner of a small business, a local business owner, or do not refer to firm size. The government employee designation refers to local government employees.