Closing the Gender Gap in Leadership Positions: Can Expanding the Pipeline Increase Parity?

Ryan Brown, University of Colorado Denver

Hani Mansour, University of Colorado Denver and IZA

Stephen O'Connell, Emory University and IZA

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Abstract

We study whether increasing the number of women in career stages that precede high-level positions affects female representation at the top of the career ladder. We exploit state legislature elections narrowly won by female candidates in India to examine the effect of expanding the pipeline of women in local politics on subsequent female representation and success in parliamentary elections. For each additional state legislature election won by a woman, there is a 34 percent increase in the number of female candidates contesting in the subsequent parliamentary election, and a 2.6 percentage-point increase in the average vote share won per female parliamentary candidate. We find that this relationship is driven by new female politicians, and not by the progression of female state legislators nor by continued candidacy by previous female candidates for parliament.

Author affiliations: Brown: University of Colorado Denver (ryan.p.brown@ucdenver.edu); Mansour: University of Colorado Denver and IZA (hani.mansour@ucdenver.edu); O'Connell: Emory University and IZA (soconnell@emory.edu).

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1 Introduction

Women continue to be underrepresented in leadership positions in academia, the corporate sector, and politics (Bertrand and Hallock, 2001; Bertrand et al., 2018; Ginther and Kahn, forthcoming; Bhalotra et al., 2018). Explanations for the low share of women in high-ranking positions include discrimination, biased beliefs regarding ability, and career-family trade-offs, among others (Wolfers, 2006; Bertrand, 2009; Bertrand et al., 2010). These factors are also likely to affect the creation and growth of a pipeline of women in early-career positions, which can determine the availability of qualified women for higher-ranking positions and change attitudes towards women in professional capacities.

The gender gap in high-ranking positions is particularly stark in politics.[1] Given that gender disparities in representation in national politics have been linked to a dearth of female candidates (Lawless and Fox, 2008), understanding the role of a career "pipeline" in generating candidates for high-level positions may shed light on the genesis of this gender gap in representation.[2] This paper investigates these career path dynamics by examining the relationship between exposure to competitively elected female politicians in local government and subsequent female participation and representation in national politics. Specifically, we quantify how women's success in state legislature elections leads to later candidacy and success of women in elections for India's national legislature. Given that the enfranchisement of historically marginalized groups is recognized as a cornerstone of inclusive development (Acemoglu and Robinson, 2012), this paper ultimately asks whether shocks to minority-group representation in local politics can be self-perpetuating at the national level. Moreover,

[1] In 2017, women comprised only 21% of the U.S. Senate, 19.3% of the U.S. House of Representatives (CAWP, 2017), 32% of the U.K. House of Commons, and 12% of India's national legislature (Bhalotra et al., 2018).

[2] It is firmly established that increasing female representation in government leads to policy initiatives benefiting women, increases trust in government, and leads to better outcomes for children (Chattopadhyay and Duflo, 2004; Miller, 2008; Iyer et al., 2012; Kalsi, 2017). Other studies documenting a relationship between female representation, constituent welfare, and policy outcomes include Clots-Figueras (2012); Bhalotra and Clots-Figueras (2014); Brollo and Troiano (2016). Ferreira and Gyourko (2014) find no effect on the policy choices of U.S. female mayors compared to male mayors.

understanding what factors promote the candidacy and representation of female politicians at the highest level of government can shed light on the process by which leaders enter public service (Myerson, 2011; Finan et al., 2015).

To conduct our analysis, we use data from state and national legislature elections over the period of 1977-2014. A typical national legislature constituency (hereinafter "NLC") comprises six state legislature constituencies (hereinafter "SLC") that each elect a representative to their state's legislative assembly. Voters in the NLC directly elect one representative to the lower house of parliament (the *Lok Sabha*); notably, neither body is subject to gender-based quotas. Our empirical approach uses the number of close mixed-gender legislative assembly elections won by female candidates in a given parliamentary constituency to generate quasi-random variation in the number of women representing that constituency in the state legislature at any given time. The identifying assumption is that the winner's gender in a mixed-gender close election is as good as random. Intuitively, this implies that an additional close election won by a female candidate in a given constituency increases the number of women representing that constituency in the state assembly by exactly one - a prediction we are able to verify in the data.

Our results indicate that exposure to an additional female state legislator increases the number of female candidates running for national parliamentary seats during the subsequent electoral cycle by 34%. These results are not sensitive to the specific margin used to define a "close" election and are quantitatively equivalent to estimates using a traditional regression discontinuity design (RDD). In addition, although imprecisely estimated (p-value=.15), we find that the number of women winning these higher level elections increases by a substantial 58%. We find that this increase in the supply of women in national races is not linked to specific women who previously ran for or held a seat in the state or national legislature, but rather by new entrants who have no recent political experience.[3] These results imply

[3]About 20% of representatives in the lower house of the Indian parliament served as state legislators prior to serving in the parliament. Historically in the United States, approximately 40% of Congressional

that incumbent female state legislators are not only more likely to re-contest their seats, as has been found previously (Bhalotra et al., 2018), but that they are also not propelled to compete for a position in the national parliament *per se*.[4] Instead, we find that these women's electoral victories affect the entry decisions of latent female candidates.

We then explore changes in voting behavior in parliamentary elections and find that greater exposure to women elected into state legislature seats leads to an increase in the average vote share won per female parliamentary candidate while not affecting overall voter turnout. These findings on voter behavior suggest that the increased presence of women in the state legislature either changes preferences of existing voters towards female politicians and/or results in more electable women running for parliamentary positions.

Lastly, we find that candidacy effects are strongest in states with lower literacy rates, and are largely derived from candidates who run as part of the major conservative party. The nature of this heterogeneity indicates that in terms of higher-level candidacy, exposure to local female politicians has a larger impact in environments and institutions with a greater degree of existing gender bias. This suggests that increased success of female politicians at the local level may help reduce barriers facing new female candidates in national politics.

Our paper fits into a previous literature that has focused on estimating the impact of greater female representation in politcs, due to either competitive elections or gender-based quotas, on the persistence of the gender gap in political representation at the *same* level of government. For instance, Broockman (2014) finds no subsequent spillover effect of electing a woman to a U.S. state legislatures on neighboring constituencies, and Gilardi (2015) finds only a temporary effect on subsequent female candidacy in municipalities in Switzerland.

representatives served as state legislators prior to Congressional service.

[4]Jensenius and Suryanarayan (2015) argue that the legislative work of Indian state politicians has decreased over time, and that they appear to spend most of their time in their home constituencies expanding their support base, lobbying, and facilitating access to governmental services. These activities may increase their chances of re-election for their state legislature seat, but it is unclear whether they spillover to other neighboring constituencies and enhance the chances of competing for a national level seat.

In India, Bhavnani (2009) found that gender-based quotas in local politics led to the same women subsequently continuing to run for seats in local government, while Sekhon and Titiunik (2012) showed that mandated seats for female representatives in Indian councils reduced the number of female council candidates in non-mandated regions.[5] In the same context as our study, Bhalotra et al. (2018) provide evidence that after a woman wins a state legislative assembly election, the probability of a woman contesting a future election in the same constituency increases – with this effect due to a higher rate of female incumbents re-contesting their seats compared to male incumbents, rather than through an increase in new female candidates competing for state legislative seats.

Despite this body of evidence, there remains the question of if or how increasing the representation of women in local government will impact the gender gap in candidacy and representation at higher levels of government. For instance, one interpretation of Bhalotra et al. (2018)'s results suggests that if the primary pathway for generating candidates for federal office operates through politicians "climbing the political ladder" after winning a local election, it is unlikely that electing women to state legislature seats will have an impact on the gender gap in higher offices – and this might even reduce future female candidacy at the national level through endogenous decisions to continue running for state legislature seats. However, women's local electoral success might also affect the beliefs that voters, parties, or potential candidates themselves have about female political candidacy (Beaman et al., 2009), which would open the possibility for additional effects on candidacy and representation beyond local government. Increasing the representation of women in local government positions could thus reduce the gender gap at higher levels of politics through such channels. This paper provides new evidence on this theoretically and empirically ambiguous relationship.

Approaching a related question is O'Connell (forthcoming), who finds that exposure to

[5]Bardhan et al. (2010) found that political parties in India fielded less qualified female candidates for quota-mandated seats, and Banerjee et al. (2017) showed that seat reservation affected incumbency and challenger entry.

leadership seats reserved for women in district councils is associated with a small increase in female candidacy for state and national legislatures. This result is driven by previous local or state legislature candidates, and the additional female candidates do not win the elections they contest. One conclusion from this work is that gender-based quotas do not meaningfully reduce barriers that give rise to the gender gap in national politics, nor are they effective in generating female candidates who win non-reserved higher office seats. A priori, though, the impact that exposure to a woman winning a local political seat has on the beliefs of votes, parties, or female politicians themselves may be substantively different when the position is competitively elected versus reserved.

Our results suggest that the process by which a woman gains her leadership position may be of critical importance to both the individual herself as well as voters and parties. This may be the case because winning a political position through an open competition, rather than obtaining it by assignment or through a quota, affects the capacity of a female politician to change the larger political landscape in any of several ways. First, winning a competitive election may allow a politician to better propel her own career. Moreover, political positions that are not subject to mandates may be more similar in scope, responsibilities, constituencies, and tasks to higher level non-quota based seats than the positions for which there are reservation policies. Thus, working in an elected position may provide better and more apt training for success in other higher level elected positions. In addition, winning a seat through an open and competitive election may generate experience relevant for campaigning for other, non-mandated seats that is not obtained when gaining the position through a gender-based reservation. Second, exposure to a woman winning an open competition for a locally elected position may have more scope to encourage other women to pursue a political career than exposure to a woman that gained their political position through a quota. For instance, seeing a woman win a competitive election can positively update a potential female candidate's opinion about their own overall electability by changing their beliefs about voters' or political party preferences for women and other barriers to female political success.

Third, a political party's beliefs, or voters' attitudes, about the likely success of backing a female candidate are more likely to be affected by seeing a woman win a competitive election than exposure to a woman in a mandated position. This is either because elected female politicians are (or are perceived to be) of higher quality, or because attitudes may be more reactive to the behaviors, policies, and rhetoric of a female politician that has "earned" their seat through open competition rather than by reservation.

Overall, our results indicate that an expansion in the number of local female politicians has an important indirect spillover effect on the careers of aspiring female politicians. These findings suggest that encouragement and support of women who compete for early-career positions may have important consequences on the evolution of the gender imbalance at higher levels of politics.

Section 2 describes the Indian electoral system and the data used in the analysis. Section 3 outlines the empirical strategy and we discuss the results in Section 4. We conclude in Section 5.

2 Context and Data

2.1 Indian Elections

Since its founding, India has had a federal system of government with single-member constituencies elected on a first-past-the-post basis in both state and national legislatures. At the federal level, there is a bi-cameral legislature consisting of the indirectly elected upper house (Rajya Sabha) and the directly elected lower house (Lok Sabha). Both houses have equal authority in nearly all legislative areas.[6] Legally, terms of office in the Lok Sabha are

[6]For the remainder of this paper, we focus on the directly elected lower house, the Lok Sabha, in all analyses. References to "parliament" will refer solely to the Lok Sabha.

five years – although at various points in history the federal government has been dissolved and reconstituted at the sole discretion of the lower house.

Each state has its own legislature, for which asynchronous elections have been held every five years since 1952, with occasional exceptions. Elections for both federal and state legislatures are administered by the federal or state elections commission. Figure 1 shows the timing of federal and state elections from 1960 to present.[7]

A typical national legislature constituency (NLC) in the Lok Sabha is comprised of six state legislature constituencies (SLC) that each elect a representative to their state's *legislative assembly*. Voters in the NLC directly elect one representative to the lower house of parliament (the *Lok Sabha*); neither state assemblies nor the parliament are subject to gender quotas. While legislative assemblies shape many state policies related to education, health, and police enforcement, the national parliament of India legislates federal policies, is in charge of approving the national budget, and is the body that can remove a prime minister and the cabinet through a vote of no confidence. Linking these two levels of government, we study whether exposure to more female representatives in the state legislature is related to the number of female candidates competing to represent, and being elected by, parliamentary constituencies.

2.2 Elections Data

We use data available from Jensenius (2013) and the Elections Commission of India that contain state legislature election returns for all states from 1977 to 2008. The data report the constituency of the election contested, the list of candidate names, their vote counts, and

[7]Redistricting has occurred twice since 1952 – once taking effect in 1977, and again in 2007. Both times, redistricting occurred at both the state and federal level. We focus our analysis on elections occurring from 1977 forward due to the fact that we are able to accurately identify constituencies' geographic boundaries before and after the 2007 redistricting, but do not have comprehensive records of state legislature constituencies prior to 1977.

the sex of the candidate. We then identify and assign each state constituency to the parliamentary constituency it is contained within based on geographic boundary files. Data from parliamentary elections are from the Election Commission of India and contain the details of all candidates across all constituencies of the directly elected lower house of parliament (the Lok Sabha) for the same period. Unlike in many countries, state legislature constituencies in India are either found entirely within parliamentary constituency areas or share coterminous boundaries; we use publicly-available digitized maps of constituency boundaries to associate state assembly constituencies to their unique parliamentary constituencies.

To explore mechanisms behind our relationship of interest, we link the names of individual candidates across state and federal elections. This allows us to disaggregate higher-level candidacy effects as coming from repeat or new candidates. We employ a name matching algorithm similar to the one used by Fujiwara and Anagol (2016), which is based on a fuzzy string matching process that searches for each parliamentary candidate's name in a given state and election with potential name matches from previous state legislature and parliamentary elections.[8]

Table 1 contains summary statistics on the state legislature elections data. In Panel A, we see that for the full sample, on average, 9.1 candidates contest for a state legislature seat. Only 0.37 (4%) of those candidates are female. The average victory margin (defined as gross percentage of votes the winner garnered over the first runner-up) is 14.5%, and 25.9% of all elections were won by a victory margin of less than five percentage points (from hereon we refer to these as "close" elections). Approximately 8.7% of elections were "mixed" (*i.e.*, the winner and first runner-up were comprised of one male and one female candidate). Following the overall pattern, approximately one quarter of the mixed elections were close (2.1% of all elections) and half of the mixed-close elections were won by the female candidate (1.1% of

[8]To validate the procedure, we manually matched records in the state and year with the largest number of female parliamentary candidates. This method resulted in agreement with the algorithmic matching in 93 percent of cases; six percent were classified as previous state legislature candidates by the manual matching but not the algorithm, while only one case was matched by the algorithm but not manually.

all elections).

In Panel B, we focus on the sample of mixed-close elections. These elections had a slightly larger pool of candidates (9.8) and, by construction, a larger number of female candidates (1.4). If the outcome of close elections between male and female candidates is "as good as random" in this sample, we expect to see women win approximately 50 percent of the time – which is precisely the case (50.5%). The mixed-close elections were more likely to occur later (average year is 1995, compared to 1991 in Panel A) which reflects the secular trend in increasing female political participation over time. From these data, we aggregate across state legislature constituencies the number of mixed-close elections and the number of female-won mixed-close elections by parliamentary constituency, and then match this to later parliamentary election returns by constituency.

Table 2 provides summary statistics on the outcome data from pooled parliamentary election returns matched to state returns. The average parliamentary constituency contains 6.1 state legislature constituencies, in which there were an average of 1.6 close elections, .57 gender-mixed elections, .13 mixed close elections, with around half of those (.07) won by the female candidate. In the parliamentary elections themselves, there was an average of 12.7 candidates, of which .55 were female, and these national level elections were won by a female candidate 7.8% of the time.

3 Methodology

Our goal is to estimate the impact of a female candidate being elected to the state legislature on female participation and success in later parliamentary elections. To do this, we use variation in the success of female candidates in state legislature elections within their corresponding parliamentary constituency. The threat to identification inherent in an observational

approach to this question is that areas in which female candidates are more numerous, more competitive, and win state legislature seats are likely to be those same areas in which female political participation and representation at the national level is correspondingly higher due to observed or unobserved factors.

To address this concern, we use the quasi-random nature of the victor's gender in close state legislature elections where a male and female candidate are the top two finishers ("close mixed-gender elections") to generate variation in female representation at the local level. Our identifying assumption is that, except for the gender of the candidate, other variables such as area or candidate characteristics, or preferences for female candidates more generally, vary continuously at the vote margin of zero. The validity of this identifying assumption enables us to interpret an additional close mixed-gender state legislature race won by a woman as an exogenous increase in female representation at the state level. Given this research design, our main analysis will measure the impact of an additional female state legislator as a result of a close-won election on later female representation and success in the affected national parliamentary constituency's elections.

3.1 Investigating the Validity of the Research Design

As is standard in the literature, we conduct several checks to confirm that preferences for female politicians are continuous at the vote margin of zero. However, our context provides another directly testable check for the validity of the identifying assumption not typically available when using this type of variation: a female victor in a close mixed-gender election in one of the state constituencies that make up a larger national constituency should increase the total number of female state legislators within that national constituency by precisely 1. This prediction could be violated if the likelihood of a female winning a close election in a particular SLC is indicative of a general preference for electing female politicians within the

same parliamentary constituency. Under such a scenario, a close female win in a SLC would be associated with more than one additional female representing the corresponding national constituency in the state legislature. Thus, when exploiting the particular variation used for this analysis, traditional tests for continuity of variables other than gender at the threshold provide necessary but not sufficient evidence for the validity of the research design. In our context, the continuity test is formalized in the following regression:

$$SLC\ seats\ held\ by\ women_{it} = \alpha_1 * \#\ of\ close\text{-}mixed\ SLC\ female\ wins_{it} + \alpha_2 * \#\ of\ close\text{-}mixed\ elections_{it} + \Gamma_i + \Theta_t + \epsilon_{it} \quad (1)$$

where $SLC\ seats\ held\ by\ women_{it}$ represents the total number of women that won a state legislature seat in a particular national constituency i, in election year t. The independent variable of interest in this model is the $\#\ of\ close\text{-}mixed\ SLC\ female\ wins_{it}$, which captures the number of women that won a close election against a man. In this analysis, "close" is defined as a $\leq$5% margin between the top two finishers. The model also controls for the total number of close mixed-gender elections in NLC i and in election year t, the $\#\ of\ close\text{-}mixed\ elections_{it}$, as well as fixed effects for NLC (Γ_i) and election year (Θ_t). We two-way cluster the standard errors by parliamentary constituency and year of the state legislature election.[9]

In Table 3, we present coefficients for this test. Column 1 estimates equation 1 omitting the vectors of fixed effects and controls and Column 2 estimates equation 1 in full. In both cases the coefficient cannot be statistically distinguished from one.

As mentioned previously, it is also important for the validity of our research design that no other relevant characteristics other than the gender of the winner are changing non-linearly as the female candidate's vote margin crosses the threshold of zero in state legislature elections.

[9]Our estimates here and below are highly robust to other clustering schemes, including dropping the year dimension or two-way clustering by constituency and state∗year.

We conduct a number of standard checks of this assumption. First, following McCrary (2008), we test for manipulation of the running variable in the mixed-gender close elections in the state legislature data. Figure 2 plots the density of the running variable, the vote margin between a male and female candidate, and provides no evidence of a discontinuity at the zero vote margin, suggesting that a female candidate is as likely to win or lose a closely contested race.

We also perform falsification exercises in which we estimate a traditional regression discontinuity specification, given below, using outcomes that should not be affected by a female candidate closely winning an election. Specifically, we estimate the following regression:

$$Y_{it} = \beta_0 + \beta_1 * female\ won_{it} + \beta_2 * win\ margin_{it} + \beta_3 * win\ margin_{it} * female\ won_{it} + \Gamma_i + \Theta_t + \epsilon_{it} \tag{2}$$

where $female\ won_{it}$ is an indicator for a female victory in state legislature constituency i, in election year t and $win\ margin_{it}$ represents the vote margin by which the female candidate won or lost the election in state constituency i, in election year t. This model uses a bandwidth of 5% in margin of victory and applies triangular weights.

In Panel A of Table 4 we estimate equation 2 using characteristics of the previous state legislature election as outcome variables. The results provide evidence that there is no discontinuity in previous state legislature election characteristics when a woman wins a close election at the state level. In Panel B, we estimate equation 2 using characteristics of the last national parliamentary election as outcomes in order to test whether our close female-won state legislature elections are occurring in national constituencies that are simultaneously experiencing systematically different political environments. The first column shows that a close female win is not related to the fraction of votes won by all women contesting in the national parliamentary election. This test is particularly relevant, as it suggests that a close female win does not reflect a change in preferences for female politicians in both levels of

government. We also verify that a close female win is not associated with the number of female parliamentary candidates who previously had run for the state legislature (column 3) nor the number of female parliamentary candidates from the major progressive or conservative parties (columns 4 and 5). A close female win has a small negative and marginally significant effect on whether any incumbent is in the parliamentary election (column 6) but it is not associated with whether a female incumbent is in the race (column 2) or with the number of parliamentary candidates who previously served in the state legislature (column 7).[10] In addition, Bhalotra et al. (2018) uses variation generated by a similar sample of mixed-close elections in Indian state legislative assemblies and finds no evidence that a close female win in the state legislature is related to candidate characteristics such as education levels or net worth.[11]

The sample of mixed-close elections is drawn from a wide range of states across India. Figure 3 plots in red the correlation between the share of overall elections that each state contributes to the sample and the share of mixed-close elections by state, while the green line represents the 45 degree line. Figure 3 shows that the contribution of each state to the sample of mixed-close elections is closely proportional to their contribution to the overall sample of elections. As a result, our sample of close elections is not driven by a few outlying or non-representative states and thus captures the variation in underlying attitudes towards women across India. The share of all elections and close mixed-gender races by time period in the sample is depicted in Appendix Figure 1 and shows that the prevalence of close gender-mixed elections increased over time.

[10] In all, there is only one coefficient that is significant at the 10 percent level in Table 4 out of 14 tests, which is what would be expected by chance.

[11] Using a similar sample to ours, Bhalotra et al. (2018) also show that other demographic and socioeconomic characteristics of the population (including population gender ratios, literacy rates, proportion of lower castes and backward tribes, and the male-female literacy differential) are also not correlated with a woman winning a close election.

3.2 Empirical Strategy

We next proceed to the main analysis in which we estimate the impact of an increase in the number of female state legislators on women's candidacy and success in later parliamentary races. The empirical specification we use is as follows:

$$Y_{ict} = \alpha_1 * \#\ of\ close\text{-}mixed\ SLC\ female\ wins_{it} + \alpha_2 * \#\ of\ close\text{-}mixed\ elections_{it} + \Gamma_i + \Theta_t + \delta_c + \epsilon_{ict} \quad (3)$$

In this model, the dependent variable reflects outcomes, Y, in parliamentary constituency i, occurring in parliamentary election year c, as a function of the results of state legislature elections held in year t. Equation 3 uses the same independent variables used in equation 1 and includes a fixed effect for the year of the national parliamentary election, δ_c. Our primary outcomes of interest are the number of female candidates, the number of female winners, and the vote share for all female candidates in the national parliamentary elections.[12] As in 1 the independent variable of interest is $\#\ of\ close\text{-}mixed\ SLC\ female\ wins_{it}$, which represents the number of women that won an election against a man when the vote margin between the top two finishers was within 5%. While this 5% definition for a "close" election is used throughout the main analyses, we also provide evidence in the results section which establishes that our estimates and conclusions are robust to alternative definitions of a "close" election.

We also separate the analyses by varying horizons to differentiate the effect of experiencing additional female state representation before ("current term") or after ("subsequent

[12] An alternative strategy would be to use mixed-gender close elections won by a woman as an instrument for the endogenous number of state legislature seats held by women. Given that the first stage model would be the same as equation 1 and thus the first stage coefficient is indistinguishable from 1, the results from the 2SLS model and the reduced form in equation 3 are very similar. IV estimates for our main candidacy results are available in Appendix Table 1. This IV approach, which can alternatively be formulated as a fuzzy regression discontinuity design, has been applied previously to understand the effects of female political leadership on constituents' health and education by Clots-Figueras (2012) and Bhalotra and Clots-Figueras (2014).

term") the elected state representative has completed their term of office. During the current term, a newly elected representative might not yet have a proven record as a legislator, and may themselves be deciding between candidacy for the state and national legislature in the subsequent election. After the current term, the politician will have the experience from a completed term of office and exposure effects are more likely to be present among potential external candidates and among voters. We are therefore more flexible in allowing our analysis to examine both immediate and longer-run effects of exposure to elected local politicians.[13] In addition, to provide a placebo test for our identification strategy, we also study outcomes from the previous parliamentary elections (i.e. one to five years before the focal state elections). If a woman winning a mixed-gender close election at the state level is uncorrelated with trends in the relevant national constituency's parliamentary elections, we should find no effect during the previous campaign cycle.

The empirical strategy presented in equation 3 is similar in many ways to a standard regression discontinuity specification in which the independent variable is an indicator for whether a woman closely won a state legislature election and the dependent variable is measured at the parliamentary constituency level but assigned to each relevant SLC, as in equation 2. We prefer to use equation 3 as our main specification because we expect it to provide us precision gains relative to an RDD as there is no loss of sample among parliamentary election observations via the imposition of a bandwidth. While our primary approach still uses within-bandwidth variation in the regressor to identify effects on the outcome, the sample is not subject to bandwidth-based restrictions. As a result, we are able to use the same source of variation as in an RDD to identify the parameter of interest

[13]Since our unit of observation is related to time since a SLC election, it is important to verify that the sample remains representative of India as the period since the SLC election becomes more distant. In each set of national elections from 1 to 9 years after the corresponding SLC election the observations represent 80-85% of all Indian states in the dataset. Observations of national elections 10 years after the focal SLC, though, are only made up of one-third of Indian states and are not geographically representative of the country. In order to be conservative in handling the potential systematic selection into the sample for observations 10 years after the SLC, the "subsequent term" period includes elections six to nine years after the SLC election. Results including year 10 in the "subsequent term" period are provided in Appendix Table 2 and are qualitatively and statistically indistinguishable from the main results.

while preserving the full available sample to identify the fixed effects in the model. In the following section of the paper we document that the advantages of estimating equation 3 do not come at the cost of adding bias to our estimates. Specifically, we show that while the results of equation 3 are more precise, there is no difference in the estimated magnitude of the relationship of interest when using either methodology.

4 Results

4.1 Candidacy

We first estimate the effect of an additional close election won by a female candidate on the number of female candidates competing in parliamentary races. The results in Column 1 of Table 5 indicate that the number of closely elected female state legislators does not affect the number of female parliamentary candidates in *past* parliamentary elections. This falsification test suggests that NLCs which are later exposed to additional state female politicians did not already have a differential number of female candidates running at the national level in the previous election. We also find no meaningful effect on higher-level candidacy during the term of office of the women who were recently elected at the state level (Column 2). In contrast, the results in Column 3 of Table 5 indicate that an increase in the number of state female legislators leads to a large and statistically significant increase in the number of female candidates in parliamentary races held during the subsequent term of the focal state legislature. Specifically, for each additional female state legislator winning by a close election, there are .22 additional female parliamentary candidates running for office in the subsequent term – an increase of 34% relative to the mean number of female candidates. Put differently, an addition of five lower-level female representatives generate one additional female candidate for the national legislature. Conditional on the number of

female close wins, the coefficient on the number of close mixed-gender elections captures the effect of an increase in the number of close elections won by men on female candidacy at the national level. The coefficients on the number of close mixed-gender elections are small and statistically insignificant in all specifications, suggesting that the effect is driven by female politicians winning state legislature seats.

While the identifying assumption relied upon for our estimates strongly implies that the election results used to represent quasi-random increases in female representation should be from races in which a female candidate narrowly defeats a male candidate, the exact choice of what qualifies as a "close" election is arbitrary. To ensure that our conclusions regarding the impact of an increase in the number of state female legislators on the number of female candidates in parliamentary races held during the subsequent term are not dependent on the specific choice of 5% to define a "close" election, Figure 4 replicates this estimate using each margin of victory from 1% to 10% in 1% intervals. In each case the estimate using an alternative definition of a "close" election provides qualitatively and quantitatively similar results to the primary specification.

As discussed when introducing equation 3, an alternative approach to our analysis would be to estimate a regression discontinuity specification analogous to equation 2 in which the independent variable is an indicator for whether a woman closely won a state legislature election and the outcome is the number of women running in the subsequent parliamentary election in the constituency that contains the SLC. The traditional regression discontinuity approach, however, could suffer from a loss in precision relative to 3 due to the smaller sample size imposed by a bandwidth selector without providing any clear benefits to identification. Specifically, while the regression discontinuity design limits the sample to only those state legislature elections that experienced a close election, equation 3's inclusion of the full sample of parliamentary elections does not alter which elections provide identifying variation, but rather allows for all observations available to identify the vectors of fixed effects.

In support of the fact that using the full sample in 3, as compared to the more restricted sample that would be leveraged in a regression discontinuity design, is not critical to identification, Appendix Table 3 estimates equation 3 when limiting the sample to only parliamentary constituencies that ever experienced a close state legislature election at some point during the sample period (Columns 2) or, even more narrowly, only those election-years that had a close state legislature election in the previous election cycle (Column 3). As expected, the estimates in Columns 2 and 3 are very similar in magnitude to the estimate using the full sample.

Alternatively, to provide evidence that the use of a traditional regression discontinuity specification would reduce efficiency without providing gains to identification, we estimate multiple versions of equation 2 for the number of female parliamentary candidates in the subsequent term in which the independent variable is an indicator for whether a woman closely won a state legislature race using varying bandwidth choices from 1% to 10% in 1% intervals, as well as the Imbens and Kalyanaraman (2012) and Calonico et al. (2014) optimal bandwidth selectors. The results are provided in Appendix Figure 2 along with a solid blue line indicating the estimated effect reported in Column 3 of Table 5 and dashed blue lines providing the 90% confidence interval for the estimate. Comparing the regression discontinuity estimates to the solid blue line indicates that the size of the relationship between the number of female state legislators and the number of female candidates in parliamentary races held during the subsequent term is larger or equivalent when using a regression discontinuity specification. Thus, estimating equation 3 is not leading to upwardly biased results and provides, if anything, conservative estimates as compared to those from a regression discontinuity design. In addition, the size of the confidence intervals attached to the regression discontinuity estimates, as compared to those from equation 3, underline the precision gains from using the full sample. In sum, while a regression discontinuity specification represents a reasonable approach to this analysis, it is strictly dominated in efficiency by equation 3 while providing the same conclusion about the relationship of interest.

4.2 Sources of Candidacy

What is the source of the increase in female parliamentary candidates? One possibility is that female politicians who won state legislature seats climb the political ladder and decide to compete in national elections. For example, serving at the state legislature may provide the politician important and relevant experience that makes her a more viable national level candidate. An alternative possibility is that the success of women in state legislature elections reduces bias and leads to updated beliefs about the viability of female candidates, which encourages new female political actors to compete in national elections.[14] In Table 6, we estimate the impact of increased female representation in the state legislature on the number of female parliamentary candidates who had previous experience in state or national legislature elections versus its impact on female parliamentary candidates with no prior experience.

The results from this analysis provide strong evidence that the effect of lower-level wins on candidacy in the subsequent parliamentary election is not operating solely or predominantly through career politicians (Column 2). Moreover, the estimate in column 2 of Table 6 means that our main effect is not driven by the behavior of the close-winning female state legislator, as she is not more likely to subsequently run at the parliamentary level.[15] What we find instead, in column 3 of Table 6, is that exposure to an increase in competitively elected women at the local level facilitates the participation of female candidates outside the sphere of existing politicians.[16]

[14]In the U.S. context, Wasserman (2018) shows that novice female candidates who compete and lose in California local elections are less likely to persist in their political career compared to male losers. Brown et al. (2019) show that U.S. female politicians who win a state legislature seat are less likely to pursue a Congressional office compared to male politicians.

[15]An alternative potential mechanism is that the new political power obtained by the elected female politician enables her to push for the nomination of other female candidates from her own party for national level seats. However, we do not find evidence to support this hypothesis. Specifically, the party affiliation of the additional female state legislator does not strongly determine the party affiliation of the additional female candidates competing in parliamentary elections.

[16]While dynastic political families are quite common in India, we believe it is unlikely that the effect is driven by candidacy among women from political families as this group would likely comprise a substantial

4.3 Representation and Vote Outcomes

In Table 7 we estimate effects on female representation in the parliament. We again find no meaningful effect during the previous or current term of office of the women who were elected at the state level. In contrast, in the subsequent term (Column 3), an additional lower-level female representative yields a large (58%) increase in higher-level representation, although this effect is imprecisely estimated (p-value=.15).[17]

We next investigate whether female parliamentary candidates are more or less competitive (in terms of the vote share they receive) when there is an increase in the presence of women in the state legislature. There are several reasons we might expect a change. We might expect that the marginal candidates that choose to run as a result of a woman having success at the state level receive fewer votes on average and thus reduce the competitiveness of female candidates in general. On the other hand, if the potential candidates induced by women's lower level electoral success are of sufficiently high quality in the eyes of voters, then their emergence as candidates would be associated with either a stable or increasing average vote share won per female candidate. Alternatively, if a woman getting elected to the state legislature either changes voter preferences favorably toward female politicians or leads to increased enfranchisement of voters with favorable preferences towards female politicians, the vote share per female candidate would increase. In Table 8, we estimate the effect of an increase in the number of female state legislators on female parliamentary candidates' average vote share. The results in Column 3 indicate that an additional female state politician leads to an increase of about 2.6 percentage-point in the average vote share

portion of those with previous political experience. In addition, and as has been pointed out by (Bhalotra et al., 2018), approaches to comprehensively detect dynasties at the local level by surnames are subject to substantial misclassification error. Moreover, it is unlikely that the affiliation to a political dynasty is correlated with mixed-gender close elections.

[17]We also estimate outcomes for the appointment or election of women to the upper house of the Indian parliament, the Rajya Sabha, in Appendix Table 4. We find no similar effect there, although this is not a directly elected house and the process by which individuals become "candidates" for these seats is markedly different from those in the lower house.

won per female parliamentary candidate in the subsequent term. To put this into context, the mean vote share won per female candidate is 5.6 – thus a 2.6 percentage point increase represents a substantial increase in the votes won per female candidate. In other words, the additional .22 women running for a parliamentary seat are able to increase the average vote share won per female candidates by 2.6 percentage points – which, on a per candidate basis, means these marginal candidates receive, on average, an 11.8 percentage-point higher vote share (2.6/.22 = 11.8).[18]

With the increase in female vote share in mind, we next explore if this is a result of increased voter participation among previously disenfranchised female voters by testing whether there were changes in overall voter turnout. In Table 9, we estimate equation 3 using the total voter turnout for the parliamentary election as the outcome and find no significant effects in any period. Assuming that the composition of voters did not change, these results suggest that exposure to local female politicians did not increase enfranchisement.[19]

4.4 Is it Gender, Party, or Incumbency?

Nearly 50% of female state legislature candidates are fielded by a single party, the center-left/progressive Indian National Congress (INC). This raises the concern that female electoral success may simply be reflecting a party effect if, for example, the election of an additional INC candidate to the state legislature impacts the supply of female candidates competing for parliamentary seats.

In order to test whether the party affiliation of an additional state legislator impacts the number of parliamentary female candidates, we use variation from close-won elections by

[18]Note that in this analysis, we code the outcome in races with no female candidates as zero; this makes no difference to the magnitude of our estimate if we leave those outcomes as undefined, although the coefficient becomes marginally significant (coefficient: 2.80, p-value=.13).

[19]We cannot rule out the alternative explanation that exposure to a local female politician increased voting participation by women by the same amount that it decreased voting participation among men.

INC candidates instead of variation in the gender of candidates in closely won elections. The results of this exercise, presented in Appendix Table 5, show that progressive-party wins actually lead to a small reduction in female participation in subsequent parliamentary elections. We also show in Appendix Table 6 that controlling for the number of close mixed-gender elections won by the progressive party also does not meaningfully affect our results or conclusions. These estimates suggest that our findings are driven by the gender of the candidate, and not their political affiliation.

It is also possible that the impact of closely electing a female state legislator varies by whether she is an incumbent or a new candidate. For example, the close election of a female politician who never served in the state assembly could provide more relevant and novel information to potential candidates and parties about voter preferences towards women than the close election of a female incumbent. To test this, we estimate equation 3 with an additional regressor that measures the count of close female wins by incumbents. The results in Appendix Table 7 suggest that the effects we find in our main analysis are driven entirely by the election of new female state politicians and provide evidence that the success of non-incumbent state female legislators is what inspires latent female parliamentary candidates and provides them, and the parties they belong to, with new information about voters' attitudes.

Lastly, we explore whether increased female representation in state legislatures also increases male candidacy at the parliamentary. If this were the case, it would imply that the identification strategy is simply picking up a spurious relationship between close mixed state elections won by women and an increase in overall participation of candidates at the national level. The results of this analysis are found in Table 10 and provide no evidence supporting this hypothesis. This indicates that the impact of female state legislators on candidacy in national elections is gender-specific.

4.5 Heterogeneity: Area Characteristics, Recency, Incumbency, and Party Affiliation

We next examine the heterogeneity of the relationship between exposure to an elected female local politician and female representation and success in national elections. We start by exploring whether candidacy effects were different in states with more or less female empowerment. For this exercise, a state's level of female empowerment is characterized by the female literacy rate based on the 2001 Population Census. We will treat states with lower literacy rates (below the national median) as areas with low historical empowerment of women.[20]

Table 11 reports estimates from separate regressions by sub-samples of states based on the female literacy rate. Column 1 indicates that the increase in the number of parliamentary female candidates is concentrated in states with low literacy rates.[21] These results are counter to Bhalotra et al. (2018)'s finding that the relationship between female electoral success at the state level and the likelihood of that woman re-contesting her seat in the next election is strongest in more progressive states. This divergence suggests that the dynamics of improving female political participation at the state level may substantially differ from those that generate increased participation and representation in national politics. We also do not find that the effects in the earlier and later periods of our sample are statistically distinguishable (Columns 3 and 4) and do not detect any substantial complementarity between close wins and the existence of the quota policy in local government (see Appendix Table 8).

Next, we examine if the political party of the close female winner deferentially affects female representation in higher-level candidacy. To do this, the main regressor is split into

[20]While our indicators of female empowerment may be endogenously related to our independent variable of interest due to the fact that they are measured in 2001, the relative persistence in these factors over time should mitigate the concerns about the use of these specific measures. These results should therefore be viewed and interpreted with this potential issue in mind.

[21]An increase in the probability of a female winning a parliamentary race is also concentrated in low literacy states, but the results are not statistically significant.

three separate measures: the number of close female wins by the major progressive party (INC), the number of close female wins by the major conservative party (BJP), and close female wins by candidates from all other parties and independents. Although nearly half of the mixed close elections won by women are won by the progressive party, the majority of the effect on later higher-level candidacy comes from lower-level wins by female candidates who run as conservatives, in smaller parties, or as independents – as shown in Column 3 of Table 12.

Lastly, we explore whether the gains to female parliamentary candidacy are accruing differentially by political party. In Panel A of Table 13 we estimate equation 3 separately for candidates running for INC, BJP, other parties, and as independents. The results of this analysis suggest that the increase in female candidacy in parliamentary elections is largest within the major conservative party (BJP) and amongst independents. In Panel B of Table 13 we investigate if this differential impact by party at the parliamentary level is driven by increases in female representation at the state level from within the same party or from competing parties. Interestingly, we find the increase in female BJP parliamentary candidates is not driven by state level success of women from any particular party, while the impact on female parliamentary candidates that are independents is strongly motivated by the success of female state legislature candidates from the major conservative party.[22]

5 Conclusion

Women are consistently underrepresented in high-ranking positions in both the public and private sectors around the world. We hypothesize that placing women into career stages that precede top-level positions might reduce observed disparities in representation over

[22]Ideally we would also observe measures of performance of the women who win close elections while in office to determine whether this has a relationship to higher-level candidacy. However, such measures are not available both comprehensively and historically. We leave this important investigation for future work.

time through increasing the supply of potential experienced candidates, encouraging new women to compete for higher-level positions and/or changing beliefs about female candidates. Specifically, we investigate whether the election of women to state legislatures in India increases the number of women who compete for and win later elections for the national parliament. An additional woman entering the political career pipeline by winning a state legislature election increases the number of female parliamentary candidates in elections held during the subsequent term of office by 34%. The impact on female success in national elections follows the same temporal pattern and, while imprecisely estimated, is also positive and large in magnitude ($\sim$58%).

We show that this effect is not caused by the career progression of women with previous political experience, but rather by inducing candidacy from women who were not already career politicians at either the local or national level. This rules out a direct supply-side channel in this context, and highlights that pipeline expansion can affect the institution of politics more broadly and change the entrance and participation decisions of *latent* candidates who had not previously run for office. These findings parallel those of Wolbrecht and Campbell (2006, 2007); Beaman et al. (2009); Iyer et al. (2012) and Khanna (2016), among others, who find that female leadership can change established norms by altering the decisions and behavior of those not directly affected by specific empowerment policies.

In addition, we find that women's political success in a state election leads to female parliamentary candidates receiving a higher average vote share without increasing voter turnout. This suggests that either voter preferences changed or the new candidates were more electable than the average female candidate. Interestingly, the effects are concentrated in states with low female literacy – areas that have traditionally had higher barriers to women's political participation and empowerment. Similarly, the cross-party effects are driven by the lower-level electoral success of women who are not part of the progressive party, but rather those who run as conservatives or independents. Given recent literature

on the ability of female politicians to outperform their male counterparts in government effectiveness and economic performance (Brollo and Troiano, 2016; Baskaran et al., 2016), we take our findings as evidence of a mechanism in which exposure reduces bias, allowing for updated beliefs about the viability of *latent* female candidates who then run for higher office.

This is the first paper to empirically test the implications of electing local female politicians on the supply of female candidates running for national legislature. Overall, we find that an expansion in the number of local female politicians has an important indirect spillover effect on the careers of high quality, aspiring female politicians, and thus the encouragement and support of women who are competing for early-career positions may have important consequences on the evolution of gender imbalance at higher levels of politics. Initiatives to promote the candidacy of women at lower levels of the political ladder have the potential to affect the gender gap in higher office, especially in environments where the barriers to entry for female politicians are high.

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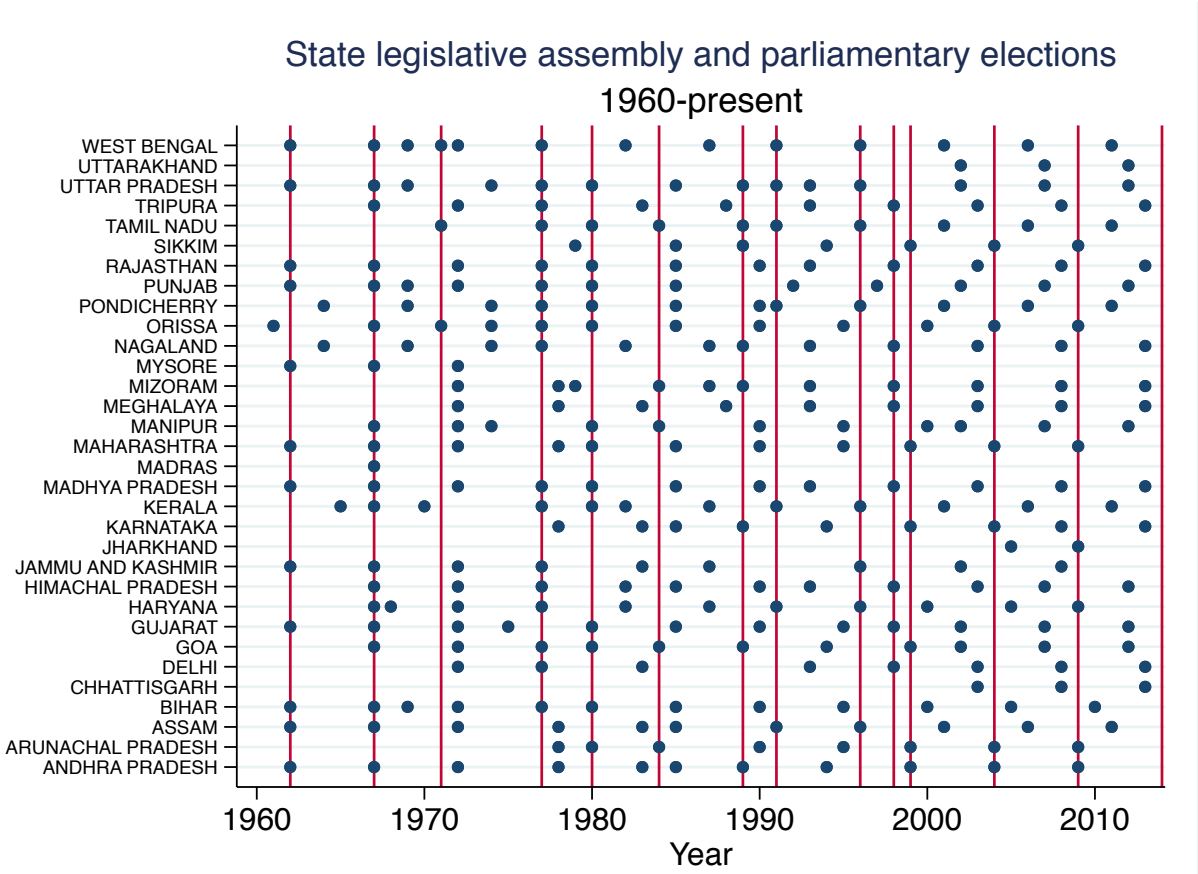
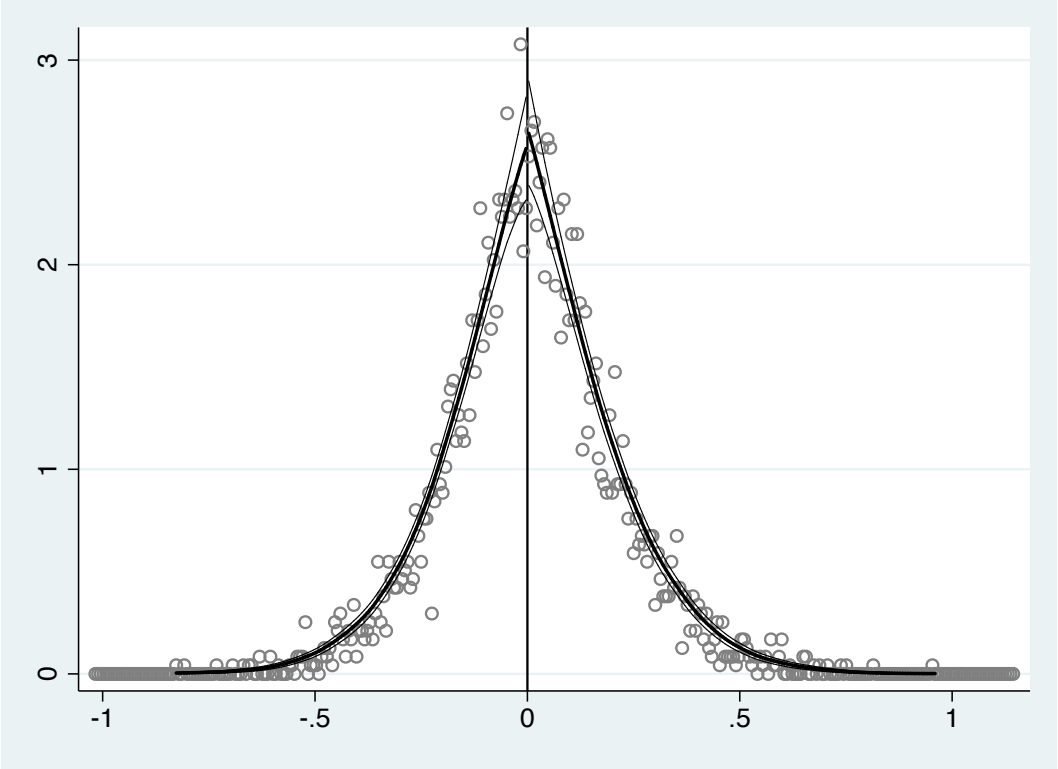
Figure 1: Timing of state and federal elections, 1960 to present



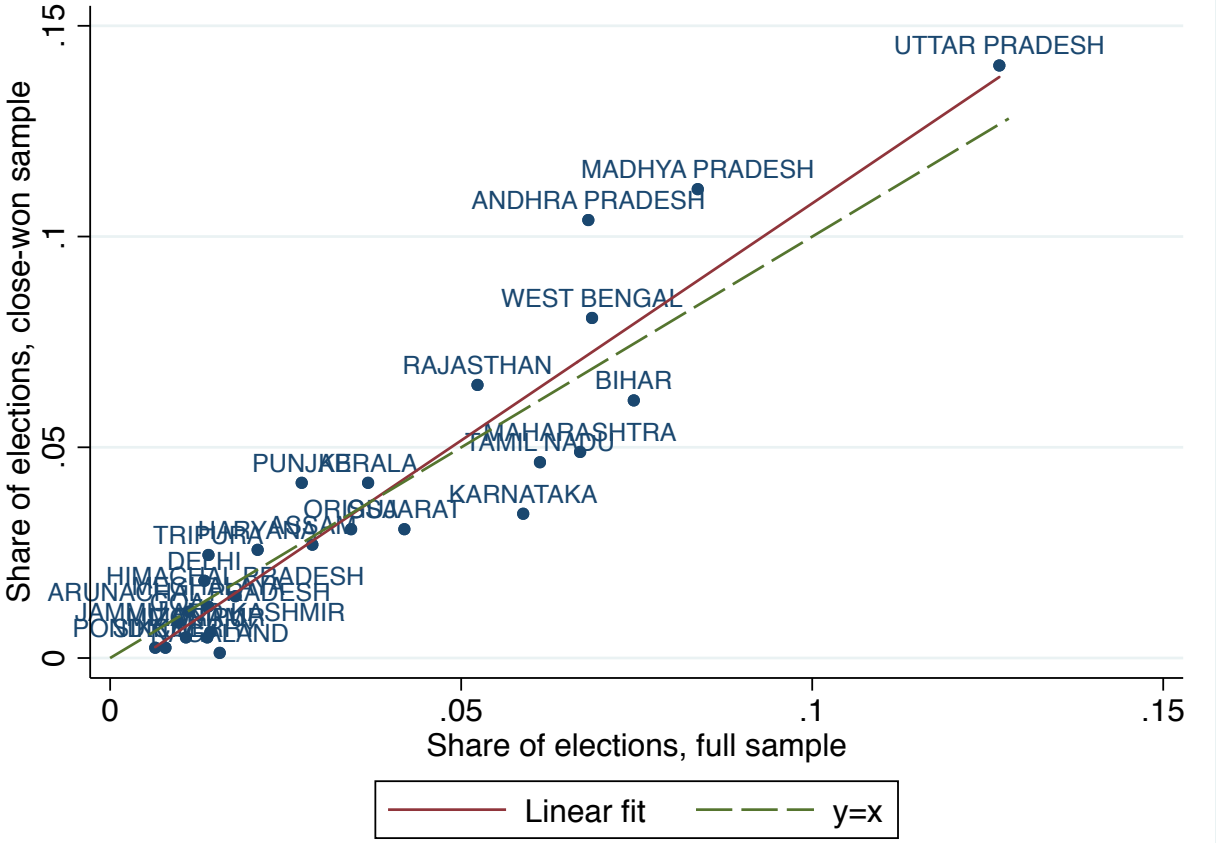
Note: Parliamentary elections are represented by vertical bars and state legislative elections are represented by dots.

Figure 2: Density test for manipulation of the running variable



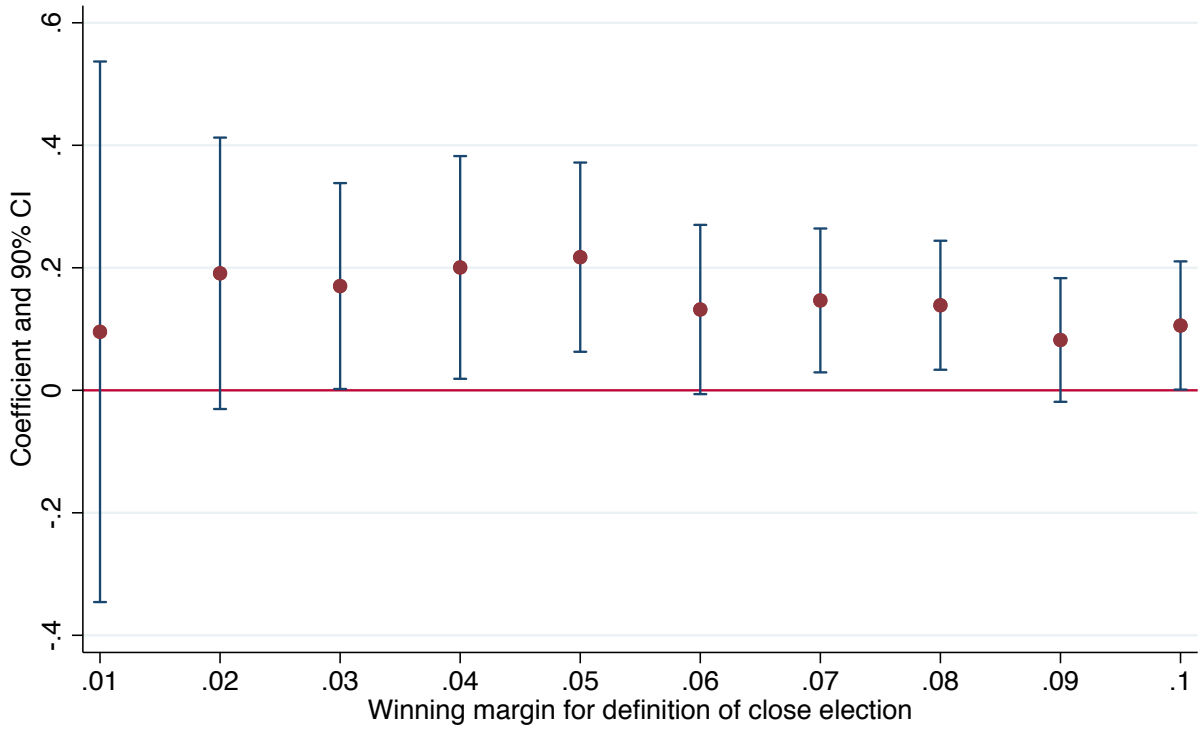
Note: The horizontal axis is the female victory margin in mixed-gender state legislature elections; positive values indicate a win by the female candidate.

Figure 3: Share of all elections versus share of close mixed-gender elections by state, 1977-present



Note: The 45-degree line is plotted by a dashed line. The solid line plots the correlation between the share of all elections and the share of close mixed-gender elections across states – the slope of which is not statistically distinguishable from 1.

Figure 4: Test of sensitivity to definition of close election for estimate of effect on female candidacy in the subsequent term



Note: Each point reports results from estimating equation 3 in the subsequent term using a different margin of victory to define a "close" election. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. 90% confidence intervals provided for each estimate.

Table 1: Summary statistics, state legislature elections, 1977-2008

Panel A: Full sample				
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Candidates	9.114	6.647	1	301
Female candidates	0.366	0.693	0	16
Victory margin	0.145	0.13	0	1
Close election	0.259	0.438	0	1
Election b/w male and female candidate	0.087	0.282	0	1
Female candidate won	0.044	0.205	0	1
Close election b/w male and female cand.	0.021	0.145	0	1
Female cand. won in M-F close election	0.011	0.103	0	1
State legis. election year	1991.42	9.631	1977	2008
High female literacy state	0.533	0.499	0	1
N		30250		

Panel B: Mixed-close election sample				
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Candidates	9.847	5.964	2	45
Female candidates	1.433	0.776	1	7
Victory margin	0.024	0.014	0	0.05
Female candidate won	0.505	0.500	0	1
State legis. election year	1995.827	9.077	1977	2008
High female literacy state	0.489	0.500	0	1
N		646		

Source: Authors' calculations based on state legislative assembly election returns, 1977 to 2008.

Table 2: Summary statistics: merged state and national elections returns

Variable	Mean	Std. Dev.	Min.	Max.
State legis. election year	1989.607	9.787	1977	2008
# SLC constituencies (elections)	6.147	4.583	1	60
# SLC close elections	1.585	1.956	0	27
# SLC elections w/ F cand. in top 2	0.567	0.847	0	9
# SLC elections won by F cand.	0.277	0.544	0	4
# SLC M-F close elections	0.132	0.382	0	4
# SLC close elections won by F cand.	0.069	0.267	0	2
Natl. legis. election year	1992.434	9.506	1980	2009
# NLC candidates	12.711	8.548	2	79
# Female NLC candidates	0.546	0.843	0	6
Whether female cand. won NLC election	0.078	0.268	0	1
Vote share for all F. cand	6.834	16.392	0	97.03
N		2,792		

Source: Authors' calculations based on state and national legislative assembly election returns, 1977 to 2014.

Table 3: Women's electoral success in mixed-gender elections and number of elected female state legislators

	(1)	(2)
# of close elections won by female cand.	1.019^{***}	0.968^{***}
	(0.040)	(0.083)
Const. fixed effects	No	Yes
Year fixed effects	No	Yes
Close elections w/ M & F	No	Yes
p-val, H_0: $\alpha_1 = 1$	0.64	0.71
N	2792	2792
R^2	0.25	0.52
Mean of outcome	0.28	0.28
St. dev. of outcome	0.54	0.54

Note: Each column reports results from estimating equation 1. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Table 4: Testing for discontinuities in election characteristics and the candidate pool in mixed-gender close elections

Panel A: Previous state legislature election characteristics

Outcome:	# candidates (1)	Female candidates (2)	Female vote share (3)	Close election (4)	Mixed-sex (5)	Woman won (6)	Woman won by close margin (7)
Woman won election	-0.302	0.103	-0.003	-0.089*	-0.031	0.028	-0.046
	(0.926)	(0.133)	(0.040)	(0.045)	(0.080)	(0.093)	(0.042)
N	822	822	822	822	822	822	822
R^2	0.31	0.12	0.07	0.08	0.07	0.07	0.07
Mean of outcome	9.25	0.74	0.19	0.10	0.39	0.28	0.05
St. dev. of outcome	6.50	0.84	0.23	0.30	0.49	0.45	0.22

Panel B: Contemporaneous national parliamentary election characteristics

Outcome:	Vote share for all female cands. (1)	Whether female incumbent ran (2)	# female previous state legis. cands. (3)	# female cands. from INC (4)	# female cands. from BJP (5)	Whether incumbent ran (any) (6)	# prev. state legis. cands. running (7)
Woman won election	0.010	0.015	0.020	0.026	-0.016	-0.056	0.025
	(0.010)	(0.048)	(0.059)	(0.073)	(0.053)	(0.060)	(0.164)
N	906	906	906	906	906	906	906
R^2	0.14	0.06	0.06	0.27	0.17	0.08	0.17
Mean of outcome	0.40	0.13	0.21	0.44	0.15	0.37	1.08
St. dev. of outcome	0.09	0.34	0.42	0.50	0.36	0.53	1.21

Note: Table reports coefficient estimates from the estimation of a regression discontinuity specification on falsification outcomes from the focal election cycle among the sample of state legislature elections in which the top two finishers were a male and female candidate within a bandwidth of 5 percentage points in the female candidate's victory (loss) margin. All equations include fixed effects for election year, a linear term in the vote share garnered by the female candidate, as well its interaction with an indicator for the female candidate having won, and are triangular kernel weighted. Significance levels are indicated by $* < .1$, $** < .05$, $*** < .01$.

Table 5: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	0.072	-0.014	0.217**
	(0.090)	(0.070)	(0.094)
# SLC M-F close elections	-0.070	0.020	0.032
	(0.073)	(0.059)	(0.064)
N	2792	2792	2792
R^2	0.40	0.41	0.39
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 6: Women's electoral success in state mixed-gender elections and the number of female candidates in subsequent parliamentary elections, by source of candidacy

	All cands.	Prior candidacy (state and/or nat'l)	No prior candidacy
	(1)	(2)	(3)
# of close elections won by female cand.	0.217**	0.049	0.169**
	(0.094)	(0.096)	(0.060)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.39	0.32	0.29
Mean of outcome	0.64	0.40	0.24
St. dev. of outcome	0.91	0.70	0.52

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 7: Women's electoral success in state mixed-gender elections and the probability of a female win in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	-0.003	-0.018	0.046
	(0.021)	(0.022)	(0.032)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.32	0.35	0.31
Mean of outcome	0.06	0.08	0.08
St. dev. of outcome	0.24	0.27	0.27

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 8: Women's electoral success in state mixed-gender elections and the average vote share of female candidates in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# SLC close elections won by F cand.	0.763	-1.197	2.660*
	(0.952)	(0.999)	(1.334)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.38	0.39	0.35
Mean of outcome	4.59	5.10	5.26
St. dev. of outcome	12.51	12.79	12.71

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 9: Women's electoral success in state mixed-gender elections and the voter turnout in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	0.391	0.345	0.004
	(0.623)	(0.722)	(0.965)
# close mixed-gender elections	Yes	Yes	Yes
N	2709	2699	2726
R^2	0.72	0.77	0.76
Mean of outcome	58.19	57.43	59.03
St. dev. of outcome	11.30	12.06	12.64

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 10: Women's electoral success in state mixed-gender elections and the number of male candidates in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	-0.534	-0.682	0.095
	(0.348)	(0.849)	(0.512)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.69	0.69	0.68
Mean of outcome	10.06	12.16	13.62
St. dev. of outcome	7.85	8.30	9.12

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 11: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections by state characteristics

	State female literacy		Post-1991	
	Low	High	Pre-	Post
	(1)	(2)	(3)	(4)
# SLC close elections won by F cand.	0.367**	0.065	0.168	0.232**
	(0.134)	(0.135)	(0.239)	(0.103)
# close mixed-gender elections	Yes	Yes	Yes	Yes
N	1610	1182	910	1882
R^2	0.40	0.39	0.71	0.42
Mean of outcome	0.69	0.58	0.35	0.78
St. dev. of outcome	0.96	0.84	0.65	0.98

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*$ $< .1$, ** $< .05$, *** $< .01$.

Table 12: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections by state-legislature candidate party

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
close elections won by F INC cand.	-0.022	-0.027	0.148
	(0.116)	(0.107)	(0.118)
close elections won by F BJP cand.	0.139	-0.124	0.366*
	(0.126)	(0.100)	(0.195)
close elections won by any other F cand.	0.140	0.060	0.215*
	(0.101)	(0.117)	(0.120)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.40	0.41	0.39
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports results from estimating equation 3 in which we disaggregate the number of close mixed-gender state legislature female victories by the female candidate's political party. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $* < .1$, ** $< .05$, *** $< .01$.

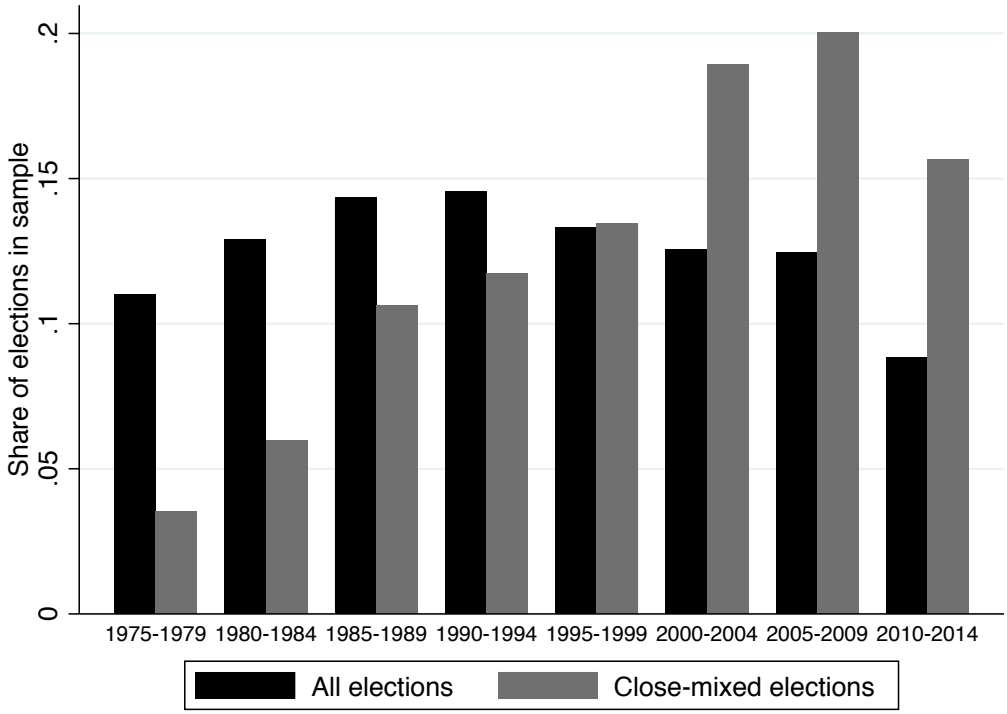
Table 13: Women's electoral success in state mixed-gender elections and the number of female candidates in subsequent parliamentary elections by state and parl. candidate party

	INC	BJP	Other parties	Independents
	(1)	(2)	(3)	(4)
Panel A: Effect on candidacy, by party				
# SLC close elections won by F cand.	0.027	0.052**	0.012	0.127
	(0.031)	(0.021)	(0.061)	(0.078)
# close mixed-gender elections	Yes	Yes	Yes	Yes
N	2792	2792	2792	2792
R^2	0.38	0.32	0.32	0.32
Mean of outcome	0.09	0.05	0.24	0.27
St. dev. of outcome	0.28	0.21	0.53	0.58
Panel B: Party-specific effects				
close elections won by F INC cand.	0.050	0.063*	0.021	0.014
	(0.050)	(0.036)	(0.092)	(0.072)
close elections won by F BJP cand.	-0.007	0.060	-0.047	0.360**
	(0.042)	(0.038)	(0.080)	(0.169)
close elections won by any other F cand.	0.020	0.034	0.033	0.127
	(0.033)	(0.025)	(0.074)	(0.086)
# close mixed-gender elections	Yes	Yes	Yes	Yes
N	2792	2792	2792	2792
R^2	0.38	0.32	0.32	0.32
Mean of outcome	0.09	0.05	0.24	0.27
St. dev. of outcome	0.28	0.21	0.53	0.58

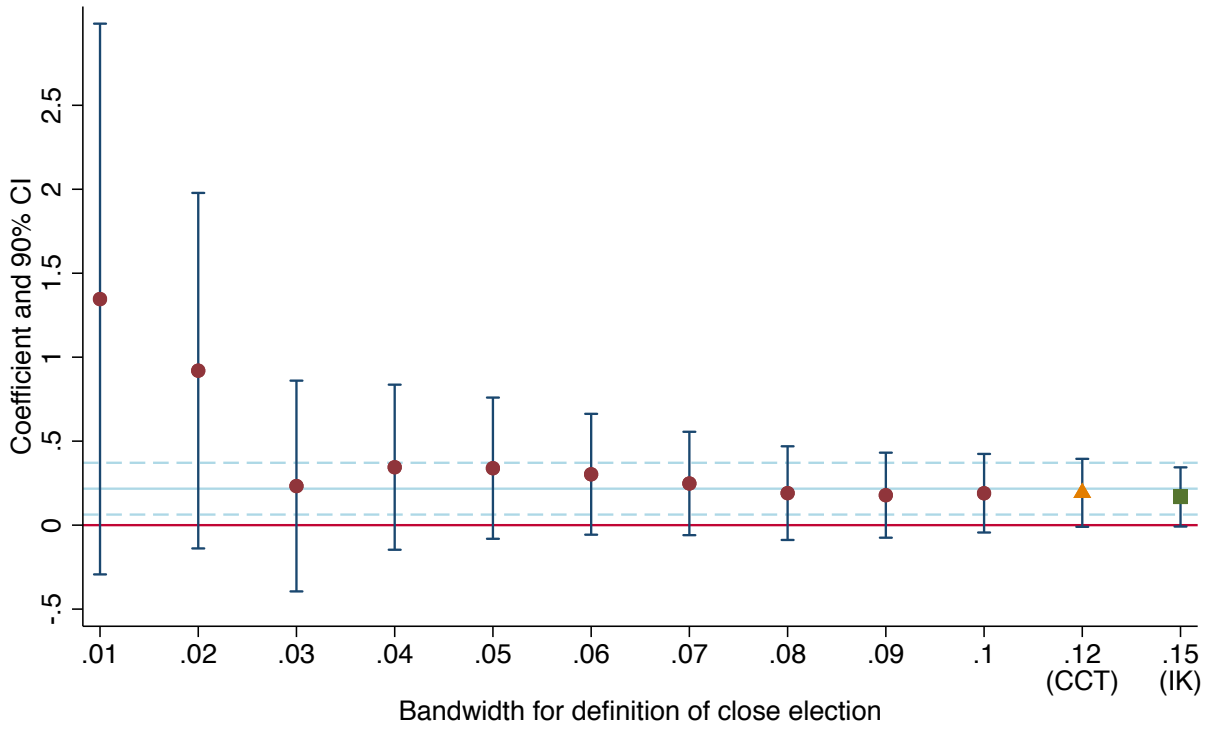
Note: Table reports coefficient estimates from equation 3 estimated via OLS. All specifications include constituency FE, assembly election year FE, and parliamentary election year FE. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $* < .1$, $** < .05$, $*** < .01$.

A1 Appendix Tables and Figures

Appendix Figure 1: Distribution of all and mixed-gender close state legislature elections by five-year ranges from 1977-2014



Appendix Figure 2: Coefficient estimate of effect on female candidacy in the subsequent term using RDD



Note: Solid blue line indicates the effect size estimated in the main analysis in the text. Dashed blue line represents the 90% confidence interval.

Appendix Table 1: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections - IV estimates

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# female state legislators	0.074	-0.014	0.224**
	(0.092)	(0.073)	(0.098)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.40	0.41	0.38
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports results from an instrumental variable regression where the number of female state legislators in a national constituency is instrumented for by the number of mixed-gender close elections won by women. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $* < .1$, $** < .05$, $*** < .01$.

Appendix Table 2: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections using alternate subsequent election samples

	Previous term	Current term	Subsequent term (incl. 10)
	(1)	(2)	(3)
# of close elections won by female cand.	0.064	-0.054	0.221**
	(0.081)	(0.068)	(0.085)
# close mixed-gender elections	Yes	Yes	Yes
N	3039	3039	3039
R^2	0.38	0.39	0.38
Mean of outcome	0.40	0.55	0.65
St. dev. of outcome	0.71	0.85	0.92

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $* < .1$, $** < .05$, $*** < .01$.

Appendix Table 3: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections - restricting sample based on presence of close mixed-gender state legislature elections

	Full sample (1)	Only parliamentary constituencies with any close M-F election in the sample (2)	Only parliamentary elections with a close M-F election during the previous term (3)
# SLC close elections won by F cand.	0.217**	0.210**	0.227
	(0.094)	(0.095)	(0.142)
# SLC M-F close elections	0.032	0.032	0.080
	(0.064)	(0.065)	(0.256)
N	2792	1657	182
R^2	0.39	0.39	0.58
Mean of outcome	0.64	0.66	0.95
St. dev. of outcome	0.91	0.93	1.11

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Appendix Table 4: Women's electoral success in state mixed-gender elections and the number of women elected/appointed to Rajya Sabha

	Woman Elected to Rajya Sabha		
	Previous term (1)	Current term (2)	Subsequent term (3)
# SLC elections won by F cand.	-0.038	-0.012	-0.027
	(0.024)	(0.027)	(0.028)
N	5522	5365	4980
R^2	0.34	0.39	0.41
Mean of outcome	0.41	0.44	0.45
St. dev. of outcome	0.60	0.61	0.62

Note: Each column reports results from estimating equation 3. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Appendix Table 5: Electoral success by INC candidates in state close elections and the number of female candidates in parliamentary elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# SLC close elections won by INC	-0.034	0.017	-0.060*
	(0.021)	(0.027)	(0.033)
Close elections w/ INC	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.40	0.41	0.39
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports estimates of the relationship between the number of close elections won by INC candidates and female candidacy at the national level. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Appendix Table 6: Controlling for progressive party (INC) wins in M-F close elections

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	0.090	-0.013	0.229**
	(0.089)	(0.069)	(0.096)
# of mixed close elections won by INC	-0.094	-0.004	-0.062
	(0.080)	(0.104)	(0.103)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.40	0.41	0.39
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports results from estimating equation 3 and additionally controlling for the number of INC candidates that won a mixed-close election. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Appendix Table 7: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections by incumbency status

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# of close elections won by female cand.	0.105	-0.021	0.222**
	(0.098)	(0.074)	(0.091)
# SLC close elections won by incumbent F cand.	-0.271	0.058	-0.038
	(0.174)	(0.268)	(0.387)
# close mixed-gender elections	Yes	Yes	Yes
N	2792	2792	2792
R^2	0.40	0.41	0.39
Mean of outcome	0.39	0.55	0.64
St. dev. of outcome	0.72	0.84	0.91

Note: Each column reports results from estimating equation 3 separating the effect by the incumbency status of close mixed-gender female winners. All specifications include constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.

Appendix Table 8: Women's electoral success in state mixed-gender elections and the number of female candidates in parliamentary elections - complementarity to quota policy

	Full sample, interacted
	(1)
# of close elections won by female cand.	-0.098
	(0.106)
SLC close elections won by F cand. * state has quota resvs.	-0.059
	(0.149)
State has quota resvs.	0.373**
	(0.131)
# close mixed-gender elections	Yes
N	2792
R^2	0.60
Mean of outcome	0.64
St. dev. of outcome	0.91

Note: Table reports results from estimating equation 3 additionally including interaction terms of the number of close mixed-gender state legislature elections won by female candidates with an indicator for the presence of a local reservation policy for female council members, and with an indicator for post 1991 elections. All specifications include an indicator for the presence of a local reservation policy for female council members and constituency, assembly election year, and parliamentary election year fixed effects. Standard errors are two-way clustered by parliamentary constituency and year of state legislature election. Significance levels are indicated by $*<.1$, $**<.05$, $***<.01$.