

# Competition and the Progression of Women's Political Participation

Ryan Brown, University of Colorado Denver

Hani Mansour, University of Colorado Denver and IZA

Stephen O'Connell, MIT and IZA

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## Abstract

Women are consistently underrepresented in elected positions at the national level in both developed and developing countries. In this paper, we study the effects of women's local electoral success on subsequent candidacy at higher levels of government in India. To address the endogeneity of female representation, we use close elections won by women contesting state legislature seats. This allows us to identify the effect of an increase in lower-level female representation on subsequent female candidacy and success in national elections. We find that greater representation at the state level encourages later participation in national legislature races: for each additional lower-level seat won by a woman, there is a 30 percent increase in the number of female candidates in subsequent national legislature elections, and women receive a disproportionately favorable increase in the vote share. Although imprecisely estimated, the probability of a woman winning the national seat increases by a similar magnitude. Accounting for differences in constituency sizes and political authority, effects from these closely-won races are larger than, although complementary to, those from quota-mandated representation at lower levels. Candidacy effects are strongest in more recent years and in areas with low historical participation and empowerment of women.

**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: Massachusetts Institute of Technology (MIT) and IZA (soconnel@mit.edu).

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# 1 Introduction

The gender gap in political representation remains large and persistent in both developed and developing countries. 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.<sup>1</sup> Evidence from recent studies suggest that increasing the share of female politicians in government leads to policy initiatives which benefit women, increases trust in government, and positively affects children’s outcomes (Chattopadhyay and Duflo (2004); Miller (2008); Iyer et al. (2012); Kalsi (Forthcoming)).<sup>2</sup>

Gender disparities in representation in national legislative bodies are primarily linked to low rates of female candidacy, rather than stark differentials in winning elections conditional on candidacy. Candidacy is then a first-order focus in discussing and addressing disparities in representation. In this paper, we ask: can local electoral success of women increase candidacy for, and representation in, higher-level offices? Motivating this is the idea that exposure to competitively elected women could affect the candidacy decisions of either existing politicians or new candidates, while also potentially changing attitudes of political parties and voters about the leadership capabilities of women and their competitiveness for elected offices.

In India, like many other countries, low rates of female representation in the political domain is longstanding and persistent (Sharma, 2016). This gender imbalance led to a gender-based quota system at the local level of government, which has been in place since the mid-1990s. While political reservations for women have been shown to generate policies that favor women’s preferences and to increase the representation of women in other governmental offices (Chattopadhyay and Duflo (2004); Iyer et al. (2012); Kalsi (Forthcoming)), it is less

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<sup>1</sup>In the corporate sector, women comprise about 5% of Fortune 500 CEOs and about 10% of corporate board members (Bhalotra et al., Forthcoming).

<sup>2</sup>Other relevant studies documenting a relationship between female representation and investments in children include Clots-Figueras (2012), Bhalotra and Clots-Figueras (2014), and Brollo and Troiano (2016). Ferreira and Gyourko (2014) find no effect on the policy choices of U.S. female mayors compared to male mayors.

clear whether they can reduce institutional and cultural barriers that give rise to the gender imbalance in politics and be effective in generating a “pipeline” of candidates for higher offices (O’Connell, 2017).<sup>3</sup>

We posit that the mechanism by which female politicians come to power may matter for changing these inertial factors. For example, the perception of a female politician assigned to a reserved seat versus winning an election may affect her capacity to inspire other potential female candidates, change voter preferences, or propel her own political career. Focusing on the effect of elected female politicians on subsequent female political participation is also important because quotas do not (and in some cases, cannot) exist in many countries at either the local or the national level. For these reasons, understanding the role of competitive elections in promoting the participation and representation of historically underrepresented groups in politics is important to further narrow observed disparities.

Previous work investigating the effect of female victories in competitive elections in India has focused on subsequent impacts within the same level of government. Specifically, Bhalotra et al. (Forthcoming) provide evidence that incumbent female politicians in Indian state legislative assemblies are more likely to recontest their seat compared to incumbent men. However, they find that exposure to a female state representative does not encourage new female candidates to enter state politics. In contrast, we study whether exposure to elected female politicians to the state legislative assembly impacts the political participation of women at the national level. This provides the opportunity to explore the impact of exposure to a locally elected female politician on the progression of female representation in more influential positions.

To conduct our analysis, we use data from state and national legislature elections in India over the period of 1977-2014. A typical national legislature constituency (NLC) in our

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<sup>3</sup>Sekhon and Titunik (2012) show that mandated seats for female representatives reduce the number of female candidates at the local level in non-mandated regions.

data is made up 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*). 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. Importantly, neither state assemblies nor the parliament are subject to gender quotas. Linking these two levels of government, we study whether exposure to more female legislators in the state legislature is related to the number of female candidates competing to represent, and being elected by, parliamentary constituencies. To our knowledge, this is the first paper to investigate whether exposure to competitively elected local female politicians changes participation and representation of female candidates at higher levels of government.

An additional contribution of our paper is to address several possible mechanisms through which local female politicians may change the supply of candidates in parliamentary races. First, serving in the state legislative assembly could provide a politician with the experience and credentials she needs to run and win a higher level seat. This is different than a typical incumbency effect, and would result in elected officials climbing the political “ladder” after gaining experience in the state legislature. Second, elected women could affect aspiring female politicians' candidacy decisions either by providing information about the competitiveness of women in electoral races, the returns to serving in office, or by serving as role models who provide indirect encouragement to run for higher offices (Bhalotra et al., Forthcoming). Third, a woman's tenure in the state legislature might change voters' and parties' preferences for female candidates, leading to an increase in the demand for female politicians in higher and more influential seats (Casas-Arce and Saiz, 2015).

In order to estimate the causal effect of female representation in state legislatures on female candidacy at the national level, we use the number of close mixed-gender *state legislature*

elections won by female candidates in a given *parliamentary* constituency area to generate quasi-random variation in the overall number of women representing that constituency in the state legislature. The main 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 one - a prediction we are able to verify in the data.

Using this variation we then analyze participants in and outcomes of national races occurring in two different periods after the election of the state legislature. The first, labeled as the “current term,” includes national races in the five year period following the SLC elections, which overlaps with the typical term of the elected state legislator. The second, referred to as “subsequent term,” includes national races occurring during the following state legislative term, after the initial term of office for the state legislator is completed. This approach allows us to segment the effects we see into distinct time horizons in which the impact of this exposure to inspire or generate career progression is likely to differ.

Our results yield several novel insights. We find that while an additional female state legislator does not impact the number of female politicians competing in national races during the legislator’s current term, the number of female candidates running for parliamentary seats during the subsequent term increases by around 30%. This effect is an order of magnitude larger per exposed citizen compared to previously estimated impacts of local level quotas on female participation in national elections (O’Connell, 2017). We are also able to show that this increase in the supply of women in national races is not driven by previous female candidates to the state assembly or by incumbent state female legislators, and thus can be attributed to new entrants. This is consistent with the results of Bhalotra et al. (Forthcoming) which indicate that female incumbents in the state legislature are more likely to recontest their seat in subsequent elections. Reassuringly, we do not find a relationship

between the number of female state legislators and the number of female candidates in national races occurring prior to the current term. The success of women in national elections, although imprecisely estimated, increases by a substantial 38%.

We also explore the heterogeneity of this result along several dimensions. We find that the candidacy effects are strongest in states with lower literacy rates and a high share of Muslim population, as well as, amongst candidates from the Bharatiya Janata Party (BJP) - the main conservative party in India. The nature of this heterogeneity differs from the findings of Bhalotra et al. (Forthcoming), and indicates that in terms of career progression exposure to elected local politicians is most impactful in areas and within institutions with more previous gender bias and may help reduce barriers facing new female candidates in national politics.

We analyze several mechanisms through which state female legislators could impact the candidacy of women for seats in the national parliament. First, we show that an increase in the number of state female legislators is associated with an increase in the share of votes received by female candidates in national races in the subsequent term while not affecting the overall voter turnout. These results suggest that exposure to elected female politicians may impact the attitudes of voters' towards females in politics. Second, we show that electing an additional female state legislator is not related to the number of male candidates competing in national races in the current or subsequent term. This is evidence that the increase in the supply of female politicians does not crowd out male candidates. Third, as described earlier, the effect does not appear to be driven by incumbent female politicians climbing the career ladder but by an infusion of new female candidates. This suggests that elected state female politicians serve as a role model for new female entrants and might mitigate the institutional and cultural barriers facing female candidates.

## 2 Background and data

### 2.1 Context

Since its founding, India has had a federal system of government with 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.<sup>4</sup> Legally, terms of office in the Lok Sabha are 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 conducted on a first-past-the-post basis, and are administered by the federal or state elections commission. Figure 1 shows the timing of federal and state elections from 1960 to present.

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.

### 2.2 Elections data: state and national legislatures

We use data available from Jensenius (2013) and the Elections Commission of India for state legislature election results in all states from 1977 to 2013. These data contain the con-

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<sup>4</sup>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.

stituency of the election contested, the list of candidate names, the vote counts, and the sex of the candidate. We then identify and assign each state constituency to the parliamentary constituency it is contained within. 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 later 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 algorithm that searches for each parliamentary candidate's name in a given state and election with potential name matches from previous state level elections in the same state.

Table 1 contains summary statistics on the state legislature elections data. In Panel A, we see that for the full sample, on average, 9.3 candidates contest for a state legislature seat. Only 0.4 (4.3%) 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 26% 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 10% of elections were “mixed” (*i.e.*, the winner and first runner-up were comprised of one male and one female candidate), and following the overall pattern, approximately one quarter (or 2.4%) of elections were mixed and close, and half of those elections (1.2%) were won by the female candidate.

In Panel B, we focus on the sample of mixed-close elections. These elections had a slightly



larger pool of candidates (10.2) and, by construction, a larger number of female candidates (1.5). 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 1999, compared to 1993 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 subsequent parliamentary elections returns by constituency.

Our sample of mixed-close elections represents a wide range of states across India. Figure 2 plots the correlation between the share of overall elections that each state contributes to the sample and the share of mixed-close elections by state. The green line represents the 45 degree line. As can be seen, our sample of close elections comes from a variety of states over this time period. This suggests that our identifying variation is not coming from elections that should be treated as anomalies.

Table 2 provides summary statistics on the outcome data from pooled parliamentary elections returns matched to state returns. The average parliamentary constituency contains 6.3 state legislature constituencies, in which there were an average of 1.6 close elections, .63 mixed elections, .15 mixed close elections, with 50% of those (.078) won by the female candidate. In the parliamentary elections themselves, there was an average of 13.7 candidates, .62 female candidates, and 7.4% of elections were won by a female candidate.

### 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 subsequent parliamentary elections. To do this, we use variation in the campaign success of female candidates for the state legislature within corresponding parliamentary constituency areas. 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 observable or unobservable factors.

We use the quasi-random nature of the victor's gender in close elections where a male and female candidate are the top two finishers ("close mixed-gender elections") in state legislature races. Our identifying assumption is that an additional close mixed-gender state legislature race won by a woman provides an exogenous increase in female representation at the state level. Given this research design, our main analysis will measure the impact of an additional state-level female politician as a result of a close-won election on subsequent female representation and success in the affected national parliamentary constituency's elections.

There is a directly testable implication of our identifying assumption: a woman winning a close state parliamentary election against a man within a particular state legislature constituency should have no relationship to the number of other women elected to the state legislature in that national constituency. In other words, 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 area by exactly and only 1. If this relationship was greater or less than 1, it would suggest there are other unobserved factors correlated with a woman winning a close election against a man for a particular state legislature seat and female representation in politics more broadly

throughout the related national constituency. This test is formalized in the following regression:

$$\begin{aligned}
 \text{SLC seats held by women}_{it} = & \alpha_1 * \# \text{ of close-mixed SLC female wins}_{it} \\
 & + \alpha_2 * \# \text{ of close-mixed elections}_{it} + \Gamma_i + \Theta_t + \epsilon_{it} \quad (1)
 \end{aligned}$$

*SLC seats held by women*<sub>it</sub> 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 *# of close-mixed SLC female wins*<sub>it</sub>, which captures the number of women that won a close election against a man. In this analysis, “close” is defined as a  $\leq 5\%$  or a  $\leq 2.5\%$  margin between the top two finishers. The model also controls for the total number of close mixed-gender elections in municipality *i* and in election year *t*, *# of close-mixed elections*<sub>it</sub>, as well as fixed effects by municipality ( $\Gamma_i$ ) and election year ( $\Theta_t$ ). We two-way cluster the standard errors by national constituency and year.

In Table 3, we present coefficients for this test. The first two columns contain estimates using the five percentage-point margin we apply throughout the paper. Column 1 estimates equation 1 omitting the vectors of fixed effects and controls and Column 2 estimates 1 in full. In both cases the coefficient is very close to, and cannot be statistically distinguished from one. Columns 3 and 4 adjust the win margin defining a close election to be 2.5 percentage points, and our results correspond closely to those in Columns 1 and 2.

We next proceed to the main analysis which explores the impact of this exposure on female

representation and success in parliamentary races.<sup>5</sup> The estimated model is as follows:

$$Y_{ict} = \alpha_1 * \# \text{ of close-mixed SLC female wins}_{it} + \alpha_2 * \# \text{ of close-mixed elections} + \Gamma_i + \Theta_t + \delta_c + \epsilon_{ict} \quad (2)$$

In this model the dependent variable reflects outcomes,  $Y$ , in parliamentary constituency  $i$ , occurring in parliamentary election year  $c$ , impacted by the state elections held in year  $t$ . 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. We will also separate the analyses by campaign cycle to differentiate the effect of experiencing additional female state representation before (“current term”) or after (“subsequent term”) the elected female state representative has completed a full term.<sup>6</sup> In addition, to provide a placebo test for our identification strategy, we also study outcomes from the previous assembly term (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 constituencies parliamentary elections, we should find no effect during the previous campaign cycle. Equation 2 uses the the same independent variables found in equation 1 and includes a fixed effect for the year of the national parliamentary election,  $\delta_c$ .

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<sup>5</sup>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 should be indistinguishable from 1, the results from the 2SLS model and the reduced form in equation 2 below will be very similar.

<sup>6</sup>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 will only include years 6 to 9 after the SLC election. Robustness checks of the main electoral participation results which include year 10 in the “subsequent term” period are provided in Appendix Table 1 and are qualitatively and statistically indistinguishable from the main results.

## 4 Results

### 4.1 Main results: candidacy, representation, and vote returns

We first estimate the structural equation with endogenous regressors in Table 4. In Columns 1-3 we estimate the relationship between female representation at the state level on candidacy, representation, and vote shares at the national level during the current term of the state assembly. Columns 4-6 estimate the same outcomes for the subsequent assembly term. All effects are small and statistically insignificant. While we would generally think that the endogeneity of female representation at the state level to these outcomes at the national level would cause upward bias, other factors, such as individual candidates' decisions to run for the same or higher office once elected, likely mitigate this upward bias.

We then estimate Equation 2 using the variation in female representation at the state level derived from mixed close elections. Coefficients are presented in Table 5, where we estimate in column 1 (as falsification) the effect on *past* parliamentary elections (between one and five years prior to the focal state election), then in column 2 on parliamentary elections held during the current term of the focal state elections, and in column 3 on parliamentary elections held in the subsequent term of the focal state elections. We find no effects in the prior period (Column 1), suggesting that NLCs that are later exposed to additional female victories in close elections at the state level did not already have differential female candidacy at the national level. 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); however, there is a large and significant effect on female candidacy in parliamentary elections held after these officials' terms have ended. Specifically, for each additional female state legislator winning by close election, there are .19 additional female parliamentary candidates running for office in the subsequent term (i.e., five lower-level female representatives generate one additional higher-level candidate) – an increase of approximately 30% over the mean number

of female candidates (.19/.63). In comparison, an additional quota-induced term leads to a similar increase of .22 female parliamentary candidates but represent seats that govern 10 times the population as a state legislator (O’Connell, 2017). This suggests that a woman winning a less powerful seat by a close election has a similar effect on female participation in national politics as a woman having held a more powerful political position through a quota.

Next, in Table 6 we estimate effects on female representation in the national parliament. We again find no effects in Columns 1 and 2, and that an increase in lower-level representation yields a large (38%) increase in higher-level representation after the lower-level representatives term has been completed, although this effect is imprecisely estimated (Column 3).

## 4.2 Voters Attitudes

We proceed by exploring the role of different mechanisms through which an increase in female representation at the state level impacts candidacy and representation of women in the national parliament. In Table 7, we estimate the aggregate share of votes going to female candidates in parliamentary elections, and see a disproportionately favorable increase in votes for women (nearly 60% per additional female state legislator relative to the mean) in the national elections held in the subsequent term. To put this into context, based on the means, there were .63 female candidates per national election winning 7.2% of the votes, which suggests that the typical female parliamentary candidate wins 11.4% of the votes in her election. For the newly-induced candidates in our analysis, an additional .19 women running for a parliamentary seat win 4.2% of the vote – which on a per candidate basis means these marginal candidates win, on average, 22.1% of the votes in their election. This suggests that the candidates who run for parliamentary seats due to prior success of female politicians at the lower level are, or become, substantially more competitive than the average

female parliamentary candidate.

With the increase in female vote share in mind, we next explore if this is a result of increased voter participation of previously disenfranchised female-leaning voters. To do this we test whether there were changes in overall voter turnout. In Table 8, we estimate Equation 2 where the outcome is the total voter turnout for the parliamentary election and find no meaningful effects in any period. This suggests, conditional on no proportional change in the distribution of voters not reflected in an overall change in the number of voters, that exposure to a local female politician may be changing existing voters' preferences or behavior.

Lastly, as a robustness check, we explore whether increased state-level female representation is also increasing male candidacy. 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 increases in overall participation of candidates at the national level. The results of this analysis are found in Table 9 and provide no evidence supporting this hypothesis, indicating that the impact on national legislature elections of lower-level female electoral success is gender-specific.<sup>7</sup>

### **4.3 Heterogeneity: area characteristics, recency, quota complementarity, 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

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<sup>7</sup>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, lower-level electoral success of the progressive party has its own effect on subsequent higher-level female candidacy. To test whether this is the case, we use identifying variation from close-won elections by INC candidates to estimate later female candidacy in the parliament. Estimates are presented in Appendix Table 2, and show that progressive-party wins actually lead to a reduction in female participation in future national elections. This indicates that progressive-party wins do not directly engender later female participation and what matters for future female national candidacy is that women win lower-level elections.

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 along two dimensions based on the 2001 Population Census: the female literacy rates and the muslim population shares. Indicators for the state being above the median are created for these characteristics and then interacted with the focal regressor to test for differential effects.<sup>8</sup>

Table 10 contains coefficients from the estimation of these interacted specifications, showing that candidacy effects were concentrated in low-literacy and high-muslim-share states.<sup>9</sup> These results are counter to Bhalotra et al. (Forthcoming)’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 and suggest 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 next ask whether exposure to the quota regime in local government played a role in facilitating the effects we see above. To do this, we interact the number of mixed close state-level female wins with the number of completed terms of office in local government since the implementation of local council quotas for women in the focal state as of the parliamentary election outcome year. In Table 11, we first estimate the specification interacting the post-1991 indicator showing the concentration of the effect in the latter period of the sample (Column 1). We then estimate two specifications: an interaction for whether the state had the reservations policy in place at all (Column 2) and then number of terms for which the preservation policy had been in place in the state (Column 3). These two specifications test whether there is a complementarity between quotas and women’s competitive electoral

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<sup>8</sup>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. Given this potential issue, these results should nevertheless be viewed and interpreted with some caution.

<sup>9</sup>Differential effects on winning similarly follow this pattern, but are not statistically significant.



success, and whether this results in candidacy responses that occur immediately or take time to materialize. While the post-1991 period interaction remains large and significant through these specifications, we do find that the longer a state has had quotas in local government, the larger the interaction with competitively won elections in generating higher-level female candidacy (Column 3).

Lastly, we examined if the political party of the close female winner differentially affects female representation in higher-level candidacy. To do this, the main regressor is split into three separate measures: the number of close wins by the major progressive party (INC), the number of close female wins by the major conservative party (BJP), and close 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. Correspondingly, we find that an additional woman winning at the lower level increases female candidacy by BJP and independent candidates, but not by INC candidates. These results are found in Table 13.

#### **4.4 Sources of candidacy**

A remaining question is whether the candidacy effect we find is due to career effects on individuals already in politics at the state level or a changed political environment which induces national candidacy by other women. In Table 14, we estimate the impact of increased female representation in the state legislature on the number of female parliamentary candidates who had previously run for, or won, a state level election. Despite identifying that more than 20% of all female parliamentary candidates were previously state legislature candidates, the effect of lower-level wins is not operating through these career politicians.

These findings indicate that exposure to an increase in competitively elected women at the local level inspires female political participation outside the prior sphere of local actors.

## 5 Conclusion

This paper investigated whether electoral success of female politicians running for state legislature seats can increase later participation and representation of women in national politics in India. We use variation in the number of female state legislators who won by close election over a male competitor to identify causal effects of the prevalence of lower-level representation on later candidacy for and representation in the parliament.

We find that effects on higher-level candidacy do exist but take some time to materialize, presenting only in the period following the five-year state legislature term of office. Specifically, exposure to an additional female state legislator increases the number of female parliamentary candidates in elections held during the subsequent term of office by around 30%. The impact on female success in national elections follows the same temporal pattern and, while imprecisely estimated, is also positive and of a similar proportional magnitude. In terms of an impact on voter behavior, we find an increase in the vote share achieved by female candidates that seems to be coming from a change in voter preferences rather than a change in the extensive margin of voter turnout.

Interestingly, the effects we find from exogenous exposure to female politicians in state legislatures is concentrated in states with low female literacy and high muslim population shares – areas that have traditionally had higher barriers to women’s political participation and empowerment. Similarly, the cross-level 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. In addition, we find that the higher-level candidacy effects

are concentrated in elections that have had longer exposure to the country's system of quotas in local government, suggesting that the dual exposures act as complements in increasing the participation of women in national politics.

Lastly, we can explore if the boost in female representation in higher level elections is a result of changes in the ambitions of politicians with experience in lower-level politics or through increased participation by other women. In this analysis we find that the new national-level female candidates are not those who previously ran for or won state legislature seats, suggesting that lower-level success inspires candidacy from women who were not those who won the close elections used to identify the relationship between state electoral success and national political races.

Overall, there is strong evidence for the potential for competitive electoral success to facilitate later, higher-level participation of women in politics. We find that additional female state-level legislators appear to inspire other women to run for higher office, and this occurs particularly in areas where historical participation of women in politics has been low. Moreover, the effects from competitively-won elections are substantially larger than effects of exposure to female politicians via quotas in local government. These results suggest that one way to improve the gender imbalance in national politics is through the support of campaigns for local level female politicians, as local exposure to competitively elected women significantly improves the chances of new female political leaders breaking through the glass ceiling, especially in areas and within organizations with historically low female representation.

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Table 1: Summary statistics, state legislature elections, 1977-2014

Panel A: Full sample				
Variable	Mean	Std. Dev.	Min.	Max.
Candidates	9.339	6.559	1	301
Female candidates	0.419	0.756	0	16
Victory margin	0.145	0.138	0	1
Close election [0/1]	0.264	0.441	0	1
Election b/w male and female candidate	0.095	0.293	0	1
Female candidate won	0.047	0.212	0	1
Close election b/w male and female cand.	0.024	0.153	0	1
Female cand. won in MF close election	0.012	0.109	0	1
State legis. election year	1993.739	11.073	1977	2013
High female literacy state	0.535	0.499	0	1
High muslim share state	0.422	0.494	0	1
<i>N</i>			34267	

Panel B: Mixed-close election sample				
Variable	Mean	Std. Dev.	Min.	Max.
Candidates	10.236	6.009	2	45
Female candidates	1.511	0.841	1	7
Victory margin	0.025	0.015	0	0.05
Female candidate won	0.505	0.500	0	1
State legis. election year	1999.064	10.245	1977	2013
High female literacy state	0.471	0.499	0	1
High muslim share state	0.41	0.492	0	1
<i>N</i>			818	

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

Table 2: Summary statistics: Merged State and National Elections Returns

Variable	Mean	Std. Dev.	Min.	Max.
State legis. election year	1992.789	10.471	1977	2013
# SLC constituencies (elections)	6.382	5.114	1	60
# SLC close elections	1.67	2.101	0	29
# SLC elections w/ F cand. in top 2	0.633	0.908	0	9
# SLC elections won by F cand.	0.295	0.567	0	5
# SLC close elections b/w M & F cand.	0.153	0.42	0	4
# SLC close elections won by F cand.	0.078	0.284	0	2
Natl. legis. election year	1996.361	10.321	1980	2014
# NLC candidates	13.741	9.541	1	122
# Female NLC candidates	0.62	0.909	0	6
Whether female cand. won NLC election	0.074	0.261	0	1
Vote share for all F. cand	6.96	16.464	0	97.03
<i>N</i>			5569	

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

Table 3: Confirming first stage estimates

	Dependent variable: number of female candidates elected			
	+/- 5% win margin		+/- 2.5% win margin	
	(1)	(2)	(3)	(4)
# of close elections won by female cand.	1.027*** (0.027)	0.953*** (0.044)	1.030*** (0.036)	0.948*** (0.063)
Const. fixed effects	No	Yes	No	Yes
Year fixed effects	No	Yes	No	Yes
Close elections w/ M & F	No	Yes	No	Yes
p-val, $H_0 : \alpha_1 = 1$	0.33	0.29	0.41	0.41
N	5791	5692	5791	5692
R2	0.26	0.46	0.14	0.39
Mean of outcome	0.28	0.28	0.28	0.28
St. dev. of outcome	0.55	0.55	0.55	0.55

**Note:** This table reports first-stage coefficient estimates from the regression of equation (1) in the text. Significance levels are indicated by \* < .1, \*\* < .05, \*\*\* < .01.

Table 4: OLS Results

	Current term			Subsequent term		
	Female cand. (1)	Female win (2)	Female vote share (3)	Female cand. (4)	Female win (5)	Female vote share (6)
# female state legislators	-0.009 (0.025)	-0.002 (0.008)	-0.671 (0.496)	0.031 (0.039)	0.001 (0.010)	0.534 (0.754)
# close mixed-gender elections	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	4521	4521	4521	3832	3832	3832
<i>R</i> <sup>2</sup>	0.38	0.28	0.33	0.39	0.30	0.37
Mean of outcome	0.61	0.07	6.97	0.63	0.08	7.22
St. dev. of outcome	0.90	0.26	16.40	0.90	0.26	16.69

**Note:** Table reports coefficient estimates from the structural equation estimated directly 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.



Table 5: Reduced form - Candidacy

Dependent variable: number of female candidates  
in subsequent parliamentary election

	Previous term (1)	Current term (2)	Subsequent term (3)
# SLC close elections won by F cand.	0.053 (0.062)	-0.023 (0.067)	0.191** (0.082)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.37	0.38	0.39
Mean of outcome	0.46	0.61	0.63
St. dev. of outcome	0.77	0.90	0.90

**Note:** Table reports coefficient estimates from equation 2 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.

Table 6: Representation – winning elections

Dependent variable: whether female candidate won  
in subsequent parliamentary election [0/1]

	Previous term (1)	Current term (2)	Subsequent term (3)
# SLC close elections won by F cand.	-0.001 (0.016)	0.006 (0.019)	0.030 (0.034)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.27	0.28	0.30
Mean of outcome	0.07	0.07	0.08
St. dev. of outcome	0.25	0.26	0.26

**Note:** Table reports coefficient estimates from equation 2 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.

Table 7: Share of votes to female candidates

Dependent variable: share of votes to female candidates  
in subsequent parliamentary election

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# SLC close elections won by F cand.	-0.436 (1.086)	-0.478 (1.290)	4.211* (2.141)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.33	0.33	0.37
Mean of outcome	6.17	6.97	7.22
St. dev. of outcome	15.64	16.40	16.69

**Note:** Table reports coefficient estimates from equation 2 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.

Table 8: Aggregate voter turnout

Dependent variable: voter turnout  
in subsequent parliamentary election

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# SLC close elections won by F cand.	0.364 (0.447)	-0.419 (0.478)	-0.799 (0.743)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	5980	4425	3765
<i>R</i> <sup>2</sup>	0.70	0.77	0.76
Mean of outcome	58.10	59.33	59.43
St. dev. of outcome	11.79	12.32	12.44

**Note:** This table reports 2SLS coefficient estimates from equation 2 in the text. 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.

Table 9: Male candidacy

Dependent variable: number of male candidates  
in subsequent parliamentary election

	Previous term	Current term	Subsequent term
	(1)	(2)	(3)
# SLC close elections won by F cand.	0.116 (0.380)	0.113 (0.598)	-0.021 (0.467)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.65	0.69	0.67
Mean of outcome	10.77	12.90	12.88
St. dev. of outcome	8.50	9.33	8.87

**Note:** This table reports coefficient estimates from equation 2 in the text. 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.

Table 10: Heterogeneous Effects

Dependent variable: Female candidates and whether female candidate won  
in subsequent parliamentary election  
Subsequent term

	Candidacy Literacy int. (1)	Candidacy Muslim share int. (2)
# SLC close elections won by F cand.	0.287** (0.113)	0.227* (0.117)
SLC close elections won by F cand. * high literacy state	-0.203 (0.142)	
SLC close elections won by F cand. * low muslim-share state		-0.083 (0.141)
# close mixed-gender elections	Yes	Yes
<i>N</i>	3832	3832
<i>R</i> <sup>2</sup>	0.39	0.39
Mean of outcome	0.63	0.63
St. dev. of outcome	0.90	0.90

**Note:** This table reports 2SLS coefficient estimates from equation 2 in the text. 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.

Table 11: Test of complementarity to quota policy

Dependent variable: number of female candidates  
Subsequent term

	Full sample, interacted (1)	Any reservations int. (2)	Terms reserved int. (3)
# SLC close elections won by F cand.	-0.182 (0.121)	-0.185 (0.121)	-0.190 (0.119)
SLC close elections won by F cand. * post-1991	0.418*** (0.144)	0.436** (0.164)	0.315** (0.149)
SLC close elections won by F cand. * state has quota resvs.		-0.016 (0.124)	
State has quota resvs.		0.083 (0.052)	
SLC close elections won by F cand. * cumul. years quota resvs.			0.076* (0.042)
Cumul. years quota resvs.			0.035 (0.056)
# close mixed-gender elections	Yes	Yes	Yes
N	3832	3832	3832
R <sup>2</sup>	0.39	0.39	0.39
Mean of outcome	0.63	0.63	0.63
St. dev. of outcome	0.90	0.90	0.90

**Note:** This table reports 2SLS coefficient estimates from equation 2 in the text. 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.

Table 12: Effects of close-won elections on later female candidacy  
by lower-level candidate party

Dependent variable: number of female candidates  
in subsequent parliamentary election

	Previous term (1)	Current term (2)	Subsequent term (3)
close elections won by F INC cand.	-0.014 (0.081)	-0.039 (0.098)	0.125 (0.106)
close elections won by F BJP cand.	0.154 (0.093)	-0.058 (0.096)	0.381** (0.171)
close elections won by any other F cand.	0.079 (0.082)	0.015 (0.083)	0.180* (0.088)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.37	0.38	0.39
Mean of outcome	0.46	0.61	0.63
St. dev. of outcome	0.77	0.90	0.90

**Note:** Table reports coefficient estimates from equation 2 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.

Table 13: Effects of close-won elections on later female candidacy across parties

Dependent variable: number of female candidates  
in subsequent parliamentary election, by party  
Subsequent term

	INC (1)	BJP (2)	Other parties (3)	Independents (4)
# SLC close elections won by F cand.	0.014 (0.034)	0.038* (0.020)	0.035 (0.055)	0.104 (0.063)
# close mixed-gender elections	Yes	Yes	Yes	Yes
<i>N</i>	3832	3832	3832	3832
<i>R</i> <sup>2</sup>	0.36	0.32	0.32	0.30
Mean of outcome	0.08	0.05	0.24	0.26
St. dev. of outcome	0.28	0.21	0.52	0.57

**Note:** Table reports coefficient estimates from equation 2 estimated directly 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.

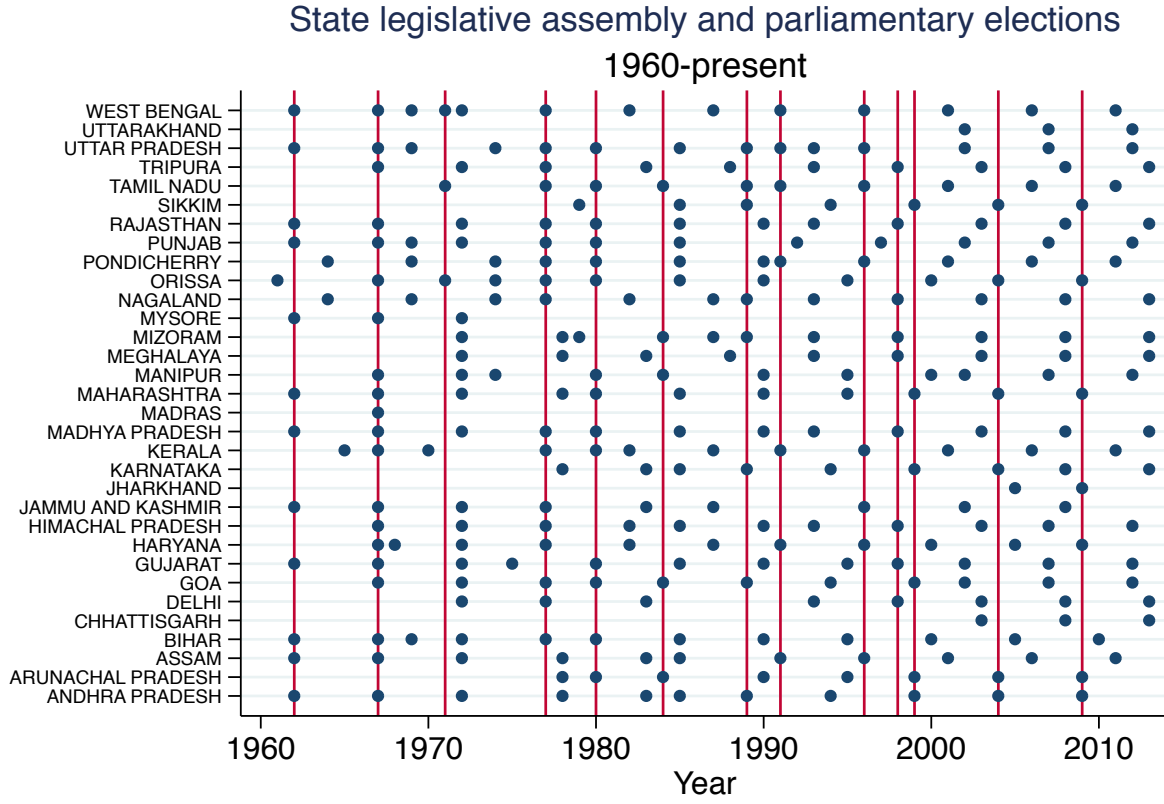
Table 14: Sources of candidacy

Dependent variable: number of female candidates  
in subsequent parliamentary election  
(by previous state candidacy/elected status)

	Current term			Subsequent term		
	All cand. (1)	Prev. state candidate (2)	Prev. state elected (3)	All cand. (4)	Prev. state candidate (5)	Prev. state elected (6)
# SLC close elections won by F cand.	-0.023 (0.067)	0.003 (0.037)	-0.014 (0.017)	0.191** (0.082)	0.056 (0.047)	0.029 (0.031)
# close mixed-gender elections	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	4521	4521	4521	3832	3832	3832
<i>R</i> <sup>2</sup>	0.38	0.27	0.23	0.39	0.27	0.24
Mean of outcome	0.61	0.13	0.03	0.63	0.14	0.03
St. dev. of outcome	0.90	0.38	0.17	0.90	0.39	0.18

**Note:** Table reports coefficient estimates from equation 2 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.

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



Note: Parliamentary elections represented by vertical bars.





## A1 Appendix Tables and Figures

Appendix Table 1: Reduced form - Candidacy (alternate sample)

Dependent variable: number of female candidates  
in subsequent parliamentary election

	Previous term (1)	Current term (2)	Subsequent term (incl. 10) (3)
# SLC close elections won by F cand.	0.053 (0.062)	-0.023 (0.067)	0.191** (0.073)
# close mixed-gender elections	Yes	Yes	Yes
<i>N</i>	6109	4521	4182
<i>R</i> <sup>2</sup>	0.37	0.38	0.38
Mean of outcome	0.46	0.61	0.63
St. dev. of outcome	0.77	0.90	0.90

**Note:** Table reports coefficient estimates from equation 2 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.

Appendix Table 2: Effects of INC close-won elections on later female candidacy in parliament

Dependent variable: number of female candidates  
in subsequent parliamentary election

	Previous term (1)	Current term (2)	Subsequent term (3)
# SLC close elections won by INC	-0.031 (0.021)	0.009 (0.024)	-0.052** (0.022)
Close elections w/ INC	Yes	Yes	Yes
<i>N</i>	6109	4521	3832
<i>R</i> <sup>2</sup>	0.37	0.38	0.39
Mean of outcome	0.46	0.61	0.63
St. dev. of outcome	0.77	0.90	0.90

**Note:** Table reports coefficient estimates from equation 2 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.