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PATHBREAKERS? WOMEN'S ELECTORAL SUCCESS AND FUTURE POLITICAL PARTICIPATION*

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We investigate whether the event of women being competitively elected as state legislators encourages subsequent political participation among women. Using a regression discontinuity design on Indian constituency level data, we find that female incumbents are more likely than male incumbents to re contest and that there is a decline in the entry of new women candidates. This decline is most pronounced in states with entrenched gender bias and in male headed parties, suggesting an intensification of barriers against women in these areas. Similar results for (mostly male) Muslim candidates indicate the presence of institutionalised demand side barriers rather than gender specific preferences and constraints.

Women are under-represented in political office around the world, accounting for only 23% of the membership of national parliaments globally. In 2015, they comprised 12% of India's national legislators, 19% of the US Congress and 29% of the UK's House of Commons. There is a similar under-representation of women in leadership positions in other fields, including the corporate sector and academia (Bertrand and Hallock, 2001; Bertrand, 2009; Ginther and Kahn, 2014). For instance, in 2014, women comprised 40% of the workforce globally but only 10% of corporate board members globally and 4.8% of Fortune 500 CEOs. The numerical under-representation of women in politics is often associated with substantive under-representation. Several recent papers find that increasing women's political representation results in policy choices that are more favourable to women (Chattopadhyay and Duflo, 2004; Iyer *et al.*, 2012; Rehavi, 2012). Moreover, women's political participation has been shown to improve broader development outcomes such as investments in children (Miller, 2008; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014; Brollo and Troiano, 2016), economic performance (Baskaran *et al.*, 2015) and corruption (Dollar *et al.*, 2001; Swamy *et al.*, 2001). This literature suggests that women's under-representation in political office disadvantages one half of society, and may have additional social costs.

Using data from India's state legislative assembly elections, we investigate whether the electoral success of women leads to subsequent increases in women's participation as political candidates. We focus upon women's candidacy as the data suggest that the small share of women candidates is an important proximate barrier to the presence of

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women in political office: women comprised 5.5% of election winners but only 4.4% of electoral candidates.¹ A woman's demonstrated electoral success has the potential to change the views of voters and parties regarding the role of women in politics, leading to greater demand for women candidates. Alternatively, a woman winning could create a positive 'role model' effect, encouraging other women to come forward as candidates.²

We use nationwide data from 3,473 constituencies over the period 1980–2007 to investigate whether a woman winning a seat in the state legislative assembly results in greater participation of women from her constituency in subsequent elections. Legislation on many important topics, including law and order, health and education, is determined at the state level in India. Importantly, there are no political quotas for women at this level, making our analysis different from recent studies of the impact of gender quotas on subsequent political participation.

In order to estimate causal effects of women's electoral victory, we use a regression discontinuity (RD) design, comparing women's political participation in places where a woman narrowly won an election to those in which a woman narrowly lost an election. We conduct several tests to verify the validity of the RD strategy. These include showing that pre-determined political and demographic characteristics, as well as the characteristics of the candidate pool, are similar across places where women won *versus* lost in mixed-gender races. Our results are robust to controlling for election-specific factors and using alternative samples, functional forms and bandwidths.

Our analysis yields four main insights. First, a woman's electoral victory leads to an increase in the share of women candidates from major parties in the next election. This is primarily driven by an increased propensity of the incumbent woman to contest for re-election. This intensive-margin response is important in India where, in contrast to the US, incumbents often do not re-contest. Moreover, the baseline probability of women incumbents re-contesting is smaller than for men: 34% of female incumbents and 28% of male incumbents do not run for re-election despite the absence of any term limits. Further analysis shows that the incumbency effect on women's candidacy is restricted to the party of the winning candidate: women incumbents are significantly more likely than male incumbents to re-contest from the same party and significantly less likely to switch parties. However, we find that incumbent women are not more likely to win the next election.

Second, we can decisively reject that there is increased entry of new major party women candidates in constituencies in which a woman won the previous election. In fact, in most specifications, there is a significant decline in the entry of new women candidates after a woman wins an election. This is not simply a consequence of the incumbent woman's greater probability of re-contesting. There is also no increase in new women candidates in nearby constituencies or from the opposing party.

Third, we find striking evidence that this 'discouragement' effect on the entry of new female candidates emerges from states characterised by entrenched gender bias, proxied by population gender ratios (Sen, 2003). In these states, there is a significantly

¹ No previous work has systematically analysed candidacy for competitive state assembly elections in India.

² See Casas Arce and Saiz (2015) for a model in which the roles of voters, parties and candidates are delineated.

lower overall candidacy response after a woman wins an election, particularly within male-headed parties, and the next election is marked by a significant decline in the share of new women candidates. In sharp contrast, for states with relatively low levels of entrenched prejudice, there is no decline in the new female candidate share (although no increase either) and a larger probability that the incumbent woman re-contests. In these areas, following women's electoral success, we also see significant increases in female and male voter turnout and the share of votes received by women. Our findings are suggestive of a 'backlash' effect in the more gender unequal states, as they indicate persistence and possible intensification of bias against women (from voters or political parties) following women's electoral victory.³ Such a backlash effect can decrease the demand for new women candidates. An alternative possibility is a reduced supply of new women candidates due to 'stereotype threat', which refers to minority groups behaving in ways that confirm group stereotypes when their group identity is made salient.⁴

Fourth, while it is inherently difficult to isolate demand *versus* supply factors, we are able to rule out the role of specific supply side factors. We find that implementation of a gender quota in local governments, which created a massive increase in the number of women with political experience, increases the overall candidacy response in gender-biased states but we continue to see a decline in the entry of new candidates. This makes it unlikely that our findings are driven by a shortage of women who are suitable political candidates. We also conduct a parallel analysis for Muslims, who form India's largest religious minority, are socio-economically disadvantaged and under-represented in political office in India (Bhalotra *et al.*, 2014). Our estimates for Muslims are strikingly similar to our estimates for women: we find no increase in the entry of new Muslim candidates following a Muslim winning office and a stronger candidacy response in states in which Muslims are less disadvantaged. As Muslim candidates are predominantly male, this makes it unlikely that the results for women are on account of gender-specific constraints such as family commitments or a reluctance to engage in competitive races.

Our study contributes to two main streams of the literature. The first concerns the barriers facing women in attaining leadership positions. Most previous research examining the impact of elected women leaders on future women's political participation has examined the impact of gender quotas.⁵ In contrast, our study investigates the dynamics of women's participation in state legislatures, where quotas are absent. Demonstration effects of women leaders may be greater in the absence of

³ Previous studies have documented evidence of backlash whereby men react negatively to higher earnings of women or to women performing non traditional roles (Schuler *et al.*, 1996; Luke and Munshi, 2011; Mani, 2011; Bertrand *et al.*, 2013; Gangadharan *et al.*, 2016). Gagliarducci and Paserman (2012) report a similar heterogeneity in responses to women mayors in Italy. On average, they find a significantly greater probability of early termination of the legislature when the mayor is a woman and this tendency is significantly stronger in the Southern regions and when the mayor interacts with an entirely male council.

⁴ Stereotype threat, often measured by the performance of minority groups in standardised tests or participation in meetings, has been documented for racial minorities (Steele and Aronson, 1995), lower castes in India (Hoff and Pandey, 2006), women (Kray *et al.*, 2002; Marx and Roman, 2002) and men in areas of female expertise (Coffman, 2014) but it has not been analysed in the literature on women's political participation.

⁵ Beaman *et al.* (2009), Bhavnani (2009), Deininger and Nagarajan (2011) and Banerjee *et al.* (2013) all examine the impact of local government gender quotas in specific regions of India.

quotas, for several reasons. For instance, quotas may lead to political parties strategically placing women candidates in races they are unlikely to win (Bagues and Esteve-Volart, 2012; Casas-Arce and Saiz, 2015). Quotas can widen the quality gap between male and female candidates and reinforce negative stereotypes if women in reserved seats are less qualified than men (Coate and Loury, 1993; Bardhan *et al.*, 2010; Besley *et al.*, forthcoming). Quotas can also generate negative spillovers in candidacy, with fewer women being fielded in non-quota constituencies (see Sekhon and Titunik (2012), who reanalyse the quota results of Bhavnani (2009)). On the other hand, quotas may have more positive effects on women’s candidacy than competitive victories if women are more likely to enter competitive activities in a single-sex environment (Gneezy *et al.*, 2003).

We present the first estimates (for any country) of how within-constituency political participation of women responds to the competitive electoral success of women. The only other study we are aware of in a competitive setting is Broockman (2013) who, similar to our study, finds no spillover effects of women winning seats in US state legislatures on women’s candidacy in nearby constituencies. There is little room to investigate within-constituency dynamics of women’s candidacy in the US, since incumbents almost always run for re-election. The findings from the analysis of quotas are mixed. Bertrand *et al.* (2014) analyse corporate board quotas in Norway and find no impact on the career decisions of the next generation of women, while de Paola *et al.* (2010) document increased political participation of women in Italy after a short-term gender quota in local government. Beaman *et al.* (2009) find no tangible improvements in subsequent candidacy or success among women after a woman has led the village council for one term (five years) but significant increases after a woman has headed the village council for two consecutive terms.

Our results show that while electoral victory enables incumbent women to run for re-election (a non-trivial margin in India), it does not result in increased entry of new women candidates. Previous electoral victory for women also does not increase the probability of a woman winning the next election. This means that repeated exposure to female state legislators is unlikely to happen in a competitive setting, especially in gender-biased states.

The second stream of research that we contribute to is that on incumbency advantage.⁶ This literature has focused upon whether incumbents are more likely to win the next election but winning is conditional on re-contesting. By testing whether the incumbent re-contests, we effectively model this selection process, which is important in many countries outside the US, such as India and Brazil, where a large fraction of incumbents do not re-contest (De Magalhaes, 2014). Studies examining gender differences in incumbency advantage include Ferreira and Gyourko (2014), who show that female incumbents exhibit stronger winning chances in the US

⁶ There is a widely documented incumbency advantage in the US (Gelman and King, 1990; Cox and Katz, 1996; Lee, 2008; Ferreira and Gyourko, 2014) but previous work has documented an incumbency disadvantage in India (Linden, 2004; Uppal, 2009) and other developing countries (Macdonald, 2014; Klasnja and Titunik, 2017). Most of these studies do not examine candidacy. See Erikson and Titunik (2015) for a recent discussion of the conditions under which the RD design can be used to recover the personal incumbency advantage (in winning).

(a setting where incumbents almost always re-contest) and Brolo and Troiano (2016), who find weaker winning chances for women in Brazil, a setting with term limits.

Our study shows that candidacy dynamics after an electoral victory are strongly dependent on the overall social context and that therefore there is no general gender advantage or disadvantage. Another contribution of our work is that we deviate from the recent tendency to analyse incumbency advantage at the party level. In the presence of party-switching, which is a frequent occurrence in India and Brazil, for example, it is relevant to study incumbent behaviour at the candidate level.

The rest of the article is structured as follows. Section 1 provides background information on the Indian political system, Section 2 describes our empirical strategy and Section 3 performs many empirical checks on the validity of this strategy. Sections 4 and 5 present our empirical findings; Section 6 concludes.

1. Women in Indian Politics

1.1. Indian Electoral Politics

India is the world's largest democracy, with a parliamentary system of government at both the federal and state levels. Elections are held every five years, on a first-past-the-post system in single-member constituencies. States may occasionally hold midterm elections, before the five-year term of the government expires, if the governing coalition loses the confidence of the majority of the state legislature and an alternative government cannot be formed. We focus on elections to state legislatures. In India's federal system, state governments are responsible for several development policy areas including law and order, health and education, and the financing of village councils. State level parties play a significant role in forming governing coalitions at the centre and previous research has shown that state-level voting behaviour is highly correlated with voting in national elections (Ravishankar, 2009).

There are currently no quotas for women in state or national level elections. A one-third quota for women in district and village level councils was mandated by a constitutional amendment in 1993.⁷ In March 2010, a bill proposing to enact a one-third quota for women in national and state legislatures was passed by the upper house of parliament but it has not yet been passed in the lower house, making the analysis in this article highly topical.

In India's political system, party leaders decide who their candidate will be in every constituency.⁸ There are no primaries as in the United States and the process of choosing candidates is not transparent. We conducted interviews with politicians from several Indian political parties to understand the candidate selection process. In general, it was described as follows: parties draw up an initial (informal) short list of 2–5 candidates from each constituency and then embark on information gathering exercises, including third-party voter surveys, to assess candidate quality. The candidate quality emphasised by all parties was the ability to attract votes, termed 'winnability' in

⁷ The impact of this reform has been examined in several recent papers, including Chattopadhyay and Dufllo (2004), Beaman *et al.* (2009) and Iyer *et al.* (2012).

⁸ See Norris and Lovenduski (1995) on the relative importance of party *versus* candidate decisions in the UK.

Indian politics. To this end, several metrics including candidate name recognition within the constituency, service to the party, financial resources, caste identity and internal party support were considered relevant. The candidate selection process was described as being very constituency specific, with local name recognition and local resources being important and it being unusual to ‘parachute’ in candidates from outside the constituency.

1.2. *Data on Women’s Political Participation in State Elections*

We obtained data on elections to state legislative assemblies in 3,473 constituencies from the Election Commission of India over the period 1980–2007, during which most states had six elections. Electoral constituency boundaries remained fixed through this period, so we do not have to worry about concerns such as gerrymandering which might differentially affect the electoral prospects for women. We have information on the name, gender, party affiliation and votes obtained by every candidate, as well as gender-specific voter turnout by constituency. We use data for the 16 major states of India that account for over 95% of the total population.⁹ We also obtained relevant demographic data (literacy, urbanisation, gender ratio, fraction of lower castes and tribes etc.) at the constituency level from the 2001 census, by matching villages to constituencies.¹⁰

We tracked candidates by name over successive elections to identify whether candidates in a specific election were present in the previous election.¹¹ Overall, in our sample, more than three-quarters of all candidates (85% of women and 83% of men) did not contest the previous election, i.e. are ‘new’ candidates. Systematic data on candidate attributes are available only after 2004, when the Election Commission made it mandatory for all candidates to file affidavits giving details of their age, education, asset ownership and any pending criminal charges. We have this information for candidates in 14 out of 16 states that held elections between 2004 and 2007. Compared to male candidates, women candidates are on average three years younger, less likely to have completed high school and less likely to have any criminal charges filed against them (summary statistics available upon request). In examining the validity of our regression discontinuity strategy, we test whether these characteristics vary across winners and losers in mixed-gender elections.

Despite the institution of universal adult suffrage since 1950, women are still dramatically under-represented in India’s state legislatures. As mentioned earlier, only 5.5% of state legislators and 4.4% of candidates were women in our sample period, 1980–2007. Almost 70% of electoral races had no female candidates at all and only 7%

⁹ The states included are as follows: Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. In 2001, three new states of Jharkhand, Chhattisgarh and Uttarakhand were carved out of the larger states of Bihar, Madhya Pradesh and Uttar Pradesh, respectively. For the new states of Jharkhand and Chhattisgarh, electoral constituency boundaries remained fixed over time. We drop the data from the Uttarakhand state elections of 2002 and 2007 since we are unable to match the electoral constituencies over time.

¹⁰ We thank Rikhil Bhavnani and Sandip Sukhtankar for sharing these data with us.

¹¹ Candidate names are frequently spelt differently across elections and many candidates change party affiliations. We therefore performed a manual matching of candidate names over time.

of races had more than one woman candidate. Women's candidacy shows a secular increase over time but varies considerably across the states. For instance, in 2000–7, the share of female candidates from major parties ranged from almost 13% in the state of Andhra Pradesh to only 4% in the neighbouring state of Karnataka (Figure A1 in online Appendix A).

State elections in India are very competitive. In our data, the mean number of candidates per constituency is ten (median is eight). Of these, only three candidates on average manage to obtain more than 5% of the votes cast, suggesting that the majority of candidates in India's electoral races are not politically viable. In order to focus on candidates who are politically meaningful, we do two things. First, in many specifications, we restrict attention to candidates from 'major' parties defined as those parties that won at least 5% of the seats in any state legislature in any year over our sample period. On average, only 34% of candidates in our data are from these major parties. Second, we analyse separately the fraction of 'competitive' women candidates, namely, those who win at least 5% of the vote in a given race. As we might expect, there is a significant overlap between these two categories: 88% of major party candidates are competitive according to this definition.

Major parties (as defined above) are more likely to nominate women candidates, with 5.6% of their candidates being women compared to only 3.7% of independent candidates. Over the period 1980–2007, only four out of 40 major parties in India were headed by women.¹² Women-headed parties have a slightly higher share of female candidates, 7% compared to the 5% share for major parties not headed by women. There is no *a priori* evidence that women avoid more competitive races. In fact, electoral races in which a female candidate is present tend to have larger electorates and a greater number of candidates.

2. Identifying the Effects of Women's Electoral Success: The Regression Discontinuity Design

We are interested in how indicators of women's political participation at the electoral constituency level respond to a woman having won the previous election. The identification problem is that a woman's political victory might be correlated with unobserved constituency characteristics, such as voter preferences, that might directly determine women's participation in subsequent elections. We address these problems using a regression discontinuity (RD) estimator, focusing on mixed-gender electoral races. Treatment assignment depends on the running variable, the vote margin between a woman and a man. The probability of a woman winning an election exhibits a sharp discontinuity when this vote margin is zero, since the candidate with the most votes wins, irrespective of how close the runner up stands.¹³ The identifying assumption is that the assignment of treatment around the threshold (i.e. a woman

¹² These are the Indian National Congress under Sonia Gandhi, the Bahujan Samaj Party under Mayawati, the All India Anna Dravida Munnetra Kazhagam under Jayalalithaa and the All India Trinamul Congress under Mamata Banerjee.

¹³ See Lee (2008) for the seminal use of the regression discontinuity design using electoral data. Studies that use close elections between men and women include Rehavi (2012), Clots Figueras (2011, 2012), Bhalotra and Clots Figueras (2014) and Brollo and Troiano (2016).

winner rather than a man) is uncorrelated with any observed or unobserved characteristics of the candidate pool or the constituency.¹⁴ The estimated model is of the form:

$$Y_{ist} = a + b\text{WomanWon}_{is,t-1} + f(M_{is,t-1}) + e_{ist}, \quad (1)$$

Y_{ist} is a measure of female political candidacy for constituency i in state s and year t . We focus upon the share of women candidates (overall and among major parties) as well as the probability of having at least one female candidate in the constituency and the fraction of competitive female candidates. The running variable $M_{is,t-1}$ is defined as the vote share difference (in the previous election) between the female and male candidates in the constituency who obtained the most votes, irrespective of whether they were the winner and the runner up (similar to the strategy in Meyersson, 2014). $\text{WomanWon}_{is,t-1}$ is a dummy which equals one if a woman won against a man in the previous election ($M_{is,t-1} > 0$) and zero if the woman lost ($M_{is,t-1} < 0$). The parameter b captures the causal impact of this event on women's participation as candidates in the next election. In order to define $M_{is,t-1}$ consistently, the sample is restricted to elections with at least one female candidate. The results are similar when we use a more restricted sample of elections selected to ensure that the winner and runner-up are of opposite gender (see Table A3 in online Appendix A). Standard errors are clustered at the level of the administrative district to allow for correlated outcomes across all constituencies within the same district and over time. This is more conservative than clustering at the constituency level, though we verify that doing the latter leaves our results unchanged.

We fit a flexible function of the vote margin, $f(M_{is,t-1})$, that is allowed to differ on each side of the discontinuity, using three approaches to investigate sensitivity of the estimates. First, we fit second-order polynomials (Lee *et al.*, 2004) since Gelman and Imbens (2014) argue against the use of higher order polynomials in RD designs; we also show that our results are robust to using higher-order polynomials. Second, we estimate local linear regressions (Hahn *et al.*, 2001; Imbens and Lemieux, 2008), restricting the sample to an optimal bandwidth around the discontinuity, with the optimal bandwidth selected by applying the methods in Imbens and Kalyanaraman (2012) and Calonico *et al.* (2014). Finally, we also investigate robustness to using a 'discontinuity sample', restricting the sample to a very small bandwidth around the discontinuity and testing the differences in means on both sides of the discontinuity (Angrist and Lavy, 1999).

To investigate area spillovers, we replace the dependent variable in (1) with an indicator of women's political participation in constituencies other than the index constituency i , but within the same administrative district (which typically consists of 9–10 electoral constituencies), or parliamentary constituency (typically covering 6–8 state electoral constituencies). To examine persistence in the relationship of interest, we re-estimate (1), replacing the first lag with longer lags. This provides reduced form estimates of how women's participation in election t responds to a woman having won

¹⁴ We thus implicitly test whether winning matters discontinuously, that is, significantly more than a good electoral performance that falls short of winning (captured by women being runners up in the 'control group' of constituencies in which women lose mixed gender elections).

in election $t - 2$ or $t - 3$ (ten and 15 years ago), respectively. We do not condition upon whether a woman won in each intervening period because this is endogenous.

While regression discontinuity estimates are likely to satisfy internal validity conditions, they may or may not have external validity. However, there are several indications that our results have considerable external validity. First, Figure 1(a) shows that the vote share obtained by all women contesting in constituencies in which the margin of victory between the male and female candidates is close to zero ranges from less than 20% to 65%. In favour of external validity, this shows a wide variation in preferences for female politicians in our sample. Second, we examined the extent to which the identity of constituencies that have mixed-gender elections changes from one election year to the next and found that there is a fair degree of churning; among the constituencies that have at least one mixed-gender election, nearly 60% have had only one or two mixed-gender elections over this three-decade period. This again points to external validity inasmuch as it establishes that a wide variety of constituencies have experienced mixed-gender elections. In addition, OLS results using the whole sample are fairly similar to the RD results.¹⁵ Since constituencies that have at least one woman candidate vary over time, restricting to these samples creates an unbalanced panel (Sekhon and Titiunik, 2012). We therefore estimated the coefficient of interest for one pair of election years at a time to investigate the stability of the relationship across areas and years, and found no significant differences in the estimates (available on request).

3. Investigating the Validity of the Regression Discontinuity Design

Before presenting our results, we conduct several checks to ensure the validity of our empirical strategy, namely, that the only variable that varies discontinuously at the vote margin of zero is the gender of the elected candidate, rather than other area or candidate characteristics, or the vote margin itself.

3.1. *Preferences for Women Politicians and Continuity of the Vote Margin*

An assumption underlying the RD strategy is that preferences for female politicians are similar on both sides of the discontinuity, so that the discontinuity isolates the role of the gender of the winner. We measure preferences for female politicians as the fraction of votes won by all women contesting in the constituency. Figure 1(b) shows that the assumption holds, there being no jump in the female vote share at the zero vote margin. We should emphasise that we are comparing areas where women won with those in which a woman lost, i.e. both types of areas had women candidates. While greater electoral competition has been shown to increase women's political participation within parties (Folke and Rickne, 2016), our comparison is within the set of

¹⁵ We run OLS regressions for the full sample, controlling for constituency and election cycle fixed effects, and district specific linear time trends. The OLS sample differs primarily in that it includes elections in which there are no female candidates, thereby extending the 'control group' of constituencies to include a wider and more heterogeneous set of areas. These results are available in Table A2 in online Appendix A.

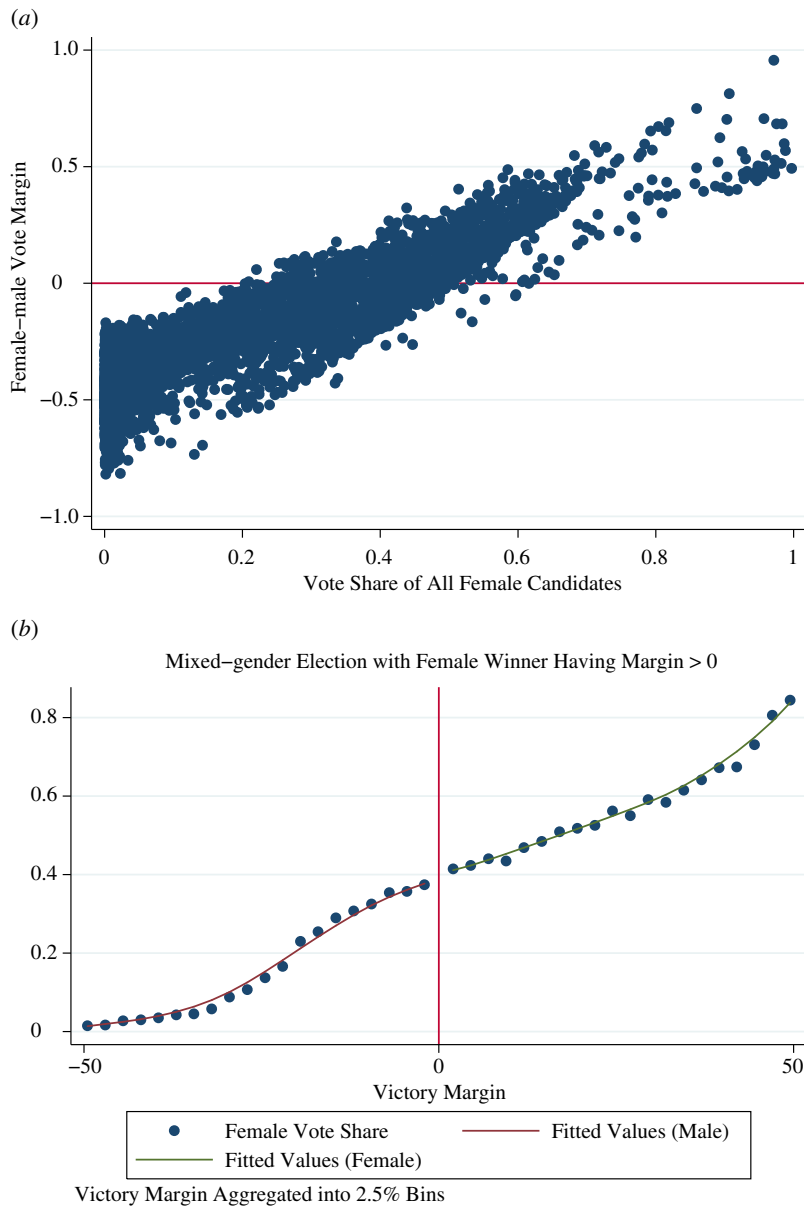


Fig. 1. *Preferences for Women Politicians. (a) Vote Share of Women Politicians Across Different Victory Margins. (b) No Discontinuity in Preferences for Women Politicians*

Notes. Constituency year observations for the sample of elections with at least one woman candidate. Female vote share is the vote share of all female candidates in the constituency; victory margin is the difference in vote share between the top two vote winners of opposite genders. The fitted values are a lowess line. Colour figure can be viewed at wileyonlinelibrary.com.

highly competitive places since the identification comes from comparing elections with narrow electoral victories for women to elections with narrow electoral losses for women.

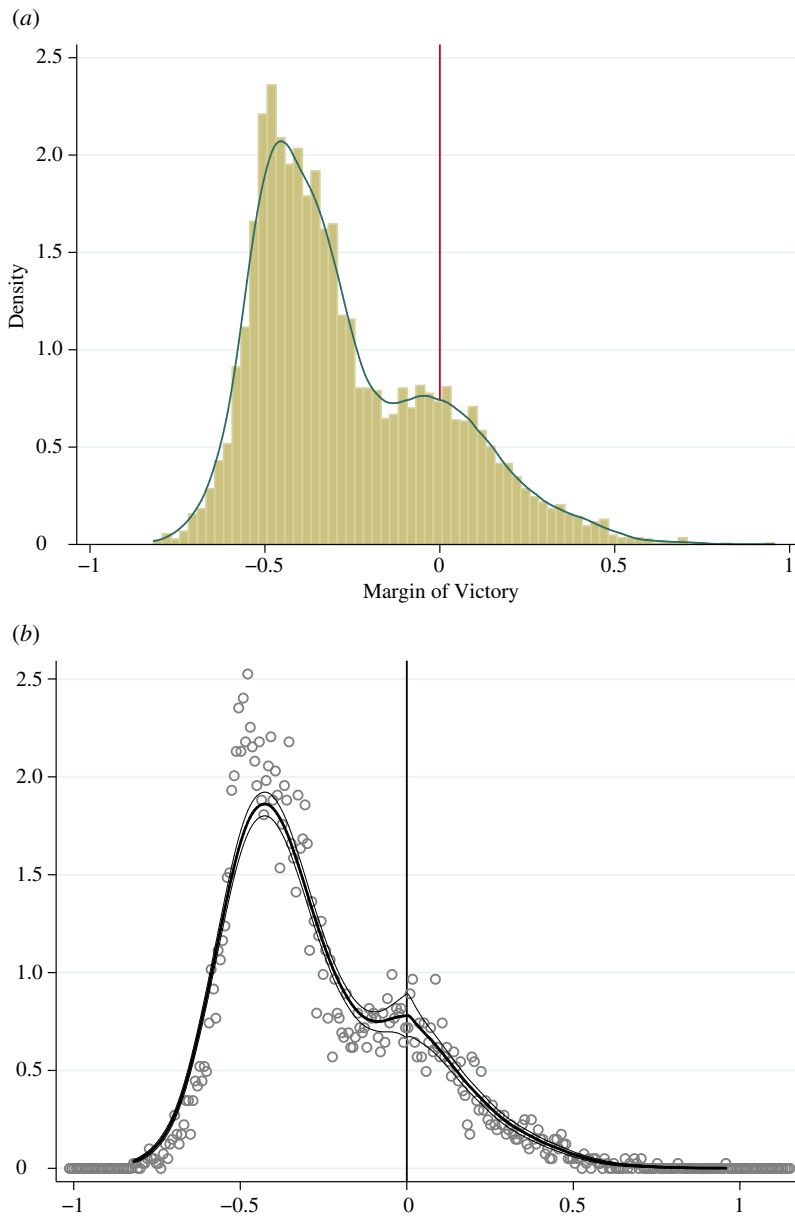


Fig. 2. *Continuity of the Victory Margin Between Female and Male Candidates. (a) Density of the Victory Margin. (b) Testing for Density Discontinuities at Zero (McCrary Test)*
Notes. Sample restricted to constituencies where there was at least one woman candidate. Discontinuity estimate in Figure (b) (log difference in height): 0.0065 (SE 0.1053). Colour figure can be viewed at wileyonlinelibrary.com.

Another RD assumption is that the density of the running variable, the vote margin between the female and the male candidate, is continuous at the winning threshold, i.e. at the zero vote margin. We plotted the density of the vote margin which looks

smooth throughout (Figure 2(a)) and, following McCrary (2008), we formally verify that there is no significant discontinuity at the zero point (Figure 2(b)). Manipulation of the vote margin is unlikely in our setting, since the Election Commission of India has a well-established reputation for independence and political and Indian elections are considered free and fair.

3.2. *Continuity in Candidate Characteristics*

We verify that the characteristics of the candidate pool are very similar across places where women win elections and places where women do not. Figure 3 examines a range of candidate characteristics including education levels, net worth, whether the candidate is an incumbent and whether the candidate belongs to a women-headed party and whether any criminal charges have been filed against the candidate (including corruption charges).¹⁶ We find that the candidate pool looks very similar in all these dimensions across places where women won elections and where they did not. In separate analyses, we have also verified that the characteristics of male candidates and female candidates look very similar across places where women won and where women lost (results available upon request).

Recent studies have questioned the validity of the RD premise that the (party) identity of the winner is quasi-random in close elections, showing that the incumbent party in US elections tends to have systematically greater chances of winning even when elections are close, consistent with incumbents using their greater power to manipulate their chances (Caughey and Sekhon, 2011; Grimmer *et al.*, 2011). However, Eggers *et al.* (2015) argue that such sorting is unique to the US House in the post-war period and find no evidence of it in several other countries including India. Along these lines, we have verified that candidate characteristics such as age, gender, education, net worth or incumbency do not predict success in mixed-gender races (results available upon request).

3.3. *Continuity in Demographic and Political Characteristics*

We also verified that a range of demographic covariates (population gender ratios, literacy rates, proportion of lower castes and backward tribes, the male-female literacy differential) and pre-determined electoral variables (total number of votes polled, the number of major party female candidates and female voter turnout in the previous election) do not vary discontinuously at the RD threshold (Figures 4(a)–(g)). This gives us confidence that our results do not reflect pre-existing demographic or political differences across places where women won or did not win elections.

¹⁶ Female politicians may be more likely to have family connections to other politicians than male politicians in India's national parliament (French, 2011) and in the US (Dal Bó *et al.*, 2009). Due to the large number of candidates for state legislative assembly elections across the country we are unable to replicate the French (2011) methodology of contacting local journalists in each constituency to assess the extent of such connections at the local level. As French says, 'It was not enough to take prominent names and make larger deductions from them. Equally, much of the information did not seem to exist. Only someone who worked at a local level, perhaps as a political journalist, would be likely to know how each MP in their area entered politics'. However, it is unlikely that family connections of the winner matter in mixed gender close elections, given that we show all other observable characteristics of female winners and female runners up to be similar.

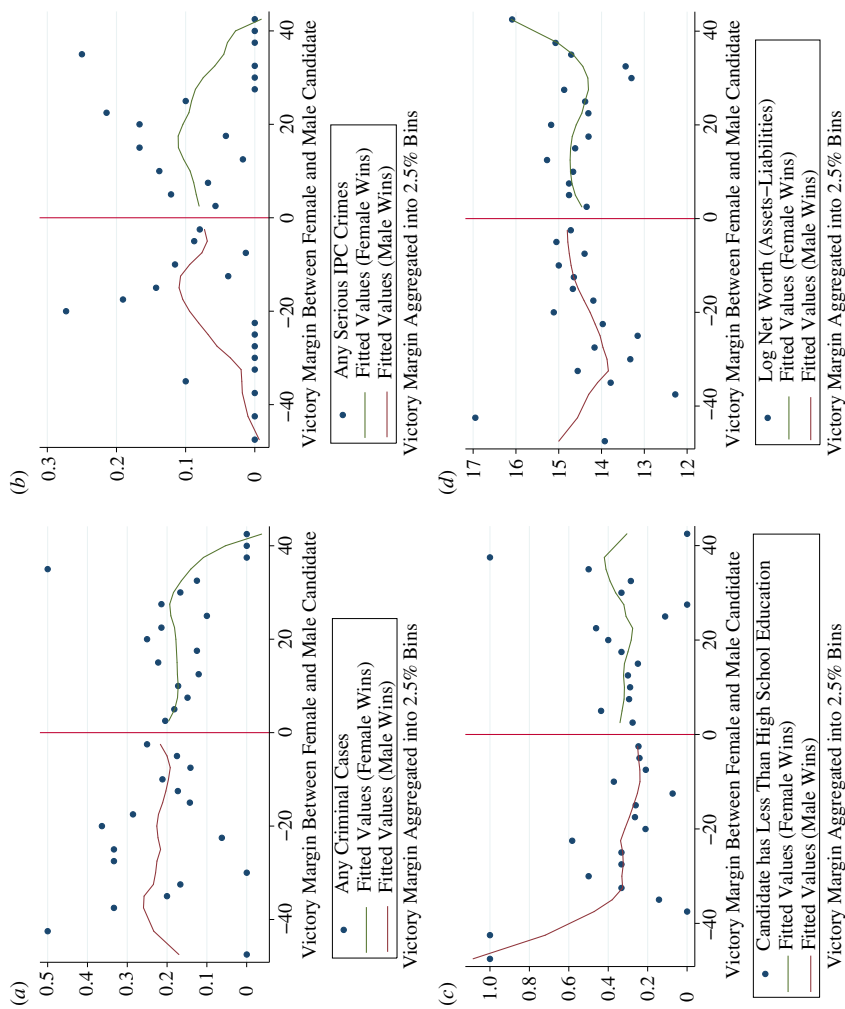


Fig. 3. Characteristics of Candidate Pool (Winners and Runners-up) in Mixed-gender Elections. (a) Any Criminal Charges Filed Against Candidate. (b) Any Serious Criminal Charges Filed Against Candidate. (c) Candidate has Less than High School Education. (d) Log (Net Worth). (e) Candidate is the Incumbent. (f) Candidate Belongs to a Woman-headed Party. (g) Candidate Belongs to INC Party. (h) Candidate Belongs to BJP Party

Note. Colour figure can be viewed at wileyonlinelibrary.com

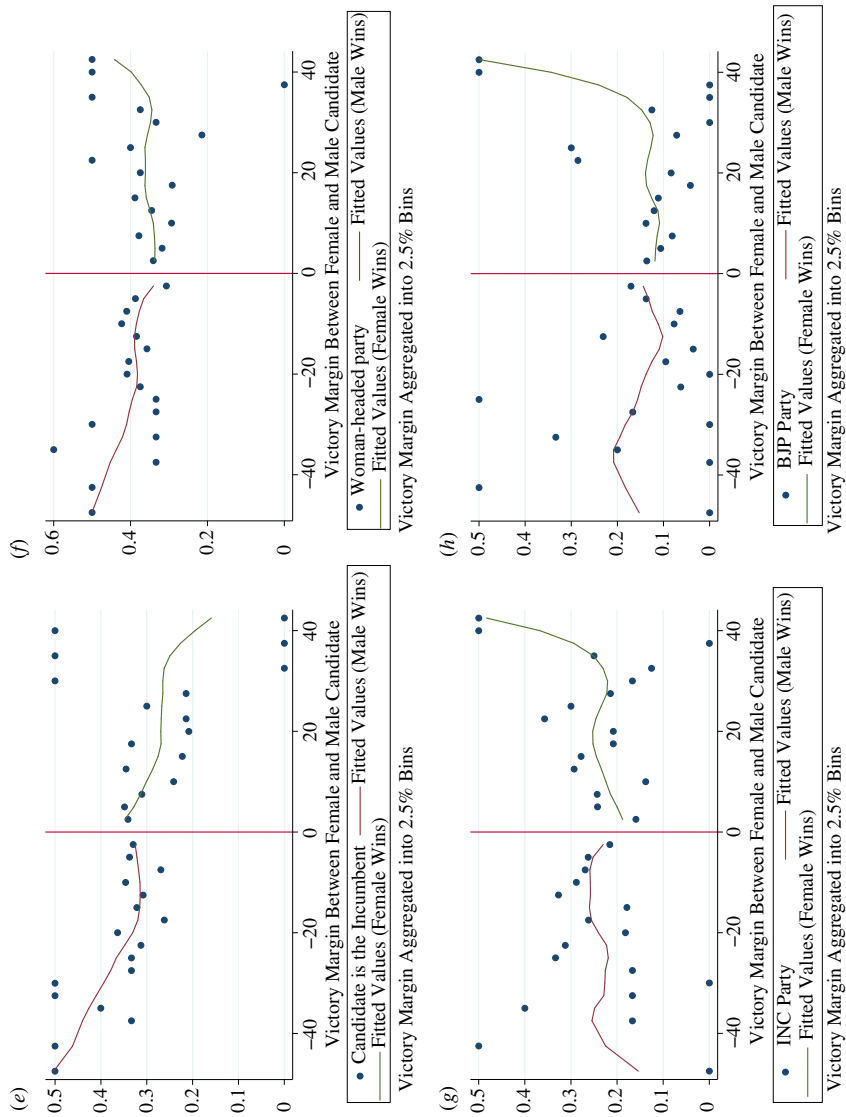


Fig. 3. (Continued)

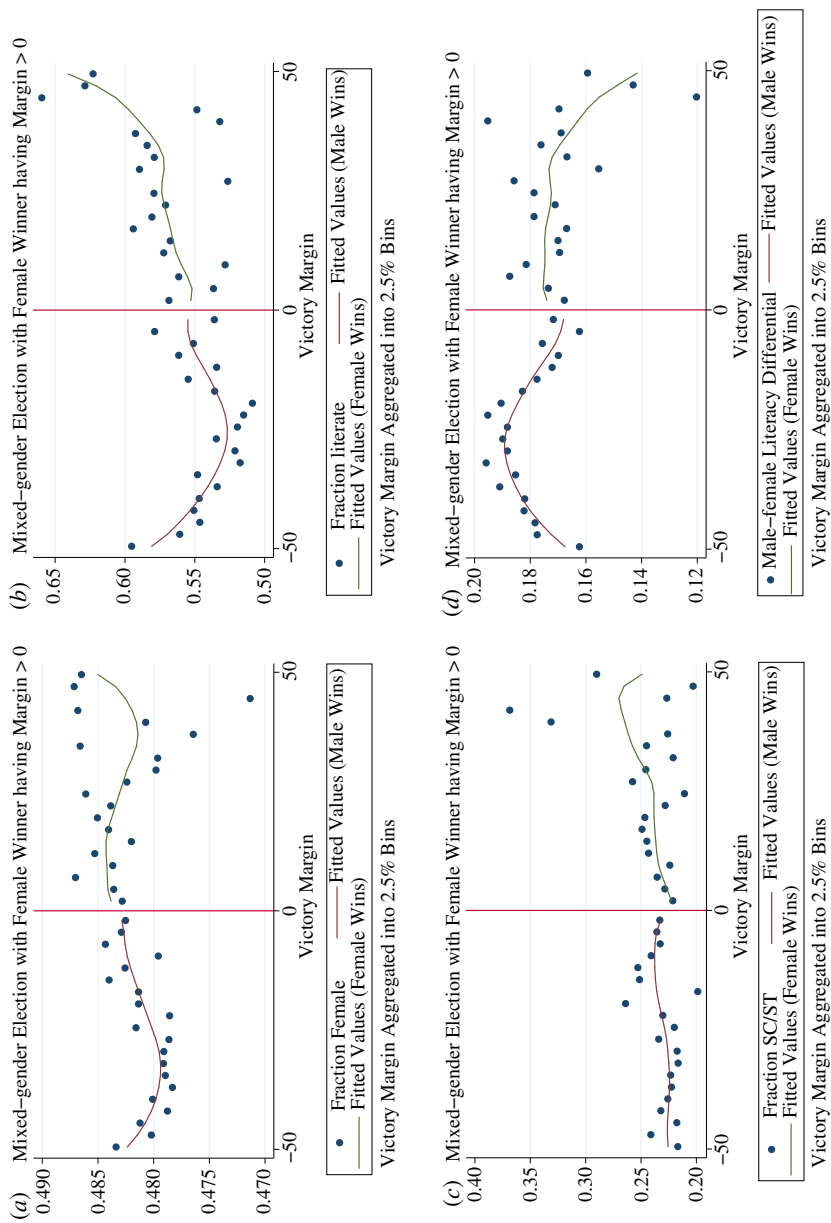


Fig. 4. Demographic Characteristics and Prior Election Outcomes. (a) Population Fraction of Women. (b) Literacy Rate. (c) Population Share of Scheduled Castes and Scheduled Tribes. (d) Male-female Literacy Differential. (e) Number of Female Candidates (Major Parties) in Previous Election. (f) Female Voter Turnout in Previous Election. (g) Total Votes Pollled in Previous Election

Note. Colour figure can be viewed at wileyonlinelibrary.com

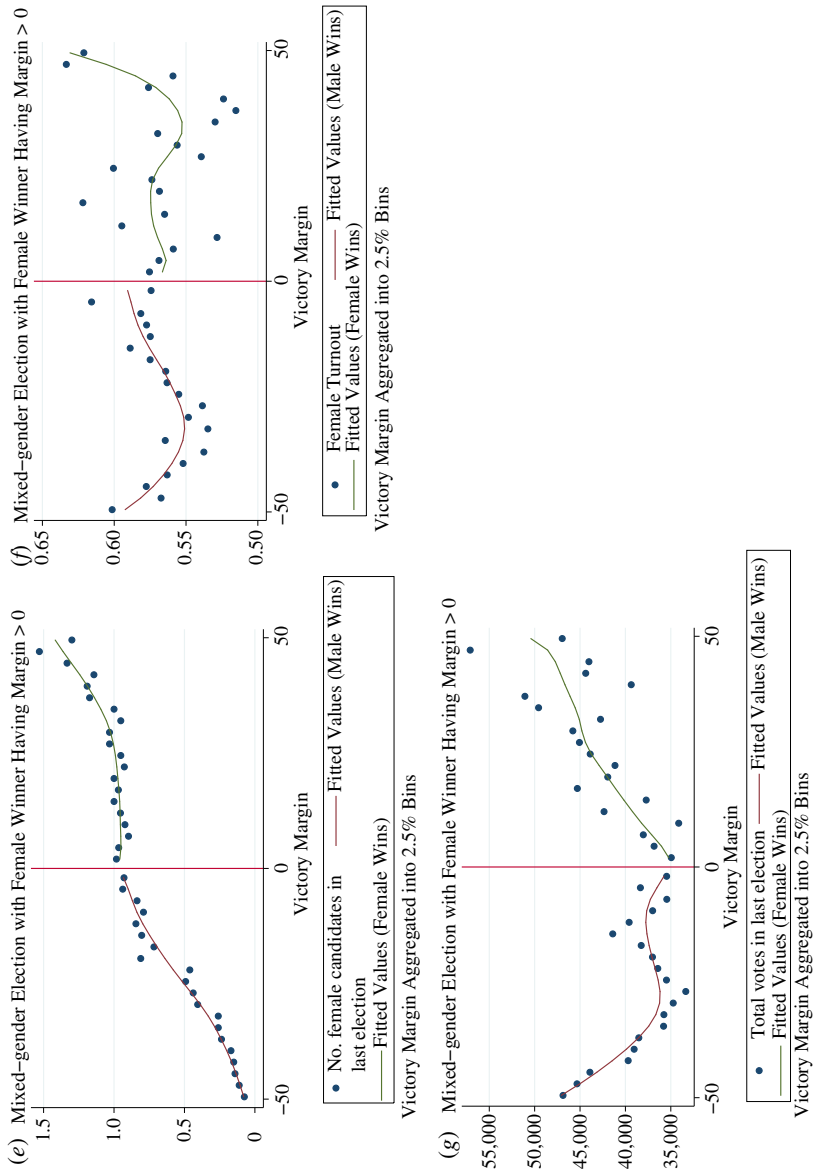


Fig. 4. (Continued)

4. Main Results: Does Women's Political Participation Respond to Prior Electoral Success?

We first investigate whether women's electoral success leads to an increase in the share of female candidates in the next election and test robustness to varying the RD specification. We find an increase in the overall share of major party women candidates following a woman's electoral victory, primarily driven by women incumbents being more likely to re-contest than male incumbents. We find no increase in the entry of new women candidates and, in many specifications, a significant decline. In Section 5, we investigate the potential mechanisms behind these findings.

4.1. Political Candidacy

The event of a woman winning an election leads to a large and statistically significant increase of 18.5 percentage points in the probability of a major party fielding at least one woman candidate in the subsequent election in her constituency (Table 1, panel (a), column (1)). This translates into an 8.5 percentage point increase in the female share of major party candidates (column (2)), which corresponds to 40% of a standard deviation in the sample of constituencies with at least one female candidate. A visual representation of these estimates is in Figure 5(a), which shows a jump in the probability of having a major party female candidate at the zero vote margin, to the left of which a woman narrowly lost the previous election and to the right of which a woman narrowly won the previous election against a man. We see a similar discontinuity for the female share of major party candidates (Figure 5(b)). As the share of female candidates will rise if there are more women *or* if there are fewer candidates in all, we investigated candidate numbers. We find an increase in the number of major party female candidates (column (3)); and no significant change in the total number of candidates from major parties (column (4)), which indicates that women candidates effectively substitute for male candidates.

We also model the competitiveness of women by defining as the dependent variable, the share of women among candidates who get at least 5% of total votes cast. This is significantly higher in constituencies in which a woman won in the previous election (column (5)). This establishes that the increase in candidacy that we observe following an electoral victory by a female politician is of politically viable women fielded by politically relevant parties. In contrast to the observed increase in women's candidacy within major parties, the fraction of independent women candidates – those not affiliated with any party – does not increase (column (6)).¹⁷ We find no significant impact of women having won the previous election on the chances of a woman winning the current election (column (7)). This is consistent with previous evidence indicating an incumbency disadvantage in Indian state elections (Uppal, 2009).

¹⁷ Given that major parties account for only one third of candidates overall, we find no increase in overall female candidacy after a woman's electoral victory.

Table 1
Women's Electoral Success and Future Political Candidacy: Regression Discontinuity Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	At least one female major party candidate	Female share of major party candidates	No. of female major party candidates	No. of major party candidates	Female share of competitive candidates	Female share of independent candidates	Woman wins election
Panel (a) controlling for quadratic polynomials in the running variable							
Woman won previous election	0.185*** (0.038)	0.085*** (0.019)	0.166*** (0.046)	0.015 (0.078)	0.060*** (0.017)	0.013 (0.012)	-0.002 (0.034)
Observations	5,881	5,881	5,881	5,881	5,881	5,504	5,881
Panel (b) local linear regressions with Imbens-Kalyanaraman optimal bandwidth							
Woman won previous election	0.172*** (0.051)	0.091*** (0.021)	0.176*** (0.061)	0.033 (0.090)	0.052*** (0.021)	0.008 (0.013)	-0.027 (0.038)
Optimal bw (IK)	0.1658	0.24421	0.1775	0.2092	0.1654	0.2102	0.2766
Observations	1,350	1,877	1,423	1,638	1,360	1,521	2,128
Panel (c) local linear regressions with Calonico-Cattaneo-Titiunik optimal bandwidth							
Woman won previous election	0.174*** (0.050)	0.088*** (0.024)	0.178*** (0.061)	0.025 (0.109)	0.055*** (0.022)	0.01 (0.016)	-0.114** (0.055)
Optimal bw (CCT)	0.1718	0.1774	0.1805	0.1509	0.1679	0.1757	0.1222
Observations	1,388	1,419	1,446	1,253	1,348	1,305	1,044

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyersson (2014). Optimal bandwidths are determined by the algorithms suggested in Imbens and Kalyanaram, 2012 (IK) and Calonico *et al.*, 2014 (CCT).

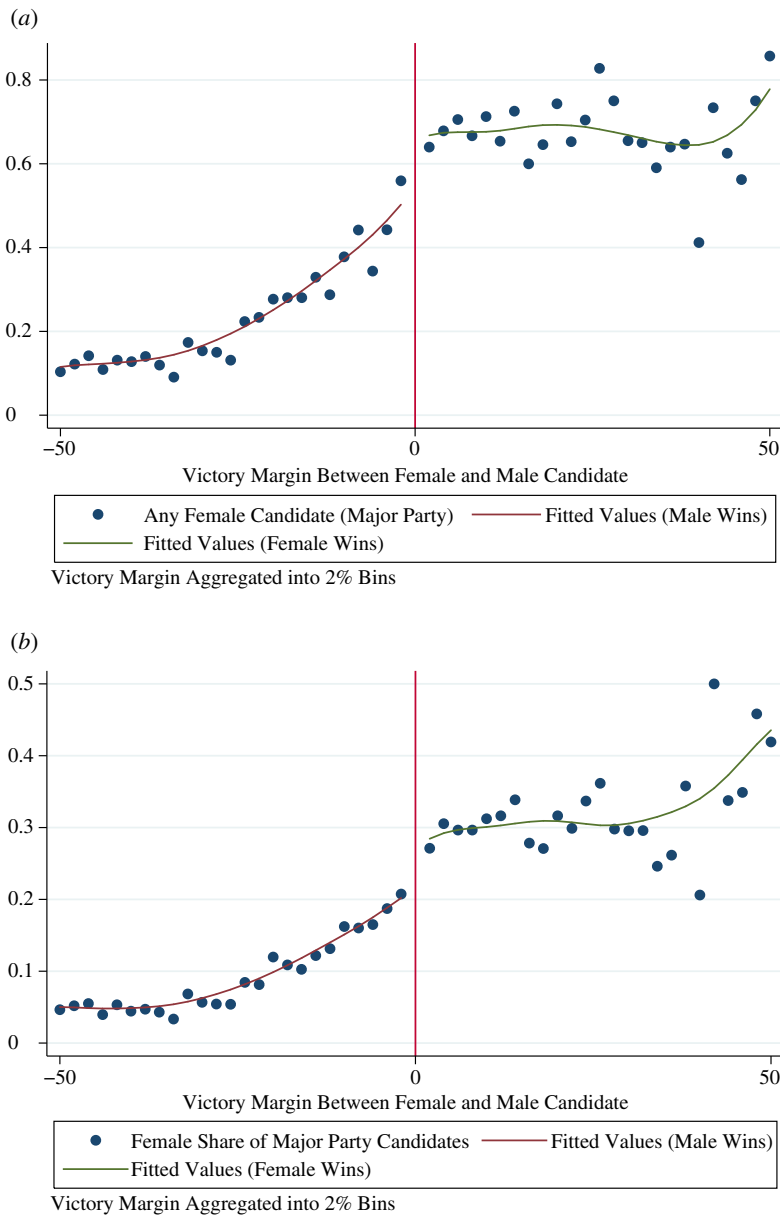


Fig. 5. *Regression Discontinuity Estimates for Women's Political Candidacy. (a) At Least One Woman Candidate from a Major Party. (b) Female Share of Major Party Candidates*
Note. Colour figure can be viewed at wileyonlinelibrary.com

4.2. Robustness of RD Estimates

We investigate robustness of the estimates to varying the functional form of the running variable in regressions run on the full sample, to estimating local linear regressions with varying bandwidths (including a very narrow discontinuity sample), to

controlling for election-specific factors, and to restricting the sample to elections in which the top two vote-getters are a man and a woman. We also present a placebo check in which we vary the discontinuity point.

4.2.1. *Robustness to functional form and sample for the running variable*

The specification in Table 1 (panel (a)) controls for a quadratic polynomial in the victory margin, which is allowed to be different on either side of the discontinuity. We verify that the coefficients on the suite of outcomes in Table 1 remain similar in size and significance when a local linear regression is estimated on a sample restricted to an optimal bandwidth around the discontinuity, using optimal bandwidths as specified by Imbens and Kalyanaraman (2012) in panel (b) and by Calonico *et al.* (2014) in panel (c).

We conduct further checks for the female share of major party candidates, which is the main outcome in Table 1. First we generalise the polynomial in the victory margin to the third and fourth order, retaining the full sample, and we find very little change in the coefficient of interest (Table A3 in online Appendix A, columns (1) and (2)). We then restrict the sample to small bandwidths of 0.1 and then 0.05, controlling for linear trends on either side of the discontinuity in the first case and simply comparing the mean of the dependent variable on both sides of the discontinuity for the smaller bandwidth, along the lines of Angrist and Lavy (1999), and our results remain unchanged (columns (3) and (4)). The estimates in column (5) examine the stability of the estimated coefficient to inclusion of a vector of state-year fixed effects which control for all relevant election-specific factors such as whether the previous chief minister was a woman, whether there was a woman party leader in the current election, or whether a new woman-headed party had been formed. The estimated coefficient retains its size and significance. Our results are also unchanged if we cluster the standard errors at the finer constituency level rather than the district level (column (6)).

Finally, we restrict the sample to elections where a woman and a man were among the top two candidates in terms of votes won. This may be relevant if, for instance, the top two candidates are men but a woman is close behind as the third vote-winner. The coefficients are similar to the baseline results in size and significance, both when we control for a second-order polynomial on either side of the discontinuity (column (7)) and when we use the Imbens and Kalyanaraman optimal bandwidth (column (8)). Our results remain similar when we further restrict the sample to elections in which the third candidate did not have a chance to win i.e. elections where the margin between the first and third candidates was larger than 5%, 10% or 20% (results available upon request).

4.2.2. *Fake or placebo discontinuities*

We tested for discontinuous increases in candidacy at points of the vote margin distribution at which there should be no jumps, that is, at points other than zero, as suggested in Imbens and Lemieux (2008). We re-computed the RD estimates using ‘fake’ discontinuities at various points both to the left and to the right of the actual discontinuity. Figure A2 in online Appendix A plots the t-statistics obtained from this series of RD estimates. We see that the largest t-statistic is at the real discontinuity, i.e. at the zero point, while all other t-statistics at placebo discontinuity points indicate statistical insignificance.

4.3. New Candidate Entry Versus Incumbent Candidacy

In this subsection, we examine how much of the observed rise in women's candidacy is attributable to the entry of new women candidates. We identify incumbent as opposed to new candidates by tracking candidates through our sample by their name. We find no evidence of new candidate entry, in fact, the regression coefficient for the new female share of major party candidates is negative and statistically significant for two of the three RD estimators (Table 2, column (1), panels (a) and (b)); we investigate this in more detail below. There is no significant impact of women's victory on the entry of new male candidates (column (2)).

Incumbent women are significantly more likely to run for re-election than incumbent men (column (3)). While this is consistent with the idea that women candidates are positively selected (as shown in the US by Anzia and Berry, 2011), we should note that in India, there is a gender gap that disfavors women in the baseline probability of women incumbents running for re-election: 34% of female winners and 28% of male winners

Table 2
Impact of Women's Electoral Success on New Versus Incumbent Candidates

	New female share of major party candidates	New male share of major party candidates	Incumbent runs for re election	Incumbent runs for re election from the same party	Incumbent runs for re election from a different party
	(1)	(2)	(3)	(4)	(5)
Panel (a): controlling for quadratic polynomials in the running variable					
Woman won previous election	0.023** (0.010)	0.025 (0.024)	0.065* (0.038)	0.149*** (0.038)	0.084*** (0.024)
Observations	5,874	5,874	5,881	5,881	5,881
Mean of dependent variable	0.04735	0.5338	0.6226	0.5092	0.1134
Panel (b): local linear regressions with Imbens Kalyanaraman optimal bandwidth					
Woman won previous election	0.024** (0.011)	0.021 (0.025)	0.071 (0.043)	0.159*** (0.044)	0.091*** (0.022)
Optimal bw (IK)	0.2731	0.2566	0.2319	0.2352	0.3489
Observations	2,105	1,976	1,795	1,818	2,889
Panel (c): local linear regressions with Calonico Cattaneo Titiunik optimal bandwidth					
Woman won previous election	0.01 (0.017)	0.008 (0.032)	0.036 (0.054)	0.162*** (0.053)	0.094*** (0.030)
Optimal bw (CCT)	0.1247	0.1647	0.1475	0.1511	0.2112
Observations	1,059	1,344	1,229	1,254	1,648

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. New candidates are defined as candidates who did not run in the previous election. They were identified by manual matching of candidate names across election years. Sample includes all races with any female candidates as in Meyerson (2014). Optimal bandwidths are determined by the algorithms suggested in Imbens and Kalyanaraman (2012) (IK) and Calonico *et al.* (2014) (CCT).

do not run for re-election in the full sample. Since party-switching is frequent in India, we investigated incumbent candidacy by party. We find that women incumbents are more likely than male incumbents to contest from the incumbent party (Table 2, column (4)) and significantly less likely to switch parties in the election after they win (column (5)). These results retain their size and significance regardless of the specification or the bandwidth used (Table 2, panels (b) and (c)).

It is possible that the presence of an incumbent woman politician might discourage new female candidates in her constituency due to splitting of the gendered votes. While we cannot test this rigorously because the incumbent's decision to contest is endogenous, we have verified that the impact on new female candidate entry does not differ by whether the incumbent chooses to run for re-election (new female candidate share declines by 1.8 percentage points when the incumbent is running for re-election, and by 2.3 percentage points when the incumbent does not run for re-election).

Table 3
Candidacy Effects Across Parties and Across Geographies

	Incumbent party has a female candidate (dummy)	Non incumbent parties have a female candidate (dummy)	Female share of major party candidates in nearby constituencies (other constituencies in same district)		Female share of major party candidates in nearby constituencies (other constituencies in same parliamentary constituency)	
			All major parties	Incumbent party	All major parties	Incumbent party
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): controlling for quadratic polynomials in the running variable						
Woman won previous election	0.535*** (0.031)	0.142*** (0.043)	0.001 (0.005)	0.002 (0.008)	0.003 (0.005)	0.007 (0.008)
Observations	5,881	5,881	5,867	5,874	5,874	5,881
Panel (b): local linear regressions with Imbens Kalyanaraman optimal bandwidth						
Woman won previous election	0.541*** (0.031)	0.161*** (0.051)	0.006 (0.005)	0.004 (0.008)	0.003 (0.005)	0.011 (0.009)
Optimal bw (IK)	0.2725	0.2063	0.2666	0.2737	0.2807	0.229
Observations	2,104	1,617	2,064	2,113	2,166	1,773
Panel (c): local linear regressions with Calonico Cattaneo Titiunik optimal bandwidth						
Woman won previous election	0.536 *** (0.044)	0.178 *** (0.053)	0.007 (0.007)	0.011 (0.011)	0.007 (0.007)	0.020 (0.013)
Optimal bw (CCT)	0.133	0.1885	0.1195	0.1371	0.1217	0.1199
Observations	1,116	1,493	1,018	1,146	1,041	1,025

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyerson (2014). Optimal bandwidths are determined by the algorithms suggested in Imbens and Kalyanaraman (2012) (IK) and Calonico *et al.* (2014) (CCT).

4.4. *Candidacy Spillovers Across Parties and Constituencies*

In this subsection, we first examine party-level (rather than candidate-level) responses and then examine whether there are any spillovers of a woman winning in a given constituency on women's participation in nearby constituencies. We find that, in constituencies where women won the previous election, it is strictly only the winner's party that is more likely to field a woman candidate in the next election and, as we saw above, this candidate tends to be the winner herself. Parties that lost the previous election to a woman are significantly less likely to nominate a woman (Table 3, columns (1) and (2)). The losing party typically fielded a man so this result simply means that in the next election, despite the man losing to a woman, they continued to field a man.

While the presence of an incumbent woman politician might discourage new female candidates in her constituency (as it would split the gendered votes), it might nevertheless encourage greater participation in nearby areas. However, we find no evidence of increased female candidacy, whether from the incumbent party or other parties, in constituencies within the same district (Table 3, columns (3) and (4)) or within the same national parliamentary constituencies (columns (5) and (6)). In separate regressions (not shown), we replaced the female share of candidates with the new female share and found similar results, i.e. that there is no tendency towards increased entry of new women in nearby constituencies. Using data from the US, Broockman (2013) similarly finds no impact of a woman being elected on the participation of women in nearby areas.

In the next Section, we push the analysis further by investigating voter, party and candidate responses to women winning with a view to understanding better the mechanisms behind our findings.

5. Mechanisms and Further Analysis

In this Section we investigate whether the weak demonstration effects we find are driven primarily by 'demand-side' factors, such as voter and party attitudes towards women candidates, or by limitations on the supply of potential candidates, such as a shortage of suitable female candidates, or the existence of gender-specific constraints that make women less likely than men to contest as candidates. We use male and female electoral turnout, votes cast for women *versus* men and women's winning chances as indicators of voter preferences,¹⁸ and the gender of the party leader as an indicator of party preferences over women.

5.1. *Heterogeneity by Indicators of Gender Prejudice*

Since the views of voters and parties are likely to be shaped by prevailing social norms regarding the role of women, we investigate whether the candidacy response to electoral victory varies by indicators of societal gender bias. India has a long history of

¹⁸ Voter turnout is often used as an indicator of political participation and interest in politics. For instance, Washington (2006) shows that black and white turnout rates increase in response to black candidates on the ballot in US elections.

gender prejudice that has resulted in millions of women ‘missing’ on account of sex-selective abortion, female infanticide and discrimination against girls and women in terms of nutrition and health care. There were 940 women per 1,000 men in India in the 2011 census which translates to about 0.86 million ‘missing women’. The population sex ratio is now widely used to proxy for women’s social disadvantage (Sen, 2003; Bhalotra and Cochrane, 2010; Jayachandran and Kuziemko, 2011).

The population gender ratio varies widely across states, from 861 women per 1,000 men in the northern state of Haryana to 1058 in the southern state of Kerala. A remarkable division seems to run right across India, splitting the country into two nearly contiguous halves, with missing women in the north and west but not in the south and east of the country (Dyson and Moore, 1983; Sen, 2003); some studies have attributed this to time-invariant factors such as soil quality (Carranza, 2014). In view of this marked heterogeneity across states, we re-estimate the response of women’s candidacy to women winning for the groups of states with sex ratios above and below the median.¹⁹

We find a much bigger response of women’s candidacy to women’s electoral victory in states in which the population sex ratio is less skewed or more favourable to women (Table 4, columns (1) and (2)). In particular, the female share of major party candidates increases by 5.2 percentage points in states where the gender ratio is skewed against women, while the corresponding effect is 13.9 percentage points in states where the gender ratio is less biased, and this difference in the RD coefficients is statistically significant.²⁰ This remarkable difference is driven both by a difference in the share of new women candidates, where a negative effect is observed only in the more gender-biased states (columns (3) and (4) and Figure A3 in online Appendix A), and in the share of non-new female candidates (columns (5) and (6)). This suggests that a social context that disadvantages women leads to a weaker candidacy response by both new and non-new candidates after a woman demonstrates the ability to win an election.

While the results in Table 4 are estimated using state-level gender ratios from the 2001 census as a proxy for gender bias, the results are robust to using other measures. We first show that these patterns hold up to using a different proxy for women’s status, namely, the male-female literacy differential. Women’s educational outcomes are much poorer than those of men: only 65% of women in India were recorded as literate in the census of 2011, compared to 82% of men. We find that the female candidacy response to women winning is weaker in states where the male-female literacy differential is below the median and that a significant ‘discouragement’ effect on new women candidates is present only for these states (Table A4 in online Appendix A, columns (1) and (2)). Both of these patterns, namely, a lower overall candidacy response and a significant negative effect on the entry of new women candidates, are

¹⁹ Fisman *et al.* (2014) similarly divide India into two halves marked by long standing differences in corruption for the purpose of testing a mechanism (rent seeking behaviour).

²⁰ The difference in the coefficients was tested using a difference in discontinuities specification following Grembi *et al.* (2016). The assumptions of this model are milder than those required for a cross sectional RD design or for a difference in differences strategy.

Table 4

Women's Electoral Success and Political Candidacy: Heterogeneity by State Level Gender Prejudice

	Female share of major party candidates		New female share of major party candidates		Non new (incumbent + losers) female share of major party candidates	
	Female population share		Female population share		Female population share	
	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): controlling for quadratic polynomials in the running variable						
Woman won previous election	0.052** (0.023)	0.139*** (0.031)	0.032** (0.012)	0.002 (0.020)	0.085*** (0.020)	0.141*** (0.029)
Observations	3,714	2,160	3,714	2,160	3,714	2,160
Panel (b): local linear regressions with Imbens Kalyanaraman optimal bandwidth						
Woman won previous election	0.041 (0.028)	0.176*** (0.028)	0.031** (0.014)	0.005 (0.019)	0.069*** (0.025)	0.160*** (0.031)
Observations	929	1,039	1,195	867	887	825
Optimal bw (IK)	0.1982	0.3643	0.254	0.3043	0.1885	0.2877
Panel (c): local linear regressions with Calonico Cattaneo Titiunik optimal bandwidth						
Woman won previous election	0.030 (0.031)	0.121** (0.049)	0.035* (0.019)	0.022 (0.029)	0.054* (0.030)	0.053 (0.049)
Observations	781	347	648	480	648	342
Optimal bw (CCT)	0.1625	0.0992	0.129	0.141	0.1291	0.0973

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyersson (2014). Optimal bandwidths are determined by the algorithms suggested in Imbens and Kalyanaraman (2012) (IK) and Calonico *et al.* (2014) (CCT). Low and high female population share refer to states with female population share above or below the national average.

present when we use either the gender ratios from the 1981 census (columns (3) and (4)) or gender ratios at the constituency rather than the state level (columns (5) and (6)). Note that the constituency-level gender ratios are subject to the influence of migration across constituency boundaries, while cross-state migration in India is extremely low (Mistri, 2015).²¹

A potential explanation of the results is backlash, namely that seeing women in leadership positions intensifies societal bias against women and that this is exhibited in voter and party leader behaviour. We investigate this in the next subsection.

²¹ Recent work has documented that the fraction of female candidates is higher in constituencies reserved for the scheduled castes (SC) in India (Jensenius, 2016). Since the caste composition does not vary discontinuously at our threshold, this does not constitute a threat to our identification strategy. However, we do find that the discouragement effect for new female candidates is larger for SC reserved constituencies, consistent with our findings since these constituencies have worse gender ratios and higher literacy differentials compared to unreserved constituencies.

5.2. Voter and Party Behaviour

Since candidates are chosen by political parties with a view to winning elections, party choices will reflect any gender bias among voters, as well as any bias among party leaders over and above voter bias. We examine whether voters and parties behave differently after observing a woman winning, distinguishing the behaviour of male and female voters and male and female party leaders.

Voter behaviour is indicated by electoral turnout and by votes cast for female as opposed to male candidates. We find that both female and male voter turnout are significantly greater in constituencies that were won by women in the preceding election but only in states with more equal gender ratios, there being no significant response in the more gender-prejudiced states (Table 5, panel (a), columns (1)–(4)). A woman's electoral victory increases the vote share of all women candidates and the chances of a woman winning the next election, more in states with better gender ratios compared to states with worse gender ratios, indicating a preference for women leaders in the better states. However, these differences in the coefficients are not statistically significant (Table 5, panel (b), columns (1–4)).

If voters or party leaders are more likely to update their views after repeated exposure to women leaders, we might observe larger effects on political candidacy over

Table 5
Women's Electoral Success and Voter Behaviour

	Female population share		Female population share	
	Low	High	Low	High
	(1)	(2)	(3)	(4)
Panel (a): voter turnout in subsequent election				
	Female voter turnout		Male voter turnout	
Woman won previous election	0.009 (0.013)	0.055*** (0.019)	0.003 (0.011)	0.052*** (0.014)
Observations	3,713	2,158	3,713	2,158
Panel (b): preferences for women candidates				
	Whether a woman wins the next election		Vote share of all women candidates	
Woman won previous election	0.033 (0.044)	0.046 (0.054)	0.028 (0.021)	0.073** (0.032)
Observations	3,714	2,167	3,714	2,167
Panel (c): female share of major party candidates in later elections				
	Second lag		Third lag	
Woman won previous election	0.020 (0.025)	0.072* (0.039)	0.002 (0.024)	0.019 (0.051)
Observations	2,939	1,649	2,171	1,120

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyersson (2014). Regressions control for quadratic polynomials in the running variable. See Table A3 in online Appendix A for robustness to alternative bandwidth selection methods.

time. However, there are very few constituencies in India in which women win a state assembly seat in a competitive election for two consecutive terms (less than 5% of our RD sample), making it hard to test for this repeated exposure effect in our data. Moreover, winning the second time is endogenous in the competitive setting, so we investigate the reduced form i.e. the response of candidacy in election t to a woman having won two elections ago ($t - 2$) and three elections ago ($t - 3$). At the ten-year mark (two elections later), we see a marginally significant increase in the share of women candidates from major parties in the states with better gender ratios and no effect at all on overall female candidacy in states with worse gender ratios (Table 5, panel (c), columns (1) and (2)). At the fifteen-year mark, the candidacy response drops to effectively zero in all states (Table 5, panel (c), columns (3) and (4)).

We now examine the role of parties. If the different results we noted in more and less prejudiced contexts are attributable to intensification of gender bias within parties and, if male-headed parties are more likely to show such intensification, then we expect a lower candidacy response in male-headed parties in gender-biased areas. This is indeed what we find: candidacy responses to women's electoral victory are similar across all states among parties headed by women (Table 6, panel (a), columns (1) and (2)). Among parties headed by men, however, we see a significantly higher candidacy response in states with better gender ratios (Table 6, panel (a), columns (3) and (4)). The patterns for new female candidates are similar across male and female headed parties (Table 6, panel (b)), suggesting that gender bias persistence within parties tends to make the path to candidacy more difficult for women who participated in the previous election.

Table 6
Women's Electoral Success and Future Candidacy: Heterogeneity by Party Gender

	Female population share		Female population share	
	Low	High	Low	High
	(1)	(2)	(3)	(4)
Panel (a): female share of major party candidates				
	Major parties headed by women		Major parties headed by men	
Woman won previous election	0.002 (0.012)	0.008 (0.023)	0.050** (0.022)	0.132*** (0.028)
Observations	3,714	2,160	3,714	2,160
Panel (b): new female share of major party candidates				
	Major parties headed by women		Major parties headed by men	
Woman won previous election	0.015** (0.006)	0.012 (0.009)	0.018* (0.009)	0.010 (0.019)
Observations	3,714	2,160	3,714	2,160

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyersson (2014). Regressions control for quadratic polynomials in the running variable.

Overall, the results are consistent with women's electoral victory leading to a persistence and possible intensification of gender bias in more gender-prejudiced states, particularly within male-headed parties. This is of course the opposite of the prediction of a model of statistical discrimination.²² Our finding that, in less prejudiced states, incumbent women are more likely than incumbent men to re-contest is consistent with statistical discrimination being lowered for women who have been selected in (as in Fryer, 2007). However, in more prejudiced states, we see what would appear to be a rise in taste-based discrimination.

In the next subsection, we examine two alternative explanations related to potential constraints on the supply of new candidates. First, we examine the extent to which a shortage of suitably experienced potential women candidates is a binding constraint. Second, to investigate the extent to which barriers to the entry of new women are gender-specific, we perform a parallel analysis of candidates belonging to a religious minority group (Muslims), who are also under-represented in political office.

5.3. Supply of Experienced Candidates

The failure of new women candidates to contest in women-led constituencies may reflect a shortage of suitably qualified women candidates. In general, it is difficult to find experimental or exogenous variation but we are able to exploit a massive shock to

Table 7
Women's Electoral Success and Political Candidacy Before and After Local Government Quotas

	Local government quotas		Local government quotas	
	No	Yes	No	Yes
	(1)	(2)	(3)	(4)
Panel (a): female share of major party candidates				
	Female population share is low		Female population share is high	
Woman won previous election	0.019 (0.030)	0.094*** (0.035)	0.224*** (0.054)	0.085** (0.041)
Observations	2,220	1,494	855	1,305
Panel (b): new female share of major party candidates				
	Female population share is low		Female population share is high	
Woman won previous election	0.029** (0.015)	0.038* (0.021)	0.014 (0.032)	0.001 (0.025)
Observations	2,220	1,494	855	1,305

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any female candidates as in Meyersson (2014). Regressions control for quadratic polynomials in the running variable.

²² Statistical discrimination involves stereotypes generated by the average performance of a group being applied to individual members of the group, and the reason that groups who are in an effective minority are often discriminated against is that the signal they emit is noisier (Phelps, 1972).

the availability of women with some political experience created by the institution of quotas for women in local government. A constitutional amendment of 1993 set aside one-third of all seats in village, municipality and district councils for women, a large increase from the pre-reform share of approximately 5%. This created a cadre of women with the experience, networks and potentially, the motivation to remain in the political sphere and contest for legislative assembly seats. As in Iyer *et al.* (2012), we use plausibly exogenous state-specific variation in the implementation of the mandate and obtain separate RD estimates for women's candidacy response to women winning for periods before and after the implementation of the local government quota.

We find a significantly higher candidacy response after quotas are implemented but only in states with more biased gender ratios (Table 7, panel (a), columns (1–4)). However, in neither group of states is the share of *new* candidates significantly different after the introduction of quotas (Table 7, panel (b)). Overall, there is no evidence that shortages of suitably experienced women candidates drive our result of no new entry after a woman wins.

5.4. Gender specific Constraints

Even if there is a cadre of women politicians in local government councils, they may be reluctant to compete for the post of state legislator, a post that is far more demanding. Recent work has highlighted gender-specific barriers to women's participation in executive positions, which are competitive and typically involve intensive and inflexible work schedules (Bertrand *et al.*, 2010). Laboratory evidence suggests that women tend to be less over-confident and more averse to competition than men (Petrie and Segal, 2014; Niederle, 2016) and a number of studies underline the role of fertility and family commitments in limiting women's careers (Goldin, 2014). As discussed earlier, a related possibility is an increased reluctance of potential women candidates to enter politics due to 'stereotype threat'.

We investigate this by conducting a parallel analysis for Muslims, with a view to isolating the role of women-specific constraints from the role of continued or intensified prejudice against a group with initially small representation. Muslims are the largest religious minority in India, constituting 14.2% of the population in 2011 (Hindus constitute the majority). We created a new data set containing the religious identity of all political candidates in India's state elections, identifying Muslim candidates by their name. Our data show that Muslims are under-represented in almost all major states: over the period 1980–2010, Muslims constituted 9.2% of all election candidates and 7.6% of election winners, and almost all (98%) of Muslim candidates are men. Similar to the literature on the impact of women representatives, there is some evidence that increasing the political representation of Muslims alters policy choices, leading to improved health and education outcomes (Bhalotra *et al.*, 2014). Here, we estimate how the share of Muslim candidates in a constituency changes in response to a Muslim having won the previous election in a competitive race against a non-Muslim. Just as women are less educated than men in India on average, Muslims are less educated than non-Muslims on average. In contrast to the case for women *versus* men, there is a significant difference in the party affiliations of Muslim *versus*

non-Muslim candidates,²³ so we control for party identity in order to isolate the effect of the religion of the politician.

The results for Muslims are very similar to the results for women. In the election after a Muslim wins a state seat, there is an increase in the share of candidates who are Muslim in that constituency, and this is statistically significant at the 10% level (Table 8, panel (a), columns (1)–(4)). Importantly, there is no increase in the fraction of new Muslim candidates and the coefficient estimate is negative though not statistically significant (Table 8, panel (b)). So, just as we found for women candidates, the overall effects on Muslim candidacy are driven by incumbent Muslim candidates being more likely to re-contest and there is no entry of new candidates.

Also similar to our results for women, the coefficient of interest varies systematically across the states with indicators of Muslim disadvantage. The positive effects on candidacy are larger in states where Muslims constitute a higher share of the

Table 8

Muslims' Electoral Success and Future Political Candidacy: Regression Discontinuity Estimates

					Muslim population share		Hindu Muslim literacy differential	
					Low	High	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel (a): Muslim share of major party candidates								
Muslim won previous election	0.028 (0.020)	0.037* (0.020)	0.094*** (0.024)	0.050 (0.031)	0.015 (0.053)	0.045** (0.021)	0.033 (0.023)	0.067* (0.037)
Observations	7,636	7,636	2,447	1,392	1,787	5,849	4,820	2,816
Panel (b): new Muslim candidate share in major parties								
Muslim won previous election	0.028 (0.019)	0.023 (0.019)	0.009 (0.017)	0.005 (0.026)	0.085** (0.041)	0.01 (0.020)	0.016 (0.022)	0.04 (0.032)
Observations	7,636	7,636	3,430	1,444	1,787	5,849	4,820	2,816
Polynomial	2nd order	2nd order			2nd order	2nd order	2nd order	2nd order
Bandwidth			Optimal (IK)	Optimal (CCT)				
Party controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Standard errors in parenthesis, clustered at the district level. ***, **, * indicate significance at 1%, 5% and 10% level respectively. Sample includes all races with any Muslim candidates. Optimal bandwidths are determined by the algorithms suggested in Imbens and Kalyanaraman, 2012 (IK) and Calonico *et al.*, 2014 (CCT). In each case, the first column in a pair indicates a stronger potential Muslim disadvantage. Muslim population share and Hindu Muslim literacy differential data are from 2001 state level census for 16 major states. Classification for population share is bottom eight states (low population share) *versus* top eight. Classification for literacy differential is less than 1 percentage point (low differential) *versus* others.

²³ Muslim candidates are significantly less likely to belong to the Bharatiya Janata Party (BJP), which often espouses an explicit ideology of 'Hindutva', and they are significantly more likely to belong to the Indian National Congress (INC) or the Bahujan Samaj Party (BSP).

population (columns (5) and (6)), and where the literacy differential between Hindus and Muslims is smaller (columns (7) and (8)).²⁴ While the standard errors are too large to conclude that these estimates are statistically different, it is clear that the patterns are similar to the patterns observed for women's political candidacy. In particular, there is a statistically significant 'discouragement' of entry of new candidates in states where the population share of Muslims is low (Table 8, panel (b), column 5). The fact that the pattern of results for religious minorities is similar to the pattern we identified for women suggests that the results for women are unlikely to be predominantly a reflection of gender-specific factors.²⁵

6. Conclusions

Many reasons have been proposed for the gender gap in leadership positions. These include 'supply-side' factors such as the lower ambition of women (Lawless and Fox, 2010), the lack of women role models (Beaman *et al.*, 2012), women's aversion to competitive environments (Gneezy *et al.*, 2003; Petrie and Segal, 2014), their fertility and family commitments which conflict with intensive and inflexible work schedules (Bertrand *et al.*, 2010; Goldin, 2014) and 'stereotype threat'. There can also be 'demand-side' factors such as parties or voters having greater preferences for male candidates. It is often argued that the scarcity of female role models reinforces these preferences and prejudices, and that women winning in a competitive race against men can therefore encourage the political participation of other women. Also, if women legislators play a role in the selection of candidates for the next election and are not contesting themselves, then they may directly encourage candidacy among other women.

We investigate the presence of such demonstration effects using quasi-experimental constituency-level variation in women winning political office in India's state elections. We identify a large and significant increase in the subsequent share of women candidates fielded by major parties in Indian state elections, driven entirely by a greater propensity for incumbent women relative to incumbent men to run for re-election. Given that a substantial fraction of incumbents in Indian state elections do not re-run and female incumbents overall are less likely to re-run than male incumbents, this is an important result.

We decisively reject that new women candidates are induced to enter politics, either in their own constituency or in neighbouring constituencies. In fact, a woman winning office appears to intensify barriers to the entry of new women in areas characterised by relatively high levels of gender prejudice. We find similar results following a Muslim winning against a non-Muslim candidate, which undermines the relevance of gender-specific preferences or constraints.

²⁴ Using a new dataset we created on incidents of religious violence from newspaper reports in the *Times of India* (Kaysser *et al.*, 2014; an updated version of Varshney and Wilkinson, 2006), we find that the candidacy response is also larger in states that experienced fewer incidents of religious violence over the period 1980–2010 (results available upon request).

²⁵ We attempted a similar analysis distinguishing high and low castes, but this was limited by sample size because we are only able to identify caste for individual candidates in elections after 2003. Examining close elections of SC/ST candidates against others in this limited sample, we find a similar absence of 'demonstration effects' on candidacy of scheduled castes (SC) and scheduled tribes (ST), who are the historically disadvantaged caste groups. Results are available upon request.

Ours is the first systematic analysis of political candidacy in competitive elections in India. Our results suggest that further economic, institutional or policy incentives may be needed to stimulate the entry of new women into the political arena. Not only are demonstration effects too weak to generate an endogenous increase in women's candidacy, demonstrated success results in persistence and possible intensification of barriers to political participation in gender-biased areas. Initiatives that are likely to have greater success are those targeted towards changing the attitudes of voters and parties in gender-biased areas, or those enabling women to overcome societal barriers to political participation.

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Appendix A. Figures and Tables.

Data S1.

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