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Path-Breakers: How Does Women's Political Participation Respond to Electoral Success?

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How Does Women's Political Participation Respond to Electoral Success?[*]

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Abstract

This paper analyzes the effect of a woman's electoral victory on women's subsequent political participation. Using the regression discontinuity afforded by close elections between women and men in India's state elections, we find that a woman winning office leads to a large and significant increase in the share of female candidates from major political parties in the subsequent election. This stems mainly from an increased probability that previous women candidates contest again, an important margin in India where a substantial number of incumbents do not contest re-election. There is no significant entry of new female candidates, no change in female or male voter turnout and no spillover effects to neighboring areas. Further analysis points to a reduction in party bias against women candidates as the main mechanism driving the observed increase in women's candidacy.

JEL Codes: J16, J71, P16

1. **Introduction**

A recent literature suggests that women's political representation influences policy choices in their favor (Chattopadhyay and Duflo 2004, Rehavi 2007, Miller 2008, Iyer et al. 2012, Bhalotra and Clots-Figueras forthcoming, Brollo and Troiano 2012).[1] However, women continue to be under-represented in political office across the world, accounting for only 21.4% of the membership of national parliaments globally. In 2013, women comprised 11% of India's national legislators, 18% of the members of the United States Congress and 22% of the United Kingdom's House of Commons. Many explanations have been put forward to explain the gender gap in executive positions in finance, business and politics. These include gender discrimination, the lack of female role models, women's distaste for competitive environments, lower ambition of women, family responsibilities, social norms and poor negotiation skills.[2] However, we know surprisingly little about the effects of exposure to women who are competitively selected into leadership positions, although there is a recent body of work exploring the impact of women entering politics through the intervention of quotas (see below).

In this paper we investigate whether women's political candidacy and electoral turnout respond to the "demonstration effects" of women winning office. Since constituencies in which women win may be different in terms of voter preferences or other characteristics from constituencies in which women lose, we use a regression discontinuity design that involves comparing future candidacy and turnout in constituencies in which women won in close elections against men with those in which women lost in close elections against men. Exposure to women politicians may lead party leaders and voters to alter their priors regarding women in leadership and executive roles, or women leaders may serve as role models to stimulate other women's engagement in politics. We analyze a stylized model of political candidacy and test its implications to identify the role of these alternative mechanisms.

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[1] See Duflo (2012) for a review of the relationship between women's empowerment and economic development.

[2] See, among others, Bertrand and Hallock (2001), Wolfers (2006) and Bertrand (2009) on the gender gap among business executives. Babcock and Laschever (2003) focus on women's reluctance to negotiate higher salaries and promotions, and Bertrand, Goldin and Katz (2010) highlight the role of career interruptions and fertility decisions in the business careers of MBA students. Niederle and Vesterlund (2007) and Croson and Gneezy (2009) discuss the role of women's preferences, particularly for avoiding highly competitive environments.

India is the largest democracy in the world, with very competitive elections involving more than 700 million voters and 100 political parties. Despite India's rapid economic growth and modernization in recent decades, women remain disadvantaged in many domains, including survival, health and education. In 2011, there were only 940 women for every 1000 men and only 65% of women were literate, compared with 82% of men. Women are also significantly under-represented in Indian politics, comprising only 5.5% of state legislators over the period 1980-2007. Over the same period, only 4.4% of candidates were women, suggesting that candidacy is an important barrier to women holding political office. Women's voter turnout has also consistently lagged behind that of men, at 59% compared with 66% and to the extent that women vote for "descriptive representatives," this too may act to limit the share of women in government.

Our main findings are as follows. First, the electoral victory of a woman results in a large and significant increase of 9.2 percentage points in the fraction of female candidates fielded by major parties in subsequent elections in the same constituency. Second, there is no impact on female or male voter turnout. We verify that the regression discontinuity strategy is valid by showing that there are no underlying discontinuities in the relationship between women's electoral success, constituency characteristics and prior election outcomes. In addition, winners and losers in mixed-gender races do not differ in characteristics such as education, age and wealth.

The increase in women's candidacy is driven primarily by the increased propensity of prior candidates to contest again; we find no significant increase in the entry of new female candidates. This "intensive margin" is a non-trivial margin in India where, in contrast to the US, incumbents do not necessarily run for re-election, and incumbents who do run have been shown to have an electoral disadvantage (Linden 2004, Uppal 2009). In our data, 34% of female winners and 28% of male winners do not run for re-election.[3]

The increase in women's candidacy following a woman's electoral victory is fairly local, being limited in time and space. There is no evidence of area spillovers: a woman's electoral victory does not increase women's candidacy in nearby constituencies. In addition, we find no evidence that a woman winning increases the chances that a woman wins in the next election. Consistent with this, the candidacy effect fades with time since the event of a

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[3] There are no term limits in Indian elections.

woman winning, from a 9.2 percentage point increase in the next election to a 4.2 percentage point increase in the election after that.

In order to gain insight into the relative importance of alternative mechanisms driving the relationship between a woman winning political office and subsequent increases in the share of women candidates, we present a stylized model of political candidacy closely related to that in Casas-Arce and Saiz (2011). We use it to generate predictions that help us discriminate between a decrease in bias against women on the part of party leaders, a decrease in voter bias against women candidates, and an increase of the supply of potential women candidates. We argue that the evidence points to a reduction in party bias. To discriminate between party and voter bias, we exploit the model's prediction that a reduction in party bias would lead to increases in women's candidacy from the incumbent party alone but a reduction of voter bias is expected to lead to increases in women's candidacy across parties. Studying the vote share of new women candidates allows us to discriminate between a reduction in party bias (which would lower the ability threshold for entry of women) and the entry of more qualified women. To further investigate the role of candidate supply, we exploit the staggered implementation of quotas for women in local government that led to a massive expansion in the number of women with some experience of political office.

We find that the increase in women's candidacy after a woman wins is unique to the incumbent party, is associated with a reduction in the vote share of new women, and is no larger in elections that occur after the pool of women in local government expands. There is hence little evidence that reduction in voter bias or entry of more qualified women drive the results, consistent with our initial findings of no significant increase in voter turnout or entry of new women. We also find that female election winners are significantly more likely to run for re-election from the same party, compared to male winners, suggesting that winning improves the intra-party environment for women more than for men.

Our paper makes two substantive advances to the literature on women's political participation. First, analysis of women's candidacy and turnout is scarce in the economics literature, especially in a competitive setting. While a few recent studies analyze the effects of electoral quotas on women's candidacy and winning chances, the implementation of quotas may introduce distortions, such as changing candidate quality for both women and men (Besley et al. 2012, Bardhan et al. 2010, Deininger and Nagarajan 2011), creating a backlash against female leaders (Gagliarducci and Paserman 2011) or strengthening taste-based

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discrimination (Boisjoly et al. 2006, Beaman et al. 2009). Moreover, it is unclear that affirmative action in general eliminates negative stereotypes (Coate and Loury 1993). The evidence on the success of quotas in increasing women's political representation is mixed in general (see Pande and Ford 2011 for a review, also see Eggers 2011, Campa 2012, Bagues and Esteve-Volart 2012) and has been debated in the case of India.[4] For these reasons, it is important to identify the extent to which a spontaneous dynamic operates in launching women into the political sphere when quotas are absent.

Our second contribution is that we analyze three plausible barriers to women's candidacy in a given setting, implementing tests that allow some discrimination between them. Most papers focus on documenting the existence of one specific mechanism. For instance, Beaman et al (2009) document a decline in statistical discrimination against women after men are exposed to women leaders through quotas, but no decline in taste-based discrimination; they do not attempt to examine mechanisms such as party bias (given that they look at local elections in which political party participation is restricted in many states) or the entry of new women into politics. Lawless and Fox (2010) conduct surveys of potential women candidates in the US, and document several factors which make women less likely to perceive themselves as viable candidates, but do not examine the role of voter bias or party bias. A notable exception is Casas-Arce and Saiz (2011), who consider several potential mechanisms. Using Spanish election data before and after the implementation of gender quotas, they find that parties sacrifice vote share rather than nominate female candidates, an indication of party bias against women.

The rest of the paper is structured as follows: Section 2 provides relevant background on the Indian political system, Section 3 describes our empirical strategy, and Section 4 presents our main results. Section 5 outlines a simple theoretical framework for candidate selection, Section 6 provides empirical evidence to distinguish between alternative mechanisms, and Section 7 concludes.

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[4] Beaman et al. (2009) find that women are significantly more likely to stand for and win elected positions in village councils in West Bengal if the post of chief councilor was reserved for a woman in two consecutive preceding elections. There are no significant impacts after one election period, in fact voter evaluations of women leaders deteriorate after one term of exposure. Bhavnani (2009) finds increases in women's candidacy and winning chances in reserved constituencies in Mumbai after quotas are lifted, but a subsequent re-analysis shows much weaker results, most likely because of the "discouragement" of women candidates in areas that were not subject to quotas (Sekhon and Titiunik, 2012).

2. Women in Indian Politics

2.1 Indian Electoral Politics

India is the world's largest democracy, with a parliamentary system of government at both the central 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. State level parties play a significant role in forming governing coalitions at the center, and previous research has shown that state-level voting behavior is highly correlated with voting in national elections (Ravishankar, 2009). Further, since state-level political office is often a stepping stone for contesting national elections, our work captures the dynamics of female participation at the "pipeline" stage for national office.

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.[5] 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 voted on in the lower house, making the analysis in this paper highly topical.

In India's political system, party leaders decide who their candidate will be in every constituency. 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 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 main candidate quality emphasized by all parties was the ability to win the election, termed "winnability" in Indian politics. To this end, several metrics

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[5] The impact of this reform has been examined in several recent papers including Chattopadhyay and Duflo (2004), Beaman et al (2009) and Iyer et al (2012). Political quotas exist at that state and national levels for members of the Scheduled Castes and Scheduled Tribes; Pande (2003) and Krishnan (2007) examine the policy impact of these quotas.

including the candidate's name recognition within the constituency, service to the party, financial resources, caste identity and internal party support were considered relevant. Interestingly, very few party leaders felt that women voters were more likely to vote for women candidates, though several expressed the view that women were less interested in politics than men, and that a political career was not attractive to women.

2.2 Data Sources

We obtained data on elections to state legislative assemblies in 3473 constituencies from the Election Commission of India over the period 1980-2007 in 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 which account for over 95% of the total population.[6] We obtained relevant demographic data (literacy, urbanization) at the constituency level from the 2001 census.[7]

We tracked candidates by name over successive elections to identify whether candidates in a specific election were present in the previous election.[8] Overall, in our sample, three-quarters of all candidates 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, which 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

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[6] The states included are: 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 first two states, electoral constituency boundaries remained fixed over time, and we drop the data from the Uttarakhand state elections of 2002 and 2007 since we are unable to match the electoral constituencies over time.
[7] We thank Rikhil Bhavnani and Sandip Sukhtankar for sharing these data with us.
[8] Candidate names are often spelt differently across elections and candidates often change party affiliations too. We therefore did a case by case manual matching of candidate names over time.

regression discontinuity strategy, we will verify that none of these characteristics vary across winners and losers in close elections.

2.3 Women's Political Participation in State Elections

Women are dramatically under-represented in India's state legislatures. As mentioned earlier, only 5.5% of state legislators were women, but only 4.4% of candidates were women. Almost 70% of electoral races had no female candidates at all, and only 7% of races had more than one woman candidate. While showing a secular increase over our sample period, women's participation varied dramatically across states. For instance, in 2000-2007, the share of female candidates from major parties varied from almost 13% in the state of Andhra Pradesh to only 4% in the neighboring state of Karnataka (Figure 1). Major parties in general are more rather than less likely to nominate women candidates, with 5.6% of their candidates being women.[9]

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. In 2013, only four out of forty major parties in India were headed by women. These parties have a slightly higher share of female candidates, 7% compared to the 5% share for major parties not headed by women. Women are less likely than men to contest elections again, irrespective of whether or not they win. Only 66% of female winners and 31% of female runners-up contest the next election, compared to 72% of male winners and 40% of male runners-up.

State elections in India are competitive. In our data, the mean (median) number of candidates per constituency is ten (eight). Of these, only 34% (2.6 candidates on average) are from major political parties and only 3 candidates on average manage to obtain more than 5 percent of the total votes, suggesting that the majority of candidates in India's electoral races are not politically viable. In the analysis to follow, we therefore consistently present results separately for major party candidates and competitive candidates in order to focus on candidates who are politically meaningful.[10]

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[9] We classify a party as a "major party" in a state if the party won more than 5 percent of the seats in the state in any year.

[10] There is a strong overlap between these categories. The vast majority (88%) of major party candidates are competitive in the sense of obtaining at least 5% of total votes cast. Similarly, about 73% of competitive candidates belong to a major party.

3. **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 characteristics such as voter preferences, which might directly determine women's participation as voters and candidates in subsequent elections. We address this problem using a regression discontinuity (RD) estimator, which focuses on mixed-gender electoral races decided by a very narrow margin. 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.[11] The identifying assumption is that the assignment of treatment around the threshold is uncorrelated with any observed or unobserved characteristics of the candidate or the constituency i.e. that constituencies in which women win in close elections against men are similar to constituencies in which women lose narrowly against men, except for the gender of the winning candidate.[12] The estimated model is of the form:

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

Y_{ist} is a measure of female political participation for constituency i in state s in year t. We focus upon the share of women candidates (overall and among major parties) and female voter turnout but we also look at the competitiveness of women candidates and at male turnout. The sample is restricted to elections in which a man and a woman were among the

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[11] See Lee (2008) for the seminal use of the regression discontinuity design using electoral data. Studies which use close elections between men and women include Rehavi (2007), Clots-Figueras (2011 and 2012), Bhalotra and Clots-Figueras (forthcoming) and Broockman (2012).

[12] We thus implicitly test whether winning matters discontinuously, that is, significantly more than a good electoral performance which falls short of winning (captured by woman being close runners-up in the "control group" of constituencies in which women lose close elections against men). Using an OLS specification, we later verify that having a woman as runner-up has no additional effect on future female candidacy.

top two vote-getters[13] and $M_{is,t-1}$ is defined as the margin of victory between the female and the male politician in the previous election in the constituency. **WomanWon**$_{is,t-1}$ is a dummy which equals one if a woman won against a man ($M_{is,t-1} > 0$) and zero if a woman lost against a man ($M_{is,t-1} < 0$). The parameter **b** captures the causal impact of this event on women's participation as candidates and voters in the next election.

So as to increase our confidence that we estimate the impact of the discontinuity that determines winning rather than an underlying non-linearity in the relationship between participation (Y) and the vote margin (M), we fit a flexible function of the vote margin, **f($M_{is,t-1}$),** on either side of the discontinuity, using second-order polynomials (e.g. Lee, Moretti and Butler 2004). We show that our results are robust to adding higher-order polynomials. We also estimate local linear regressions (Hahn et al, 2001; Imbens and Lemieux, 2007), restricting the sample to an optimal bandwidth around the discontinuity, with the optimal bandwidth selected by applying the method in Imbens and Kalyanaraman (2011). Finally, we 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). To examine persistence in the relationship of interest, we estimate equation (1) replacing the first lag with longer lags, first the second, then the third lag. These provide reduced form estimates of how women's participation in election t responds to a woman having won in election $t-2$ or $t-3$ (ten and fifteen years ago), respectively, implicitly averaging over the gender of the winner in intervening elections.

While regression discontinuity estimates are likely to satisfy internal validity conditions, they may or may not have external validity. In particular, the relationship that we identify may not hold in constituencies that do not have close elections between men and women. In the appendix, we report OLS estimates of a panel data specification run on the universe of elections:

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[13] The top two vote-getters in mixed gender races get on average 81% of the total votes in their constituencies.

$$(2) \ Y_{ist} = a_{is} + b_t + cWomanWon_{is,t-1} + u_{ist}$$

where a_{is} is a fixed effect for constituency i in state s and b_t is a fixed effect for the election cycle.[14]

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

4.1 Regression Discontinuity Estimates

We find that the event of a woman winning an election leads to a large and statistically significant increase of 9.2 percentage points in the share of women candidates from major parties in the subsequent election (Table 2, column 2). As the mean share of women among major party candidates is 23% in the regression discontinuity sample, this is close to a 40% increase. The share of women among competitive candidates, defined as those who get at least 5% of total votes cast, also increases significantly (column 3). This is consistent with the strong overlap between major party and competitive candidates. Interestingly, when we consider all candidates, there is only a statistically insignificant increase of 1.5 percentage points in future female candidacy (Table 2, column 1). So the evidence rejects the notion that women are token candidates, 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.

The increase in the female candidate share is not driven by a decrease in the overall number of candidates. Neither the total number of candidates nor the number from major parties changes significantly following a female electoral victory (columns 7 and 8). Instead, there is a substitution of female for male candidates among major parties: the number of female candidates increases by 0.177 and the number of male candidates decreases by 0.21, and these coefficients are statistically significant (columns 9 and 10).

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[14] Since elections are held every five years on average, we use the five year intervals (1980-84, 1985-89 etc) to denote the "election cycle". Our results remain unchanged if we include annual year dummies instead. Standard errors for OLS regressions are clustered at the constituency level, for RD regressions they are clustered at the state-electoral cycle level, given that in many constituencies there is only one election between a woman and a man. However, RD results with standard errors clustered at the district level are very similar to those reported in the paper and available on request.

A visual representation of these estimates is in Figure 2B, which shows a jump in the major party female candidate share 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. The jump at the threshold is smaller for the overall share of female candidates (Figure 2A).

We next examine how much of the observed rise in women's candidacy represents entry of new female candidates, defined as those who did not contest the previous election. We find no evidence of entry: the regression coefficient for the new female share of major party candidates is small, negative and statistically insignificant (see Table 2, column 4 and Figure 2C). So a woman winning raises women's candidacy in the next election primarily through raising the chances that prior women candidates obtain the party nomination. We also examined whether women's participation as voters changes in response to women's electoral victory. We find no significant change in female or male voter turnout (Table 2, columns 5 and 6). We have also verified that voter turnout is not significantly associated with the fraction of female candidates in the *current* election (results available on request). This contrasts with the finding that both black and white voters are more likely to turnout to vote when blacks are on the ballot in U.S. elections (Washington 2006). In addition, we find no significant increase in the probability that a woman wins the next election (Table 2, column 11).

We present OLS estimates using all elections in an appendix (Table A1). The OLS coefficients are similar to the RD coefficients for major party, competitive candidates, and for electoral turnout, if somewhat larger in magnitude (columns 1, 3, 6 and 7). However, OLS results are different from RD for the share of new women candidates and the overall share of female candidates (columns 4 and 5). We see that a woman placing as a runner-up in the previous election has no impact on future female candidacy, justifying our focus on winning (column 2).

4.2. Spillovers and Persistence

We find no evidence of spillover effects to other constituencies within the same district (Table 3, column 1). This is consistent with our interviews with politicians which described the candidate selection process as being constituency specific: local name recognition or local resources were a major determining factor, and "parachuting" in

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candidates from outside the constituency seldom happened. A related analysis of US data similarly finds no impact of a woman being elected on the participation of women in neighboring districts (Broockman 2012).

The effects of a woman winning an election persist to the ten year mark (two elections later) although the marginal increase in the share of women candidates from major parties is reduced to just under half its size at the five year mark (a 4.2% point increase). At the fifteen year mark it drops to effectively zero (Table 3, columns 2 and 3), though the sample size declines by 23% and 40% when considering these lags. This diminishing effect is consistent with increased female candidacy depending upon women winning elections, and we saw that a woman's victory in one election does not imply a higher probability that a woman wins the next election.

4.3 Robustness and Validity of the Regression Discontinuity Design

4.3.1. Robustness to functional form and sample for the running variable

We conduct a series of robustness checks for the RD result that the female share of major party candidates in a constituency rises following a woman having won (Table 3, Panel B). The baseline specification in Table 2 controls for a quadratic polynomial in the victory margin that is allowed to be different at both sides of the discontinuity; we now enrich the specification with controls for third and fourth order polynomials in the victory margin. The point estimate decreases with the order of the polynomial but is not significantly different from the reported baseline coefficient (Table 3, columns 4 and 5). The estimate is again similar when a local linear regression is estimated on a sample restricted to an optimal bandwidth around the discontinuity (column 6)[15] and when the sample is restricted to a very narrow bandwidth of 0.05 and we effectively compare the mean of the dependent variable on both sides of the discontinuity (column 7). We then include 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. Again the estimated coefficient retains its size and significance (column 8).

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[15] The optimal bandwidth is 0.24.

4.3.2. *Continuity of the vote margin*

For the identification strategy to be valid the density of the running variable has to be continuous at the threshold. Manipulation of the vote margin is unlikely in our setting, since the Election Commission of India has a well-established reputation of independence and political neutrality, and Indian elections are usually considered free and fair. Following McCrary (2008), we formally verify that there is no significant discontinuity at the zero point; the estimated discontinuity is 0.0534 with a standard error of 0.0951 (see Figures 3A and 3B).

4.3.3. *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, points other than zero. As suggested in Imbens and Lemieux (2007), we implemented a placebo check re-computing the RD estimates using "fake" discontinuities at the medians of the subsamples on either side of the zero vote margin. The coefficient of interest is much smaller and statistically insignificant (Table 4, Panel A).

4.3.4. *Do covariates and pre-determined variables show discontinuities?*

A virtue of the RD design is that its assumptions are testable. We verified that a range of demographic covariates (population gender ratios, literacy rates, urbanization rates)[16] and pre-determined electoral variables (total number of female electors, the number of candidates, voter turnout and the number of female candidates from major parties in the previous election) do not vary discontinuously at the RD threshold (Table 4, Panel B). We test this using our main specification and with local linear regressions run on an optimal bandwidth. Only one of the 26 coefficients is significant, and reassuringly, all coefficients are very small, which means that these variables are balanced around the discontinuity.

4.3.5 *Do characteristics other than gender vary discontinuously?*

In a seminal paper, Lee (2008) investigated party incumbency advantage in the US using close elections between Democrats and Republicans. Recent studies (Caughey and Sekhon 2011, Grimmer et al., 2011) have questioned the validity of the RD premise that the (party)

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[16] We used census data at the constituency level for this.

identity of the winner is quasi-random in close elections, showing that in fact the incumbent party in US elections tends to have systematically greater chances of winning even when elections are close. However Eggers et al. (2013) 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.

We nevertheless test for sorting and find no evidence that winners and losers in close elections between women and men are significantly different in a range of relevant characteristics such as gender, education, wealth, criminal convictions, belonging to a major political party or being the incumbent (Figure 4). If this were not the case, we may attribute to gender other characteristics of winners. Importantly, women are not more likely than men to win these elections (Figure 4A), and incumbents do not have an advantage in winning close elections (Figure 4F).[17]

5. A Simple Model of Candidate Choice

In this section, we analyze a simple model of candidacy, based on the framework of Casas-Arce & Saiz (2011). The model incorporates three barriers to the participation of women in politics: party bias, voter bias, and a tendency for women to be less willing to come forward as candidates than men. Women winning and holding office may lead to party leaders or voters revising their bias or to potential women candidates being encouraged to compete, so the impact of women winning on female candidacy that we have identified may arise through any of these mechanisms. The stylized model we present here is used to generate testable implications that help identify the empirical relevance of the alternative mechanisms.

In the model, there is a continuum of voters with mass 1 and their preferred policy outcomes are distributed uniformly along a policy continuum between 0 and 1. There are two parties in the model, with policy positions exogenously given at 0 and 1. We assume that

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[17] Female politicians are 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). 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 the winner and the runner-up to be similar.

party policy positions are decided before candidate selection (assumption A1), so as to isolate the determinants of female candidacy.[18] This is reasonable in the Indian setting, where policy positions are decided by the party leadership at the state level and party nominees are then chosen at the constituency level.

5.1 Timing of events

There are three time periods. First, potential candidates (male and female) decide whether to be in contention or not, creating a pool for parties to choose from. There may be differences between men and women in the cost of entering politics, perhaps because of social norms regarding the public roles of women, because women believe the payoff to running is lower, or because women perceive a career in politics to be incompatible with family responsibilities (Lawless and Fox 2010). This means that the ability distributions of potential male and female candidates can be different. In the second stage, parties choose their nominee for each constituency, in a process described in more detail below. Finally, voters vote to elect candidates to power.

5.2 Voters

Voters care about policies, candidate ability and gender. A voter with preferred policy $x \in [0,1]$ obtains the following utility by voting for party $p \in \{0,1\}$:

$$U(x,p) = C - (1/2)*\lambda*|p-x| + A_p - d_v*W_p$$

where C is a constant and λ measures the extent to which voters penalize deviations of party ideology from their own policy preference. Holding everything else constant, if λ is low, voters do not care a lot about party ideology and are more likely to switch based on candidate characteristics. A_p is the ability of party p's candidate, W_p equals one if party p's candidate is a woman and $d_v \geq 0$ measures the extent of voter bias against women. For simplicity, voter bias against women is assumed independent of the policy preferences of the voter. Candidates' abilities are known to voters before they vote (assumption A2), so that

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[18] Previous work on women's political representation endogenizes policy choice but does not model candidate selection (e.g. Chattopadhyay and Duflo, 2004).

voter bias is a taste discrimination parameter. However, if statistical discrimination takes the form of voters consistently assuming that the expected ability of women is lower than their actual ability, this would be observationally equivalent to voter bias in our model.[19]

Voters turn out to vote as long as the net utility of voting is higher than a reservation utility $\underline{C}$ of not voting. We assume that the opportunity cost of voting is low enough that all voters turn out to vote (assumption A3) which, in our setting, is without loss of generality since we find no changes in voter turnout following a woman's electoral victory. Given the full turnout assumption, the equilibrium outcome is such that all voters in $[0, x_m]$ vote for party 0, and all voters with ideal points in $[x_m, 1]$ vote for party 1, where the marginal voter x_m satisfies

$$(3)\ x_m = (1/2) + (1/\lambda)* [(A_0 - A_1) - d_v (W_0 - W_1)]$$

Party 0 gets the vote share x_m and Party 1 has vote share $(1 - x_m)$.

5.3 Parties

Potential candidates vary in their ability, with ability distributions f_{pm} and f_{pw} for men and women within party p. We assume that potential candidate ability is initially unknown, that parties draw a random sample from the male and female candidate pool within their parties, after which ability is revealed and then parties make the candidate choice that maximizes their utility. We assume that parties choose their party nominees simultaneously (assumption A4), a fair representation of the Indian political system where there are no official primaries to enable parties to predict the other party's candidate choice and all parties have a common deadline to declare an official candidate, typically one month before the election.

Parties are interested in winning elections. We therefore assume that they are interested in maximizing their vote share,[20] but that they also discriminate against women in

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[19] Statistical discrimination could also take the form of voters assuming that the variability of women's ability is larger than the variability of men's ability (Aigner and Cain 1977). We do not model this. In our data, there is no significant difference in the variability of realized vote shares for men and women major party candidates (considering vote share as a proxy for candidate ability). In fact, vote share variability is slightly lower for women. Of course, vote shares are measured after candidate selection.

a taste-based manner i.e. that party p experiences a disutility $d_p \geq 0$ from having women candidates.[21] After Party 0 obtains candidate ability draws a_{w0} and a_{m0}, it has to decide whether to choose a man or a woman to maximize utility $U^0 = x_m - d_0 W_0$. Taking the choices of Party 1 to be given (i.e. W_1 and A_1 are fixed), this implies solving:

$$\text{Max } (1/\lambda)*A_0 - (1/\lambda)* d_v W_0 - d_0 W_0$$

Party 0 therefore chooses the woman candidate over the man if

$$\textbf{(4)} \qquad \textbf{a}_{\textbf{w0}} > \textbf{a}_{\textbf{m0}} + \textbf{d}_{\textbf{v}} + \lambda \, \textbf{d}_{\textbf{0}}$$

A similar equation applies to party 1. So when neither parties nor voters discriminate (i.e. $\textbf{d}_{\textbf{v}}$ =0 and $\textbf{d}_{\textbf{0}} = \textbf{d}_{\textbf{1}}$=0), parties will choose the highest ability candidate, irrespective of the candidate's gender. However if either or both of political parties and voters discriminate, then the ability threshold for a woman candidate to be selected will be higher than that for male candidates.

Equation (4) captures the three mechanisms that might drive a rise in female candidacy in party 0 after a woman from that party wins an election: (a) a decline in the party's disutility of having a woman candidate (*d₀*), which is party-specific, either because the incumbent woman winner may act to recruit more women or, relatedly, because of the ascendance of woman-friendly factions within the party. The latter is consistent with a model in which party utility is the aggregate utility of current incumbents (as in Frechette, Maniquet and Morelli 2008); (b) a decline in voter bias against women (*d_v*) as voters get accustomed to seeing women in leadership positions, and (c) a rightward shift in the ability distribution of potential women candidates, due to the entry of more qualified women candidates. It is clear from equation (4) that if party and voter bias do not change then only a rightward shift in the ability distribution of potential female candidates can lead to an

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[20] This is without loss of generality, since winning is an increasing function of vote share with a discontinuity when vote share exceeds half in a two-party setting, and a different (endogenous) threshold in a multi-party setting.

[21] As with voter bias, a model of statistical discrimination in which parties assume that women and men have different expected average ability would be observationally equivalent to this one.

increase in the probability of selecting a female candidate. Using this framework we conduct some comparative static exercises.[22]

6 Testing Mechanisms

6.1 Reduced voter bias or an intra-party mechanism?

A reduction in voter bias (d_v) will lower the ability threshold for choosing a female candidate for both parties (see equation 4 above), leading us to expect to see greater female candidacy in *both* parties. On the other hand, if a woman's victory reduces party bias against women or leads to greater entry of potential female candidates within the woman winner's party, then the increase in female candidacy will be restricted to the party from which the woman won. So we are able to distinguish voter bias reduction from intra-party mechanisms by running the following regression:

$$(H1)\ Femcand_{pist} = a + b_{10}*WomanWon_{is,\,t-1} + b_{11}*WomanWon_{is,\,t-1}*$$
$$IncumbentParty_{pist} + \quad +b_{12}f(M_{is,t-1}) + b_{13}f(M_{is,t-1}) * IncumbentParty_{pist} + u_{pist}$$

where $Femcand_{pist}$ is the probability that the candidate from party p in constituency i of state s and time t is a woman, $WomanWon_{is,t-1}$ is a dummy which equals one if a woman won the last election in that constituency, and $IncumbentParty_{pist}$ is a dummy which equals one for the party from which the woman won in the previous election.[23] If voter bias reduction were the *only* mechanism at work, we would expect $b_{11}=0$.

The evidence rejects voter bias reduction in favor of a within-party mechanism since the estimated b_{11} (the interaction coefficient) is significantly greater than zero (Table 5, column 1). The increase in the probability that a woman candidate is fielded is unique to the incumbent party, there being a decline in the probability that the other party fields a woman candidate.. Combined with our previous result of no entry of new candidates (Table 2), this

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[22] We use the same RD design on close elections here as in the main analysis. For reference, we present OLS estimates on the wider sample of elections in Table A2.

[23] Note that, in the spirit of the "difference in discontinuities" methodology, see Grembi et al (2012), we also interact the margin and the margin polynomials with the *IncumbentParty$_{pist}$* dummy.This allows us to test whether the two discontinuities (for incumbent parties and other parties) are significantly different, while allowing the margin functions for both types of parties at both sides of the discontinuity to be different.

means that the primary effect of electoral victory is to enable women winners to contest for re-election.[24] In Section 6.4, we examine whether this pattern is different for male winners.[25]

We now look to distinguish between a reduction in party bias against female candidates and a rightward shift in the ability distribution of potential candidates.

6.2 Reduced party bias *vs* the candidate supply mechanism

In general, the change in vote share for party 0 between elections t-1 and t is given by:

(5) $V_{0,t} - V_{0,t-1} = (1/\lambda)* [(A_{0,t}-A_{0,t-1}) - (A_{1,t}-A_{1,t-1}) - d_{v,t}(W_{0,t}-W_{1,t}) + d_{v,t-1}(W_{0,t-1}-W_{1,t-1})]$

If more qualified women come forward within party 0 after that party has a female winner, we have $E(A_{0,t} - A_{0,t-1}) > 0$ provided party 0 fields a woman candidate both times. If there is no change in voter bias ($d_{v,t} = d_{v,t-1}$) and no change in the ability distribution in party 1 (i.e. $E(A_{1,t} - A_{1,t-1}) = 0$), then the expected change in vote share for female candidates is positive i.e. $E[V_{0,t} - V_{0,t-1}] > 0$. Since this will not happen if the same woman runs again ($A_{0,t} = A_{0,t-1}$), it follows that the vote share of *new* female candidates will go up if new, more qualified women are induced to enter. On the other hand, if party bias falls, this will lower the ability threshold for women potential candidates and new women candidates will have lower expected ability than before i.e. $E(A_{0,t} - A_{0,t-1}) < 0$, implying a lower vote share on average i.e. $E[V_{0,t} - V_{0,t-1}] < 0$.[26] We can discriminate between these mechanisms by estimating the following regression:

(H2) Voteshare of new female candidates$_{ist}$ = a + b$_{20}$Woman Won$_{is,t-1}$+ b$_{21}$f(M$_{is,t-1}$) + u$_{ist}$

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[24] We have verified this explicitly. When the dependent variable is changed to whether a *prior* female candidate is present in the current election, we find a very similar coefficient of 0.763 for b_{11}. There is no entry of new female candidates from incumbent or other parties.

[25] Party bias against women is more likely to be exercised in less competitive environments where the cost of exercising bias (in terms of votes lost) is smaller (Casas-Arce and Saiz 2011). Our RD strategy exploits the presence of close elections, which are by definition very competitive. So there is insufficient variation in the sample to test this (and we will tend to under-estimate party bias). However the descriptive statistics are consistent with women's candidacy being greater in more competitive settings.

[26] The voter bias reduction mechanism yields ambiguous results: on the one hand, the ability threshold to become a candidate has been lowered for women, but all women now receive more votes.

The increased candidate supply hypothesis implies $b_{20}>0$, while reduction in party bias implies $b_{20}<0$. The estimated b_{20} is negative and statistically significant (Table 5, column 2) consistent with a reduction in party bias against women candidates rather than an increase in the supply of potential women candidates. This finding resonates with our earlier result that a woman winning does not stimulate entry of new women candidates (see Section 4). In the next section, we conduct a further test of the candidate supply hypothesis that focuses upon the supply of experienced women.

6.3 Does an increase in the supply of experienced potential female candidates matter?

In general, it is difficult to measure the ability of political candidates (Besley et al, 2012). In our case, variables such as education, income and other relevant characteristics are not available for the full sample of candidates in Indian electoral data and the test presented in section 6.2 relies upon vote share as a measure of ability. Here we assess the candidate supply mechanism by exploiting a massive shock to the supply of women with political experience determined by a constitutional amendment in 1993 that mandated a one-third quota for women in district and village level councils. As in Iyer et al. (2012), we use the variation in the incidence of this shock generated by the fact that the Indian states implemented this mandate in different years (for exogenous reasons). We test whether the increase in women's candidacy following a woman winning a state seat is greater in state elections that occur after the more local village and district level quotas for women were put in place. To do this we run a difference-in-discontinuities model as follows:

(H3) Femcand$_{ist}$ = a + b$_{30}$*WomanWon$_{is,t-1}$ + b$_{31}$*WomanWon$_{is,t-1}$* PostQuota$_s$+b$_{32}$ f(M$_{is,t-1}$)   + b$_{33}$f(M$_{is,t-1}$) * PostQuota$_s$ +u$_{ist}$

where **PostQuota$_s$** is an indicator which equals one if the state has implemented gender quotas in local elections, and zero if it has not. If the supply of women with political experience (and connections) were a constraint then we would expect $b_{31}>0$.

The estimated b_{31} is statistically insignificant (Table 5, column 3). This result is relevant because it highlights the lack of "upward mobility" in the political sphere, the

implementation of quotas at lower levels does not appear to increase female candidacy at higher levels of government.

6.4 Do female winners behave differently from male winners in future elections?

Our results so far indicate that the increased candidacy of women is primarily driven by women candidates that won the previous election contesting again. We now investigate whether this holds equally for male winners by running the following regression in the mixed-gender elections sample:

$$(H4)\ ContestNextElec_{cist} = a + b_{40}*Won_{cis,t} + b_{41}* Won_{cis,t} * Female_{cis} + b_{42}f(M_{is,t}) + b_{43}f(M_{is,t}) * Female_{cis} + u_{cist}$$

where $ContestNextElec_{cist}$ is a dummy for whether candidate c in constituency i of state s and year t is a candidate in the next election, $Won_{cis,t}$ is a dummy variable indicating whether candidate c won the mixed-gender race, $Female_{cis}$ is an indicator for whether the candidate is female, and $M_{is,t}$ is the margin of victory. The coefficient of interest is b_{41}, which captures the difference between female and male winners.

We find that both male and female candidates are equally likely to re-run for election after a victory (Table 5, column 4).[27] However, when we examine the probability of running for re-election from the same party as a dependent variable, we find a significant gender difference. Women winners are more likely to contest the next election from the same party as before, compared to male winners (Table 5, column 5), and this effect is not present for women who lose the election. We interpret this as supportive evidence that the within-party environment has improved for women following an electoral victory.[28]

7. Conclusions

Using plausibly exogenous variation in women winning political office, we identify a large and significant increase in the subsequent share of women candidates fielded by major

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[27] When running the same specification without the gender interaction we find that winners in mixed-gender races are 21% more likely than losers to contest the next election. Men who win in close elections against other men are 19% more likely to contest for re-election, an effect which is not statistically different.

[28] This is not because the woman candidate necessarily improves the party's prospects. The probability of having a woman candidate after a woman's electoral victory does not vary by whether the electoral victory was accompanied by an improvement in the party's vote share (results available upon request).

parties in Indian state elections. The increase arises mainly from an increased propensity for previous candidates to run for re-election, rather than the entry of new women candidates. 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. There is however no significant increase in the probability that a woman wins the next election. Consistent with this, the estimated impact on women's candidacy fades over time although a significant impact persists through two elections, which is a period of ten years. There are no significant spillovers to other constituencies in the same district, and no change in voter turnout amongst women or men. Testing the implications of a stylized model of candidate choice suggests that reduction in party bias against women is the primary driver of the increase in women's candidacy following a woman's electoral victory. We find little support for a reduction in voter bias or an increase in the supply of more qualified potential candidates.

Our results show how large and yet how local the power of a good example is. The novel and important new finding is that parties appear willing to change their priors with regard to the viability of women candidates after observing a woman win an election. However, we still know very little about internal party processes in developing country democracies, and how they are likely to react to policy measures such as gender quotas.[29] Our results also highlight that a "demonstration effect" is not enough: further economic, institutional or policy incentives are needed to stimulate entry of new women into the political arena and more widespread participation of women as voters. Both these directions are likely to be fruitful areas for future research.

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[29] Existing literature on political parties in India has mainly focused on the strategies used to reach out to voters, rather than candidate selection processes (Chandra 2004; Thachil 2011).

References

Aigner, Dennis and Cain, Glenn. 1977. "Statistical Theories of Discrimination in Labor Markets." *Industrial and Labor Relations Review* 30:175-187.

Angrist, Joshua and Victor Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *Quarterly Journal of Economics*, 114 (2).

Babcock, Linda and Sara Laschever. 2003. *Women Don't Ask: Negotiation and the Gender Divide.* Princeton University Press, New Jersey.

Bagues, Manuel and Berta Esteve-Volart. 2012. "Are Women Pawns in the Political Game? Evidence from Elections to the Spanish Senate," *Journal of Public Economics* 96, pp. 387-399.

Bardhan, Pranab, Dilip Mookherjee and Monica Torrado. 2010. "Impact of Political Reservations in West Bengal Local Governments on Anti-Poverty Targeting." *Journal of Globalization and Development* 1(1):Article 5.

Beaman, Lori, Raghabendra Chattopadhyay, Esther Duflo, Rohini Pande and Petia Topalova. 2009. "Powerful Women: Does Exposure Reduce Bias?" *Quarterly Journal of Economics* 124(4): 1497-1540.

Bertrand, Marianne. 2009. "CEOs". *Annual Review of Economics* 1:1.1-1.29.

Bertrand, Marianne, Claudia Goldin and Larry Katz. 2010. "Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors." *American Economic Journal: Applied Economics* 2(3): 228-55.

Bertrand, Marianne and K.F. Hallock. 2001. "The Gender Gap in Top Corporate Jobs." *Industrial and Labor Relations Review* 55:3–21

Besley, Timothy, Olle Folke, Torsten Persson and Johanna Rickne. 2012. "Gender Quotas and the Crisis of the Mediocre Man: Theory and Evidence from Sweden." Working Paper.

Bhalotra, Sonia and Irma Clots-Figueras. Forthcoming. "Health and the Political Agency of Women." *American Economic Journal: Economic Policy.*

Bhavnani, Rikhil. 2009. "Do Electoral Quotas Work After They Are Withdrawn? Evidence from a Natural Experiment in India." *American Political Science Review* 103 (1):23-35.

Boisjoly, Johanne, Greg Duncan, Michael Kremer, Dan Levy and Jacque Eccles. 2006. Empathy or Antipathy? The Consequences of Racially and Socially Diverse Peers on Attitudes and Behaviors.*" American Economic Review*, 96, 1890-1906.

Broockman, David E. (2012). Do Female Politicians Empower Women To Vote or Run for Office? A Regression Discontinuity Approach. Mimeograph, Department of Political Science University of California, Berkeley

Brollo, Fernando and Ugo Troiano. 2012. "What Happens When a Woman Wins a Close Election? Evidence from Brazil." Working Paper, Harvard University.

Campa, Pamela. 2012. "Gender Quotas, Female Politicians and Public Expenditures: Quasi-Experimental Evidence." Working Paper, Stockholm University.

Casas-Arce, Pablo and Albert Saiz. 2011. "Women and Power: Unwilling, Ineffective, or Held Back?" IZA Discussion Paper No. 5645.

Caughey, Devin and Jasjeet Sekhon (2011). "Elections and the Regression-Discontinuity Design: Lessons from Close U.S. House Races, 1942-2008." *Political Analysis*, 19 (4): 385-408.

Chandra, Kanchan. 2004. *Why Ethnic Parties Succeed: Patronage and Ethnic Head Counts in India.* Cambridge University Press.

Chattopadhyay, Raghabendra and Esther Duflo. 2004. "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India." *Econometrica* 72(5): 1409-1443.

Clots-Figueras, Irma. 2011. "Women in Politics: Evidence from the Indian States." *Journal of Public Economics* 95: 664-690.

Clots-Figueras, Irma. 2012. "Are Female Leaders Good for Education? Evidence from India." *American Economic Journal: Applied Economics* 4(1), 212-44.

Coate, S. & Loury, G.C., 1993. Will Affirmative-Action Policies Eliminate Negative Stereotypes? *The American Economic Review*, pp.1220-40.

Croson, R. & Gneezy, U., 2009. Gender Differences in Preferences. *Journal of Economic Literature*, pp.448-74.

Deininger, Klaus and Hari Nagarajan. 2011. "Does Female Reservation Affect Long-Term Political Outcomes? Evidence from Rural India." World Bank Policy Research Working Paper 5708.

Dal Bó, E., Dal Bó, P., and Jason Snyder. 2009. "Political Dynasties". *Review of Economic Studies*. 76(1), January 2009.

Duflo, Esther. 2012. "Women's Empowerment and Economic Development", *Journal of Economic Literature* 50(4): 1051-79.

Eggers, Andrew. 2011. "Is Female Political Participation Self-Reinforcing? Evidence from French Municipal Politics." Mimeograph.

Eggers, Andrew C., Olle Folke, Anthony Fowler, Jens Hainmueller, Andrew B. Hall and James M. Snyder, Jr. 2013. "On The Validity Of The Regression Discontinuity Design For Estimating Electoral Effects: New Evidence From Over 40,000 Close Races". Mimeograph, London School of Economics.

Frechette, Guillaume, Francois Maniquet and Massimo Morelli. 2008. "Incumbents' Interests and Gender Quotas." *American Journal of Political Science* 52(4), 891-909.

French, Patrick. 2011. "The Princely State of India". *Outlook Magazine*, Jan 17 2011.

Gagliarducci, Stefano and Daniele Paserman. 2012. "Gender Interactions within Hierarchies: Evidence from the Political Arena." *Review of Economic Studies* 79(3): 1021-1052.

Grembi, V., Nannicini, T and Ugo Troiano. 2012. Policy Responses to Fiscal Restraints: A Difference-in-Discontinuities Design. IZA DP No. 6952.

Grimmer, Justin, Eitan Hersh, Brian Feinstein and Dan Carpenter. 2011. "Are Close Elections Random?" Mimeograph. Harvard School of Government.

Hahn, J., Todd, P., Van Der Klaauw, W., 2001. "Identification and estimation of treatment effects with a regression discontinuity design." *Econometrica*, Vol. 69.

Imbens, Guido and Thomas Lemiuex, 2007, "Regression discontinuity designs: A guide to practice", *Journal of Econometrics*, doi:10.1016/j.jeconom.2007.05.001.

Imbens, Guido, and Karthik Kalyanaraman. 2011. "Optimal Bandwidth Choice for the Regression Discontinuity Estimator." *Review of Economic Studies*.

Iyer, Lakshmi, Anandi Mani, Prachi Mishra and Petia Topalova. 2012. "The Power of Political Voice: Women's Political Representation and Crime in India." *American Economic Journal: Applied Economics*, 4(4): 165-193.

Krishnan, Nandini. 2007. "Political Reservations and Rural Public Good Provision in India." Working Paper, Boston University.

Lawless, Jennifer L. and Richard L. Fox. (2010) *It Still Takes A Candidate: Why Women Don't Run for Office*, New York: Cambridge University Press.

Lee, David. 2008. "Randomized experiments from non-random selection in U.S. House elections." *Journal of Econometrics* 142 (2): 675–697.

Lee, David S., Enrico Moretti, and Matthew J. Butler. 2004. "Do Voters Affect or Elect Policies? Evidence from the U.S. House." *Quarterly Journal of Economics*, 119(3), 807-860.

Linden, Leigh. 2004. "Are Incumbents Really Advantaged? The Preference for Non-Incumbents in Indian National Elections." Working Paper.

McCrary. 2008. "Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test," *Journal of Economic Literature* 142 (2).

Miller, Grant. 2008. "Women's suffrage, political responsiveness, and child survival in American history." *Quarterly Journal of Economics*, 123, 1287–1327.

Niederle, Muriel, and Lise Vesterlund. 2007. "Do Women Shy away from Competition? Do Men Compete Too Much?" *Quarterly Journal of Economics*, August 2007, Vol. 122, No. 3: 1067-1101.

Pande, Rohini. 2003. "Can Mandated Political Representation Increase Policy Influence for Disadvantaged Minorities? Theory and Evidence from India." *American Economic Review* 93(4): 1132-1151.

Pande, Rohini and Deanna Ford. 2011. "Gender Quotas and Female Leadership: A Review," Background paper for the World Development Report on Gender.

Ravishankar, Nirmala. 2009. "The Cost of Ruling: Anti-Incumbency in Elections." *Economic and Political Weekly* 54 (10): 92-98.

Rehavi, Marit. 2012. "Sex and Politics: Do Female Legislators Affect State Spending?" Working Paper, University of British Columbia.

Sekhon, Jasjeet S. and Rocio Titiunik. 2012. "When Natural Experiments are Neither Natural Nor Experiments." *American Political Science Review* 106 (1): 35-57.

Thachil, Tariq. 2011. "Embedded Mobilization: Nonstate Service Provision as Electoral Strategy in India." *World Politics*, 63 (July): 434-469.

Uppal, Yogesh. 2009. "The Disadvantaged Incumbents: Estimating Incumbency Effects in Indian State Legislatures." *Public Choice* 138: 9-27.

Washington, Ebonya. 2006. "How Black Candidates Affect Voter Turnout." *Quarterly Journal of Economics* 121(3): 973-998.

Wolfers J. 2006. Diagnosing Discrimination: Stock Returns and CEO Gender. *Journal of the European Economic Association*. 4:531–41

Figure 1
Female Share of Major Party Candidates in Major Indian States, 1980-2007

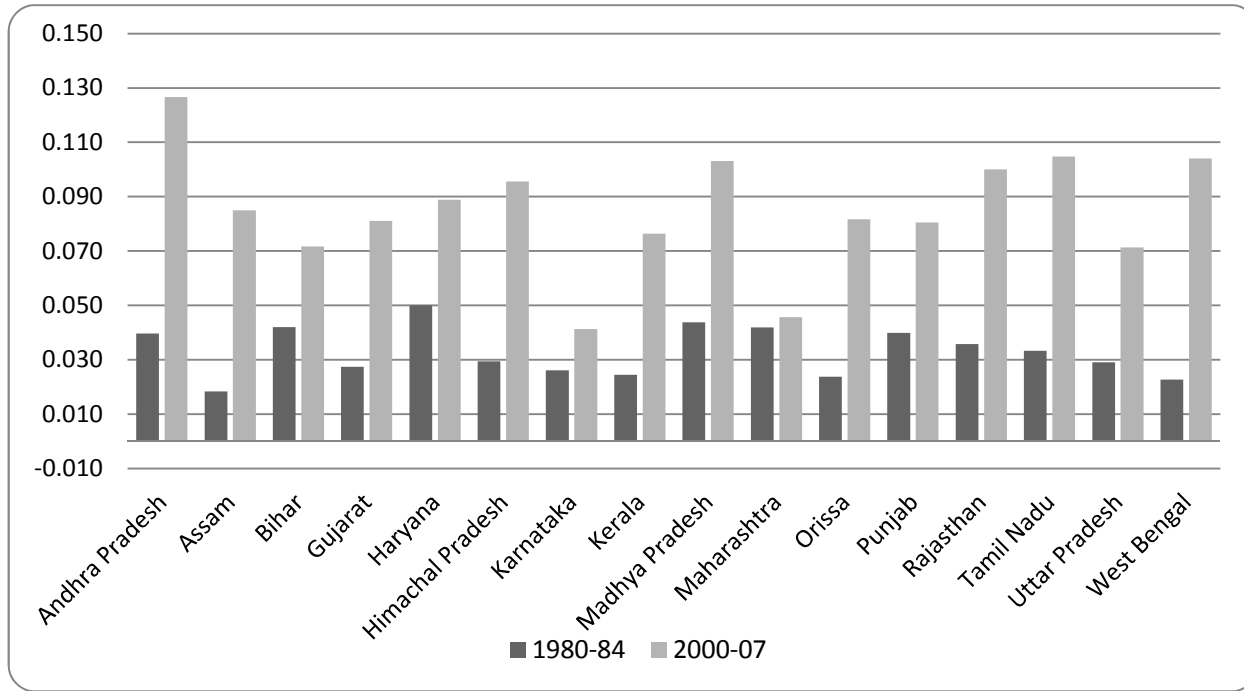**Figure 2: Regression Discontinuity Estimates for Women's Political Participation**

A: Fraction of female candidates
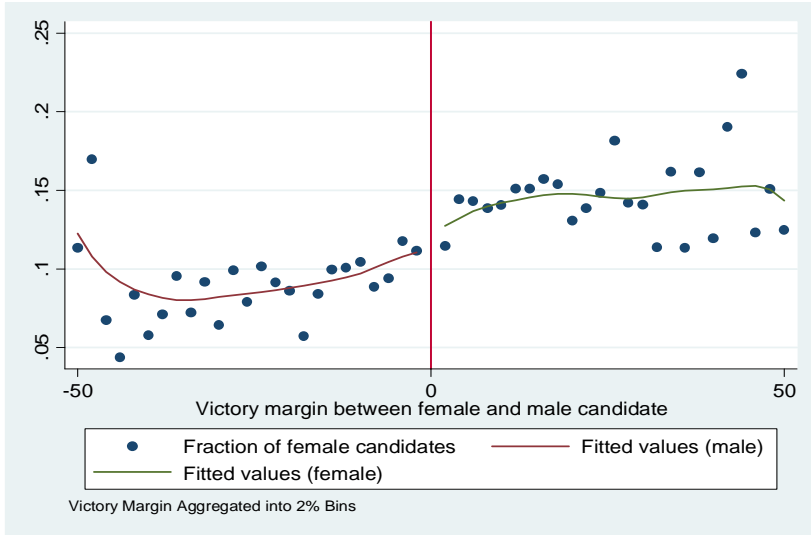
Victory Margin Aggregated into 2% Bins

B: Female share of major party candidates

Victory Margin Aggregated into 2% Bins

C: New female share of major party candidates

Victory Margin Aggregated into 2% Bins

D: Female voter turnout

Victory Margin Aggregated into 2% Bins
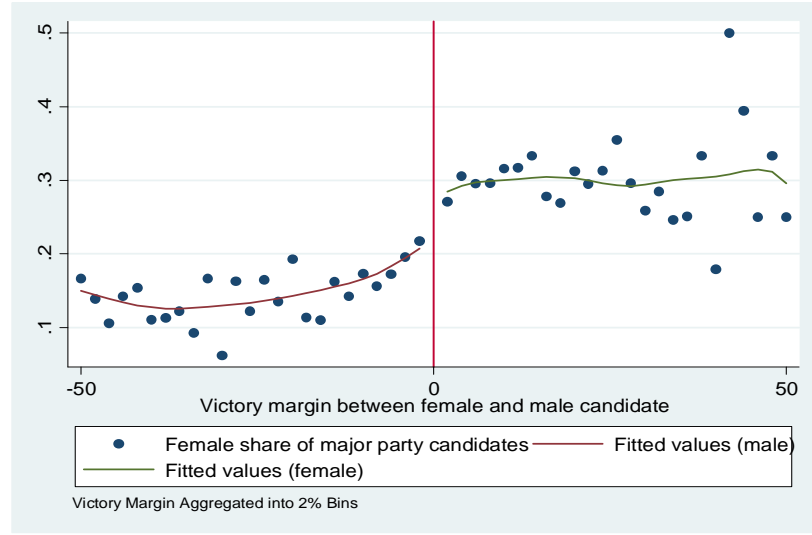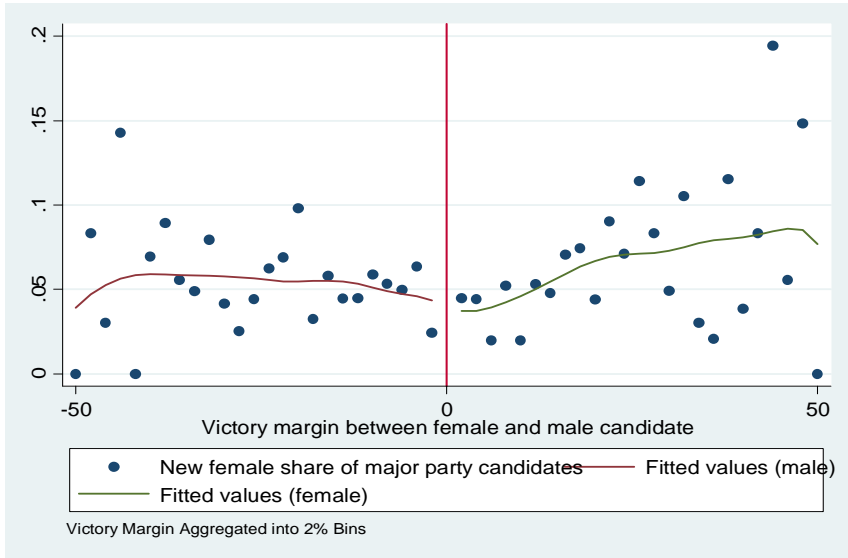
Figure 3: Testing the Continuity of the Victory Margin between Female and Male Candidates

A. Density of the victory margin
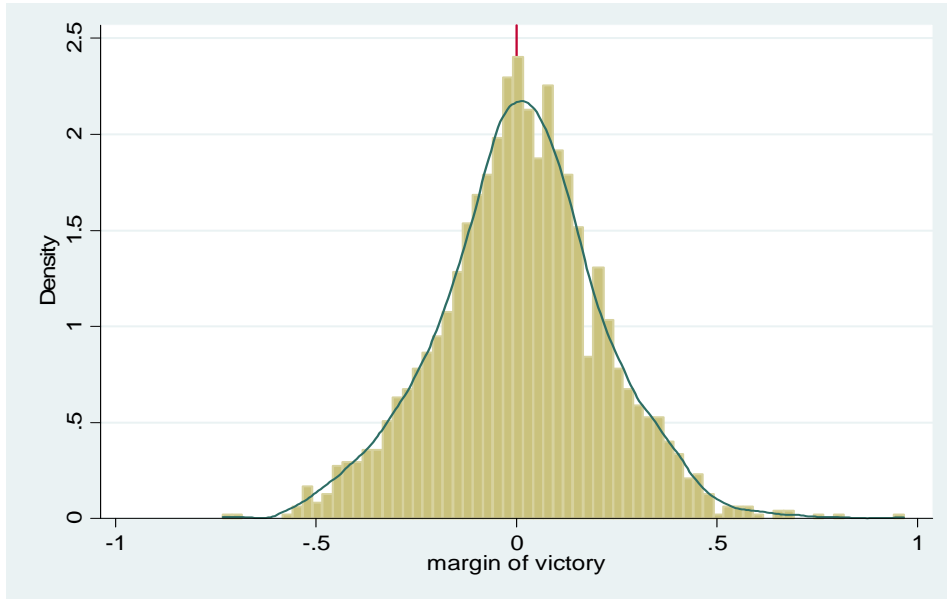
B. Testing for density discontinuities at zero (McCrary Test)
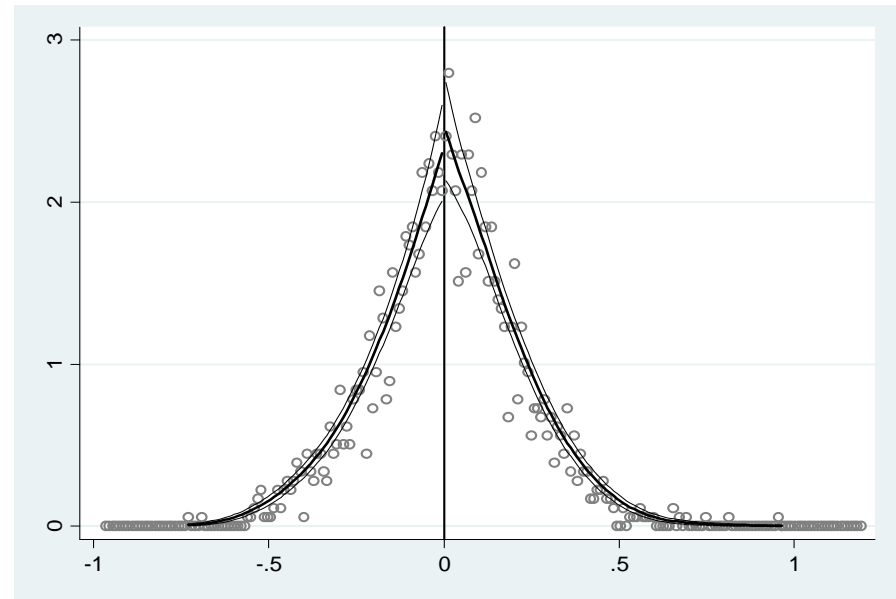
Notes: Sample restricted to those where a man and a woman were the top two vote-getters in the election.

Discontinuity estimate in Figure B (log difference in height): .05338 (s.e. = 0.0951)

Figure 4: Characteristics of Winners and Losers in Mixed-Gender Elections

A. Gender of winning candidate

Victory margin between winner and runner-up

- Winner is female — Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins
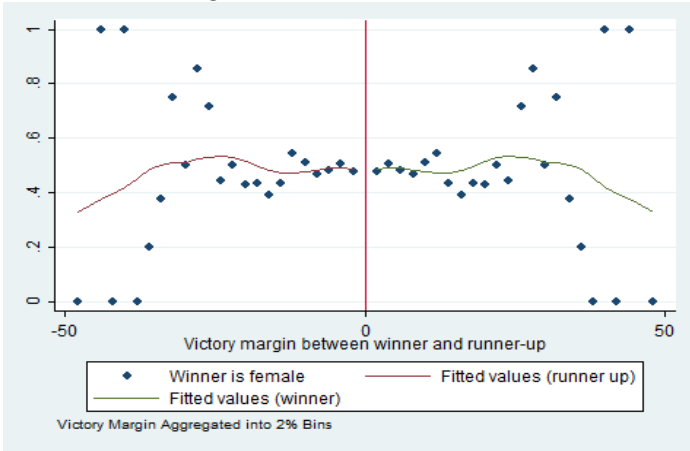
B. Any criminal charges filed against candidate

Victory margin between winner and runner-up

- Any criminal cases — Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins

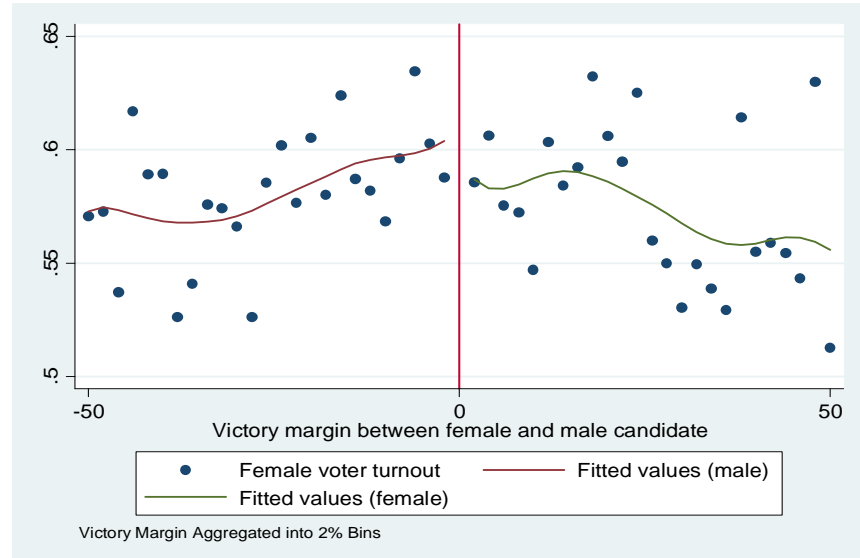**C. Candidate has less than high school education**

Victory margin between winner and runner-up

- Candidate has less than high school education Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins

D. Log (net worth)

Victory margin between winner and runner-up

- Log net worth (assets-liabilities) — Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins

E. Candidate belongs to a major party

Victory margin between winner and runner-up

- Major party candidate — Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins
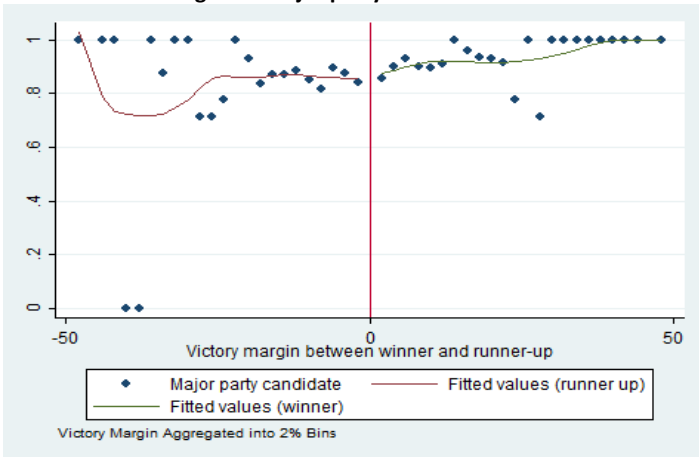
F. Candidate was the incumbent

Victory margin between winner and runner-up

- Candidate is the incumbent — Fitted values (runner up)
- Fitted values (winner)

Victory Margin Aggregated into 2% Bins
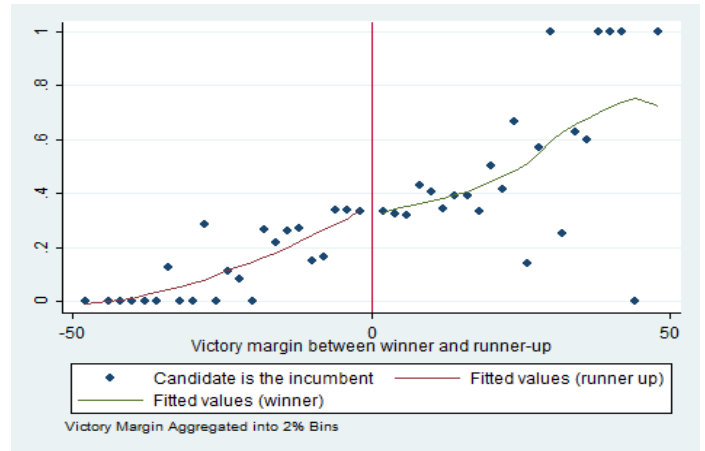
Table 1
Descriptive Statistics

Whole Sample	Obs	Mean	Std. Dev	Min	Max
Fraction of female candidates	22478	0.044	0.082	0	0.8
Female share of major party candidates	22420	0.056	0.156	0	1
New female share of major party candidates	22420	0.038	0.129	0	1
Female share of competitive candidates	22478	0.050	0.134	0	1
Female voter turnout	22421	0.587	0.154	0	1
Male voter turnout	22415	0.664	0.124	0.004	1
Woman won previous election (dummy)	22296	0.048	0.214	0	1
Regression Discontinuity Sample	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Fraction of female candidates	1898	0.120	0.124	0	0.8
Female share of major party candidates	1897	0.232	0.252	0	1
New female share of major party candidates	1897	0.054	0.153	0	1
Female share of competitive candidates	1898	0.213	0.217	0	1
Female voter turnout	1896	0.586	0.155	0.010	0.975
Male voter turnout	1895	0.660	0.125	0.011	0.946
Woman won previous election (dummy)	1898	0.528	0.499	0	1

Table 2
Women's Electoral Success and Future Political Participation: Regression Discontinuity Estimates

Panel A: Main Variables

	Fraction of female candidates	Female share of major party candidates	Female share of competitive candidates	New female share of major party candidates	Female voter turnout	Male voter turnout
	1	2	3	4	5	6
Woman won previous election	0.015	0.092 ***	0.063 ***	-0.014	-0.017	-0.004
	[0.012]	[0.022]	[0.022]	[0.013]	[0.015]	[0.012]
Observations	1898	1897	1898	1897	1896	1895
Polynomial	2nd order	2nd order	2nd order	2nd order	2nd order	2nd order

Panel B: Supplementary Variables

	Total number of candidates	# of major party candidates	# of female major party candidates	# of male major party candidates	Woman wins next election
	7	8	9	10	11
Woman won previous election	-1.062	-0.033	0.177 ***	-0.210 **	-0.036
	[1.465]	[0.094]	[0.052]	[0.096]	[0.043]
Observations	1898	1898	1898	1898	1898
Polynomial	2nd order	2nd order	2nd order	2nd order	2nd order

Sample restricted to constituencies where a woman and a man were among the top two vote-getters in the previous election.

Standard errors in brackets, clustered at the state-election level.

***, **, * indicate significance at 1%, 5% and 10% level respectively.

Table 3

Spillovers, Persistence and Robustness

Panel A: Spillovers and Persistence

| | Female candidacy in rest of district | Persistence | |
		2nd lag	3rd lag
	1	2	3
Woman won previous election	-0.003	0.042 *	0.008
	[0.007]	[0.024]	[0.026]
Observations	1897	1467	1130
polynomial	2nd order	2nd order	2nd order

Panel B: Robustness of RD Results to Changes in Functional Form and Bandwidth

| | Female share of major party candidates | | | | |
	4	5	6	7	8
Woman won previous election	0.078 ***	0.063 **	0.0594 **	0.089 ***	0.087 ***
	[0.026]	[0.028]	[0.026]	[0.021]	[0.023]
Observations	1897	1897	932	421	1897
polynomial	3rd order	4th order	linear	none	2nd order
bandwidth			optimal [0.24]	0.05	
State*year fixed effects					yes

Sample restricted to constituencies where a woman and a man were among the top two vote-getters in the previous election.

Standard errors in brackets, clustered at the state-election level.

***, **, * indicate significance at 1%, 5% and 10% level respectively.

Table 4: Validity of the Regression Discontinuity Strategy

Panel A: Regression Discontinuity Estimates at "Fake Discontinuity" Points

	Quadratic polynomial in vote margins		Local linear regressions, optimal bandwidth	
Coefficient on female winner (dummy)	0.030	-0.003	-0.051	-0.024
[standard error]	[0.040]	[0.030]	[0.037]	[0.029]
Fake discontinuity point	*-0.1224*	*+0.1248*	*-0.1224*	*+0.1248*

Note: the fake discontinuity points are chosen as the median of the observations on the left and the median of the observations on the right of the real discontinuity.

Panel B: Regression Discontinuity Effects of Female Electoral Success on Covariates and Pre-Determined Variables

	Quadratic polynomial in vote margins		Local linear regressions, optimal bandwidth	
	coefficient	standard error	coefficient	standard error
Demographic covariates				
Fraction female	0.001	[0.002]	0	[0.003]
Total literacy rate	-0.008	[0.015]	0.006	[0.019]
Female literacy rate	-0.017	[0.018]	0.007	[0.023]
Fraction SC/ST population	0.004	[0.015]	-0.009	[0.013]
Fraction urban population	0.022	[0.023]	0.052	[0.032]
Outcomes from previous election				
Total votes polled	-1478.312	[1500.219]	-1807.62	[2007.14]
Male electors	-2061.794	[3406.182]	-6819.58	[4272.63]
Female electors	-1514.283	[2921.579]	-4356.18	[3231.76]
Number of candidates	-1.281	[1.669]	-0.279	[0.893]
Number of female candidates	0.048	[0.079]	0.162	[0.091]
Num female candidates from major parties	0.018	[0.032]	0.097	[0.054]
Male voter turnout	-0.013	[0.009]	-0.004	[0.0197]
Female voter turnout	-0.028 *	[0.014]	0.002	[0.024]

Table 5
Testing Mechanisms

	Party has a female candidate (dummy)	Vote share of new major party female candidates	Female share of major party candidates	Candidate runs for re-election	Candidate runs for re-election from the same party
	1	2	3	4	5
Woman won previous election	-0.173 ***	-0.022 **	0.067 **		
	[0.024]	[0.011]	[0.033]		
Woman won previous election	0.757 ***				
* incumbent party dummy	[0.046]				
Incumbent party dummy	-0.192 ***				
	[0.030]				
Woman won previous election			0.044		
*post-quota period for local elections			[0.045]		
Post-quota period for local elections			0.01		
			[0.039]		
Candidate wins election*female candidate				0.108	0.150 **
				[0.075]	[0.071]
Candidate wins election				0.153 ***	0.089 *
				[0.053]	[0.050]
Female candidate				-0.083	-0.005
				[0.056]	[0.046]
Observations	4852	1898	1897	3374	3374

Standard errors in brackets, clustered at the state-election level. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

Sample restricted to constituencies where a woman and a man were among the top two vote-getters in the previous election.

RD estimates computed using a quadratic polynomial control in vote margins and a difference-in-discontinuities specification

Regressions are at party-constituency level in column (1), constituency level in columns (2) and (3), and candidate level in columns (4) and (5). Column (1) restricted to major parties only, columns (4) and (5) restricted to winners and runners-up in mixed-gender elections.

Table A1

Women's Electoral Success and Future Political Participation: OLS Estimates

	Female share of major party candidates		Female share of competitive candidates	Fraction female candidates	New female share of major party candidates	Female voter turnout	Male voter turnout
	1	2	3	4	5	6	7
Woman won previous election	0.110 ***	0.109 ***	0.097 ***	0.041 ***	-0.083 ***	-0.003	-0.002
	[0.009]	[0.009]	[0.008]	[0.004]	[0.007]	[0.003]	[0.003]
Woman was a runner-up in previous election		-0.004					
		[0.008]					
R-squared	0.38	0.38	0.40	0.36	0.22	0.77	0.72
Observations	22238	22238	22296	22296	22238	22240	22234

Standard errors in brackets, clustered at the constituency level. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

All regressions control for constituency and election cycle fixed effects, and district specific trends.

Table A2

Testing Mechanims: OLS Estimates

	Party has a female candidate (dummy)	Vote share of new major party female candidates	Female share of major party candidates	Candidate runs for re-election	Candidate runs for re-election from the same party
	1	2	3	4	5
Woman won previous election	-0.077 ***	-0.090 ***	0.098 ***		
	[0.024]	[0.006]	[0.012]		
Woman won previous election	0.540 ***				
* incumbent party dummy	[0.046]				
Incumbent party dummy	-0.023 ***				
	[0.030]				
Woman won previous election			0.029		
*post-quota period for local elections			[0.018]		
Post-quota period for local elections			0.012 ***		
			[0.004]		
Candidate wins election*female candidate				0.071 ***	0.054 **
				[0.024]	[0.023]
Candidate wins election				0.311 ***	0.305 ***
				[0.005]	[0.005]
Female candidate				-0.093 ***	-0.031 *
				[0.018]	[0.016]
R-squared	0.21	0.24	0.38	0.26	0.24
Observations	56546	22296	22238	38000	38000

Standard errors in brackets, clustered at the constituency level. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

All regressions control for constituency and election cycle fixed effects, and district specific trends.

Regressions are at party-constituency level in column (1), constituency level in columns (2) and (3), and candidate level in columns (4) and (5). Column (1) restricted to major parties only.