

# Gender Differences in Political Career Progression \*

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## Abstract

We establish the existence of gender differences in career progression to leadership positions among U.S. politicians and study their underlying causes. Using a close elections strategy, we find that an additional state legislature term increases the probability of ever running for Congress by twice as much for men as it does for women and the effect on winning a Congressional race is five times larger for men than women. These gaps emerge early in legislators' careers, widen over time, and are seen alongside a higher propensity of female politicians to continue running for the state legislature. The gap cannot be attributed to differences in experience, career-family tradeoffs, election or constituency characteristics, nor preferences for part-time public service careers.

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## I. Introduction

The underrepresentation of women in high-status occupations persists worldwide, even in countries that have made significant progress towards gender equality (Bertrand et al. 2018). This is particularly true in politics, where the share of women at the highest levels of government is well below their share of the population in nearly all countries (CAWP 2017).<sup>1,2</sup> These gender gaps exist even in contexts where women have an equal likelihood of winning elections conditional on candidacy. For example, despite the underrepresentation of women in the U.S. Congress, it has been well established that the gender of a Congressional candidate has little impact on the amount of campaign funds raised, the vote share won by the candidate, or a candidate’s probability of winning (Anastasopoulos 2006; Barber et al. 2016).<sup>3</sup> Selection into candidacy is thus a critical determinant of the gender gap in political representation (Lawless and Fox 2008).

The underrepresentation of female candidates among top political offices can result from a lower rate of entry into politics or a lower rate of career progression within the political system – as candidacy for higher office often follows from experience in lower office (Folke and Rickne 2016). In this paper, we study the role of gender in determining the likelihood of promotion to premier political positions through the lens of service in a state legislature, which is the most common pipeline to a Congressional career. We then investigate the possible mechanisms that would generate gender inequality in these outcomes. Gender differences in climbing the political ladder would imply that the pipeline through which politicians advance to leadership positions does not function equally for men and women. This is important because it would suggest that encouraging more women to enter politics, by itself, may not be sufficient to significantly increase

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<sup>1</sup>See Figure 1 for trends in female representation in the U.S. since 1970. In 2018, women comprised 21 percent of the U.S. senate and 19 percent of the U.S. House of Representatives (CAWP 2017). This is not only an American phenomenon: women comprised 32 percent of the U.K. House of Commons in 2018, and 12 percent of the Indian Parliament (Bhalotra et al. 2018).

<sup>2</sup>Numerous studies have shown that female and male politicians have different policy preferences, and that increasing the share of female politicians can improve the outcomes of women and children, while also increasing trust in government more generally (Chattopadhyay and Dufo 2004; Miller 2008; Iyer et al. 2012; Kalsi 2017; Clots-Figueras 2012; Bhalotra and Clots-Figueras 2014; Brolo and Troiano 2016). In the U.S., Ferreira and Gyourko (2014) found no evidence that female mayors make different policy choices compared to male mayors.

<sup>3</sup>The relative scarcity of women in leadership positions, including politics, is partly related to their lower probability of promotion compared to men with similar productivity and initial career profiles (Lazear and Rosen 1990; Pekkarinen and Vartiainen 2006; Smith et al. 2013; Antecol et al. 2018; Hospido et al. 2019). Many reasons have been proposed to explain this phenomenon, such as a higher probability of quitting (Lazear and Rosen 1990), career interruptions due to having children (Antecol et al. 2018), and higher thresholds for promotion (Pekkarinen and Vartiainen 2006).

the share of women at the top of the political hierarchy.

State legislatures have historically functioned as an important stepping stone for Congressional candidates. Between 1976 and 2016, an average of 46.5 percent of the U.S. House of Representatives were members who had served as state legislators. In the 2016 elections, 20 percent of female candidates for the House and 23 percent of male candidates for the House had prior state legislative experience.<sup>4</sup> It is perhaps unsurprising that service in a state legislature is a common precursor to a Congressional career, as it can provide candidates with campaigning and legislative experience while also allowing voters and parties to update their beliefs about a candidate’s policy preferences and overall ability.

Differences in the probability of moving up the political “career ladder” between two candidates who only differ by gender may arise because discriminatory practices by voters or party elites perpetuate a “glass ceiling” for women (Folke and Rickne 2016; Fourniaies et al. 2018; Gagliarducci and Paserman 2011; Bauer 2020). The existence, or perception, of a “glass ceiling” may, in turn, lead female state legislators to underestimate their own ability and electability compared to male legislators, or shape their preferences about serving in Congress (Seltzer et al. 1997; Fox and Lawless 2011; Folke and Rickne 2016; Bordalo et al. 2019; Bauer 2020).<sup>5</sup> Alternatively, the effect of state legislature service on Congressional candidacy and representation may differ between men and women for reasons other than discrimination. For example, female politicians may face higher costs borne of career-family tradeoffs due to prevailing gender norms, especially since Congressional service is not considered a family-friendly job (Bertrand et al. 2010; Goldin 2014; Goldin and Katz 2016; Kleven et al. 2019; Kuziemko et al. 2018). Heterogeneous effects between men and women could also arise because men are more likely to have accumulated more legislative experience, or because of party-specific differences in the career profiles of politicians (Sanbonmatsu 2002).<sup>6</sup>

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<sup>4</sup>These figures are based on the authors’ calculations using data from the Biographical Characteristics of Members of the United States Congress (ICPSR 7803) and the VoteSmart Biographical database. The latter figures include only candidates who held a single-member district seat, which is most similar to a U.S. House position. Currently, over half of the 115th U.S. Congress began their political careers in the state legislature (NCSL 2018).

<sup>5</sup>In recent work, Bordalo et al. (2019) experimentally show that both men and women overestimate their own ability. However, men overestimate their own ability in traditionally male-dominated tasks, and vice versa for women.

<sup>6</sup>Both of these explanations are consistent with existing descriptive evidence of gender differences in “progressive ambition” of sitting politicians and other potential candidates (Fox and Lawless 2004; Carey et al. 2008). For instance, in a 2002 survey conducted among state legislators, female representatives reported more interest in continuing to serve in their current capacity and less interest in running for higher offices, including for Congress (Carey et al. 2008). Moreover, Fox and Lawless (2004) provide evidence that among a pool of potential candidates, women express lower levels of political ambition compared to men with similar professional credentials. See also Schlesinger (1966);

To quantify gender differences in the effect of state legislative service on the later pursuit of a Congressional career, we estimate the effect of winning a state legislative seat on the probability of competing in (or winning) a Congressional race. To do this, we link the near-universe of candidates for U.S. state legislatures since 1967 to Congressional election returns, allowing us to accurately observe whether a given candidate for a state legislature seat subsequently competes in future primary or general Congressional elections. We use a regression discontinuity design (RDD) based on close-won state legislature elections between men and women that effectively compares the eventual Congressional candidacy and representation of women who closely won a state legislature election over a man to women who closely lost a similar election. We then estimate this quantity for men, in which we compare the career paths of men who closely won over a woman to men who closely lost to a female candidate. By construction, our strategy ensures that winners and losers are otherwise comparable *within* gender, and that male and female candidates in our sample are drawn from state legislative and congressional districts with highly comparable constituency characteristics (Duerst-Lahti 1998; Fulton et al. 2006; Maestas et al. 2006; Sanbonmatsu 2006; Palmer and Simon 2008; Carroll and Sanbonmatsu 2013; Mariani 2008).

Winning a state legislature seat has a large positive effect on the probability that male legislators run for Congress compared to male candidates who narrowly lost a state legislature race. In contrast, serving as a state legislator has a smaller, statistically insignificant effect on the likelihood of female state legislators to pursue a career in Congress. These results are robust to controlling for previous legislative experience, party affiliation, election type, term length, and the number of the candidates in the race. Given the higher likelihood of men to compete for Congress after serving as state legislators, we also find that, unconditional on candidacy, men have a much higher likelihood of winning Congressional races, but no such effects are found for women. Our estimates suggest that differences in candidacy among female and male state legislators explain between 10 and 30 percent of the 2016 gender gap in Congressional candidacy.

While the empirical strategy identifies an unbiased estimate of the effect of winning a state legislature seat on political career outcomes for women and men, interpreting the gender gap in this effect requires care (Anzia and Berry 2011; Fulton 2012). This is because narrowly elected female

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Black (1972); Duerst-Lahti (1998); Fulton et al. (2006); Maestas et al. (2005; 2006); Sanbonmatsu (2006); Palmer and Simon (2008); Crowder-Meyer (2013), and Carroll and Sanbonmatsu (2013).

and male state legislators may have systematically different observed or unobserved characteristics, which represent either bias-inducing unobserved heterogeneity or mechanisms through which gender influences the empirical relationship we have uncovered. In fact, when comparing marginal winners or losers across gender, we find that narrowly elected female legislators have lower legislative experience, are less likely to be a sitting incumbent, are more likely to be a first-time candidate, and are more likely to be a Democrat than a Republican. However, despite these differences, when we model the heterogeneity of the effect across these dimensions, they have no impact on the estimated gender gap described above.

The gender gap in the effect of state legislative experience is also not explained by several factors highlighted in previous studies. For example, Lawless and Pearson (2008) show that women face more competition in primary elections compared to men. In our sample, however, we find no differences in the election or district characteristics between male and female winners or between male and female losers. Moreover, including interaction terms of winning a state legislature seat with a host of district characteristics does not attenuate the estimated gender gap. The gender gap in experience effects is also not specific to either the Democratic or Republican party. As a result, we can rule out explanations that hinge on party differences in the type of candidates that can win the party's support, or the differential role played by party elites in recruiting and screening female candidates (Niven 1998; Caul 1999; Sanbonmatsu 2002; Box-Steffensmeier et al. 2004; Sanbonmatsu 2006; 2010; Elder 2012; Thomsen 2015). Moreover, we do not find gender differences in a host of other incumbent or election characteristics that determine differential opportunity structures proposed as explanations for the gender difference in representation, such as whether the incumbent in the election is female, or whether an incumbent is running (Mariani 2008; Darcy and Choike 1986; Carroll 1994; Darcy et al. 1994).

We also are able to show that the gender difference in the effect of state legislative service on career progression is not due to differences in the timing at which female and male politicians decide to pursue Congressional office. In fact, the disparity begins with the first opportunity that state legislators can compete in a Congressional election, widens over the next few opportunities, and never closes. Alternatively, female state legislators have a higher probability of re-running for the same seat in the subsequent state election compared to male politicians, generating higher female

incumbency rates in state legislatures.<sup>7</sup> Overall, our findings confirm that the transition from local to national politics is less assured for women relative to men.

In order to explore if preferences regarding career-family tradeoffs are an important driver of the gender difference in pursuing a Congressional career, we show our effect is driven by the 20 percent of state legislators who serve in full-time legislatures and by politicians in states located close to Washington, DC. These findings suggest that gender differences in the value of non-work time available for home production are unlikely to be the prominent mechanism behind our results, as the additional cost of moving from the state legislature to the national legislature along these dimensions is higher for women in part-time (versus full-time) positions, and for women located further away from DC (Bertrand et al. 2010; Goldin 2014; Goldin and Katz 2016; Mas and Pallais 2017).<sup>8</sup>

Lastly, we provide evidence that the gender difference in the probability of running in a Congressional election is driven by male and female candidates who won their state legislature election, rather than by the differential attrition of men or women who lose their state legislature election. This is in contrast to recent findings by Wasserman (2018), who shows that novice female candidates who lose in local office elections in California are less likely to run again compared to male candidates who faced similar losses.

Overall, the results do not support the hypothesis that the gender gap in pursuing a Congressional career among state legislators can be explained by differences in candidate, election, or district characteristics. Although we cannot definitively conclude that the gender gap is the result of discriminatory barriers that prevent female legislators from climbing the political ladder, we provide additional evidence to support this mechanism. Specifically, we show that the gender gap is driven by female politicians serving in legislatures with a high share of male representatives, sug-

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<sup>7</sup>A similar incumbency effect has also been documented among female state legislators in India (Bhalotra et al. 2018). Brown, Mansour and O’Connell (2018) show that electing more female state legislators in India subsequently increases the number of female candidates for the national parliament, but their effect is driven by the entry of new politicians and not by incumbents.

<sup>8</sup>There is also evidence that divorce rates are higher in households where the husband earns less than the wife, and that elections to become a parliamentarian or mayor in Sweden increases the divorce rates for women but not for men (Bertrand et al. 2015; Folke and Rickne 2020). In addition, Fisman et al. (2006) show in speed dating experiments that men prefer not to be matched with women who they perceive to be more ambitious than themselves, and Bursztyn et al. (2017) found that single female MBA students self-report lower level of ambition when they know the information will be shared with other students. Such a non-monetary cost (if anticipated) can deter some female politicians from climbing the political ladder.

gesting that working in male-dominated environments may deter women from pursuing a political career in Congress. The link between characteristics of in-office experience to later career progression is consistent with recent findings suggesting the gender gap in progression to higher office is at least partly shaped by individuals' specific experience within political institutions (Gagliarducci and Paserman 2011; Fourinaies et al. 2018).

The paper makes two main contributions. First, we add to the extensive literature on gender inequality in the labor market, particularly to studies focusing on the lower rate at which women are seen in leadership positions (Lazear and Rosen 1990; Pekkarinen and Vartiainen 2006), and studies highlighting the role of occupational choices and discrimination in explaining gender gaps (Altonji and Blank 1999; Bertrand et al. 2010; Olivetti and Petrongolo 2016; Blau and Kahn 2017; Kleven et al. 2019; Angelov et al. 2016). Investigating gender differences in career promotions or occupational choices in the labor market is inherently difficult because job assignments are endogenously determined by firms, and labor supply decisions are endogenous to workers' unobserved characteristics. In contrast, we observe female and male politicians for whom experience in the same position in the career hierarchy was exogenously assigned, and estimate its effect on their pursuit and attainment of higher-status positions in the career ladder.

Second, we contribute to a growing literature on the impact of policies aimed at increasing the representation of women in high-status positions. Existing studies have found mixed evidence that increasing the share of women in leadership positions (via quotas or other methods) affects the careers of female professionals (Bagues and Esteve-Volart 2010; Kunze and Miller 2017; Bertrand et al. 2018; Brown et al. 2018; Langan 2019; O'Connell 2020).<sup>9</sup> In politics, Broockman (2009) finds no evidence that narrowly electing a woman for a state legislature seat in the U.S. mobilizes women to vote or inspires other female candidates from nearby districts to run for office, while Gilardi (2015) provides evidence that electing female mayors in Switzerland increases the number of female candidates in neighboring municipalities, with the effect fading as more women are elected.<sup>10</sup> While

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<sup>9</sup>For instance, Kunze and Miller (2017) found that having more female bosses decreases gender gaps in promotions. In contrast, Bertrand et al. (2018) found no evidence that mandating a higher share of women in boards of Norwegian companies benefited women working in these companies, while Langan (2019) shows that appointing female department chairs in academia reduces gender gaps in publications and increases the tenure probability for female assistant professors.

<sup>10</sup>Ladam, Harden and Windett (2018) show that narrowly electing female governors is associated with an increase in the number of female candidates running for the state legislature, and Baskaran and Hessami (2018) find that electing a female mayor in Germany led to an increase in the vote share received by female council candidates.

the literature has largely focused on spillover-type effects on other politicians, this study focuses on first-order effects of local political experience on the same specific individual’s career progression to national politics.

The remainder of the paper is organized as follows. Section II describes the data sources, provides background on U.S. state and national legislature elections, motivates our empirical approach, and describes the sample used in the analysis. Section III details the empirical strategy. We present results on moving from state to national politics in Section IV. Section V examines the sources of the gender gap and discusses potential mechanisms, and Section VI concludes.

## II. Context and Data Sources

### A. Data Sources

Our data start with the near-universe of candidates for U.S. state legislatures since 1967. The primary data source for state legislature elections comes from the State Legislative Election Returns (SLER) data set, hosted by the Inter-University Consortium for Political and Social Research (ICPSR 34297) and constructed by Klarner et al. (2013). The SLER provides candidate-level election returns for all state legislative elections from 1967 and contain information on the name of the candidate, the state, district, and chamber they are running in, as well as total vote counts and the candidate’s party. Other election-level data includes information on the term length, type of election (e.g., general, special), and the number of candidates who contested the seat.<sup>11</sup>

We merge information from state legislature candidates to records from Congressional primary and general election returns from 1968-2016 for both the U.S. House of Representatives and the Senate. We match candidates across levels within state using a fuzzy matching algorithm based on first and last name fields that is similar in practice to Anagol and Fujiwara (2016) and Brown et al. (2018).<sup>12</sup> Although we are only able to track primary participation for Democrat and Republican candidates (or third-party candidates who participate in these elections), we observe candidates of all parties in general elections.<sup>13</sup>

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<sup>11</sup>Appendix B provides additional detail on the data sources and the procedure to clean and code variables.

<sup>12</sup>To help prevent spurious matches, we only search for Congressional candidates in the same state in which they appear in the state legislature elections data. Because male candidates may be more prone to move across states, our estimates of the gender gap might thus represent a lower bound.

<sup>13</sup>In practice, however, there are relatively few third-party candidates, and candidates who pursue Congressional



To determine a candidate’s gender, we compare candidates’ first names to historical records from the U.S. Census Bureau and the Social Security Administration (SSA).<sup>14</sup> We code a candidate as male or female if both the Census and SSA records agree on the candidate’s gender. We hand code the remainder of candidates (about five percent) whose names are not unambiguously indicative of their gender. We drop a small number of elections (2.8 percent of total) where we do not know the gender of either of the top two candidates.

## B. Context

Historically, women have comprised a minority of U.S. state and Congressional legislators. Figure 1 plots the female share of state and national legislators since 1970. While women have recently made gains in representation, they still lag far behind men: as of 2016, women comprise about 25 percent of state legislators and 19 percent of the Congress. While the share of female representatives in state legislatures started to grow in the early 1970s, the share of women in Congress did not start to increase substantially until the early 1990s. Notably, the difference in the share of women in state legislatures and in Congress has widened significantly since the early 1970s. Given the importance of state legislature service as a pathway to national office, the objective of this paper is to understand the effect of state legislature experience on career transitions from local to national politics, and its role in generating gender disparities in Congressional representation.

There are more than 7,000 state legislative seats in the United States, with each position having a two- or four-year term length. Congress is comprised of 435 seats in the (lower) House of Representatives and 100 seats in the (upper) Senate.<sup>15</sup> Experience in state legislatures has become increasingly common among Congressional representatives. For example, in the 115th Congress (serving from 2017 to 2019), approximately half of all members served in a state legislature at some point prior to being elected to their current office; the share of sitting Congressional representatives who had previous state legislature experience grew steadily between the mid-1970s until the early 1990’s, from below 40 percent to just under 50 percent as of 2019.

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office tend to not switch parties across levels of government.

<sup>14</sup>We first cross-reference all first names with lists of common first names. We classify candidates as male or female if their name only appears in one of the lists, that is, their name is unambiguously male or female, and then compare the remaining names to Census and SSA records.

<sup>15</sup>Within state, there are an average of about 20 legislative seats per Congressional seat. With the exception of Nebraska, each state has a bicameral legislature comprising of a House and a Senate.

### C. Motivating the Empirical Strategy and Analysis Sample

The endogenous decision of state legislators to compete for a given Congressional seat is likely related to their own observed or unobserved characteristics, the characteristics of the Congressional district, as well as expected characteristics of the current local election or future national elections.

To address these concerns, we implement a regression discontinuity design (RDD) to estimate the causal impact of state legislative experience on the decision to run for Congress. The RDD effectively generates quasi-random assignment of legislative experience across otherwise-similar candidates who run for local office in comparable locales. Since our focus is on gender differences in political career progression, we estimate the effect of serving in the state legislature separately by gender. Specifically, we compare the political career progression of a female (male) candidate who narrowly won a state legislature race to the outcomes of a female (male) candidate who narrowly lost. For ease of interpretation, we focus only on single-member seats that result in the winner holding a position in the state legislature. We exclude any primary elections or elections in multi-member districts where there is more than one winner for a given constituency.<sup>16</sup>

Because 85 percent of female candidates in state legislature races compete against male candidates, our female and male samples are limited to mixed-gender elections – defined as those elections in which the top two vote-earning candidates were a man and a woman. This sample allows us to isolate the effect of a quasi-experimentally-assigned additional term in the state legislature in constituencies that could have plausibly elected either a man or a woman. In order to not overrepresent the likelihood of running for a Congressional seat by candidates who compete in multiple mixed-gender state legislature elections, each candidate is represented only once by the first such election observed in the sample (henceforth, “first-time mixed-gender elections”).<sup>17</sup> Conditional on ever running for Congress, the average state legislator spends about eight years in the state legislature before running for higher-level office. We thus limit our sample to state legislature elections for years up to and including 2008 (and observe outcomes through 2016), as the inclusion

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<sup>16</sup>Ten states have at least one multi-member district.

<sup>17</sup>The number of times a candidate runs for a state legislative seat before their first mixed-gender race may be endogenous. We provide two tests that suggest this endogeneity problem does not bias our estimates. In robustness checks below, we show that our estimates are qualitatively similar when we focus on mixed-gender elections where both candidates are competing in a state legislative election for the first time. We also allow candidates to compete in mixed-gender elections multiple times and again find that winning a state legislature seat has a large impact on the probability that male state legislators compete in a Congressional race.

of more recent state legislature elections will increase the frequency and intensity of measurement error (due to right-censoring) in the outcome variable. Our first-time mixed-gender elections sample contains 25,389 candidates from 16,293 elections from which we draw our estimation sample of narrowly won elections.

#### D. Descriptive Statistics

Table 1 reports sample means for a set of election characteristics (Panel A), historical state legislative district characteristics (Panel B), and Congressional outcomes for state legislative candidates (Panel C). The sample means for our estimation sample of first-time mixed-gender elections within an optimal bandwidth are reported in Column 1 of Panels A and B and Columns 1-2 of Panel C. Given our sample restrictions, a natural concern is that mixed-gender elections are inherently different from the average state legislature election. Column 1 of Panels A and B show that our analysis sample is broadly similar to all contested state legislature elections (Columns 2) with respect to both characteristics of the focal state legislature election and historical legislative district characteristics. In both samples, there are 2.15 candidates per election, and the average term length is approximately 2.3 years. Historical rates of female participation and the competitiveness of elections at the state legislative district level are also comparable: in the analysis sample, mixed-gender elections comprised 19.6 percent of all prior elections, which is comparable to 17.0 percent for the full sample. The incumbent ran for re-election in 54.0 percent and 52.5 percent of prior elections in the analysis and full samples, respectively.

Moreover, candidates from first-time mixed-gender elections (Columns 1 and 2 of Panel C) exhibit remarkably similar rates of future political candidacy when compared to candidates in other contested legislative elections (Columns 3 and 4 of Panel C).<sup>18</sup> For instance, between 4.4 and 4.8 percent of male candidates in either sample ever run in any Congressional election, and 3.2 percent of female candidates run from mixed-gender elections, compared to 3.7 percent of female candidates from all elections. In Appendix Figure A1, we also show that the analysis sample is drawn from a roughly proportionate sample by state.

Using the full sample of first-time mixed-gender elections, Figure 2 plots the mean rate at which male and female state legislature candidates are ever observed contesting for higher office

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<sup>18</sup>The means in columns 3 and 4 are calculated using the top-two candidates from all contested legislative elections.

by election year. The differential between male and female candidates in their propensity to ever contest for higher office is on the order of two to four percentage points through the 1970s and 1980s. This difference then stabilizes to around two percentage points in the early 1990s and persists, with only one exception, through 2010.<sup>19</sup>

### III. State Legislative Experience, Congressional Candidacy, and Representation

#### A. Empirical Model

We estimate the relationship between winning a state legislature seat and the probability of future national political candidacy separately by gender via the following OLS regression:

$$\textit{Ever ran national}_{ict} = \alpha \textit{Won election}_{ict} + \beta f(x_{ict}) + \gamma [\textit{Won election}_{ict} \times f(x_{ict})] + X_{ict}\delta + \tau_c + \phi_t + \epsilon_{ict} \quad (1)$$

Where  $\textit{Ever ran national}_{ict}$  is an indicator variable equal to 1 if state legislature candidate  $i$  in election at time  $t$  in constituency  $c$  is ever observed contesting for a primary or general election for the national legislature in the future, and zero otherwise. The variable of interest,  $\textit{Won election}_{ict}$ , is an indicator variable equal to 1 if candidate  $i$  won their state legislature election in constituency  $c$  in year  $t$ . We also include a linear measure of the candidate's victory margin,  $f(x_{ict})$ , and allow the effect of the victory margin to vary for winners and losers.  $X_{ict}$  represents a vector of individual controls including the candidate's cumulative legislative experience, their party affiliation, length of term for the contested seat, and number of candidates in the election, as well as for the type of election (general or special). To control for time- and constituency- invariant unobservables and to improve precision, we include state legislature constituency fixed effects,  $\tau_c$ , and state legislature election year fixed effects  $\phi_t$ .  $\epsilon_{ict}$  is the error term, and we cluster standard errors by state. Our coefficient of interest is  $\alpha$ , which captures the effect of winning an additional term in the state legislature on future career outcomes in national politics.

We first estimate equation (1) with a simple local linear specification consisting only of narrowly won first-time mixed-gender elections based on an optimal bandwidth selector (Calonico et al. 2019;

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<sup>19</sup>This pattern could be a result of higher rates of electoral success by men, although conditional on candidacy, there is no male advantage in terms of vote share won or the probability of winning (Anastasopoulos 2006; Barber et al. 2016).

forthcoming). We then show that this RDD estimator is closely approximated by a global RDD specification applied to the full sample of first-time mixed-gender state legislature elections. We also estimate equation (1) by replacing the dependent variable with any of four indicator variables that take a value of one if the state legislator ever runs in a House primary, a Senate primary, a House general election or any general election, respectively, and zero otherwise, as well as the unconditional probability of winning a seat in the national legislature.

### B. Investigating the Validity of the Research Design

Our empirical approach compares just-winning women (men) to just-losing women (men) in order to estimate the impact of winning a state legislature seat on future political candidacy for the national legislature. The assumption underlying this approach is that women who narrowly win over a male competitor are comparable, on average, to women who narrowly lose to a male competitor (and similarly for men winning over/losing to female candidates).

We first test for manipulation of the running variable following McCrary (2008) by plotting the distributional density of a candidate’s margin of victory in first-time mixed-gender state legislature elections for both male and female candidates. In Figure 3, we plot these distributions for female candidates in Panel A and male candidates in Panel B. Both analyses provide no evidence of a discontinuity around the zero vote margin of victory in the sample of first-time mixed gender state legislature elections, which is the same sample we use to estimate the effect of winning a state race on future candidacy.

We next test whether individual, election, or district characteristics exhibit any differential discontinuous jump at the identifying threshold. Columns 2 and 3 of Table 2 show the difference in the focal characteristic (indicated in rows) for the election winner relative to the election loser for the sample of female and male candidates, respectively. As can be seen in Columns 2, the individual, election, and district characteristics tested show no difference between women who narrowly won or lost a state legislature seat, and only two out of 12 characteristics are marginally statistically significant for men (Column 3). These results indicate that winning a state legislature seat in a mixed-gender race is not associated with the candidate being a Democrat, part of a third party, as well as with the contested seat’s term length or the number of candidates in the election. We also

find no evidence across winners and losers related to the historical characteristics of the districts in which these elections occur, such as average margin of victory, the historical mixed-gender share of elections, and the share of previous elections contested by incumbents.<sup>20</sup>

## IV. Results

### A. Effects of State Legislature Experience on Congressional Candidacy

We start by presenting a graphical analysis of the relationship between state legislative service and career progression in Figure 4. The figures are based on a local linear regression estimated on binned means of a sample of close first-time mixed-gender elections. Panels A and B plot the probability of ever running for any Congressional seat (House or Senate) in any type of election (primary or general) within each margin of victory bin for female and male state legislature candidates, respectively. Although both female and male winners are more likely to compete in future Congressional elections, the effect of winning a state legislature election is significantly larger for men than women.

Table 3 contains coefficients from the estimation of equation (1). When a man wins a state legislature election (Column 1, Panel B) they are 7.4 percentage points more likely to ever run for a Congressional seat than if they had lost (p-value:  $<0.001$ ). In comparison, winning a state legislative seat for women (Panel A) increases the likelihood of ever running for a Congressional seat by only 2.6 percentage points (p-value:  $>0.10$ ). Successively adding controls for cumulative legislative experience, party affiliation, election type, term length, or number of candidates in the race (Columns 2-6) has little impact on the estimates.<sup>21</sup>

The difference of 4.8 percentage points across men and women in the effect of state legislative experience on the likelihood of ever running in a Congressional race is significant at the 10 percent level (p-value: 0.073). As we discuss later these gender differences are almost surely not caused by biologically predetermined mechanisms related to a candidate's gender identity, but rather by how

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<sup>20</sup>Columns 2 and 3 of Appendix Table A1 test for differences in candidate, district, and election characteristics in the full sample of mixed-gender elections. In the full sample, female (male) winners are less likely to be first-time candidates, less likely to be democrats, and more likely to belong to a third-party compared to female (male) losers. Male winners are more likely to be a sitting incumbent compared to male losers. For both female and male candidates, there is little evidence that the election or district characteristics are different between winners and losers.

<sup>21</sup>Appendix Figure A2 provides graphical evidence of the robustness of our findings to varying the bandwidth choice. In addition, the choice of polynomial order also has virtually no effect on the estimates.

it interacts with societal norms. Thus they should be interpreted with caution, as the marginal female winner is likely different, on observed or unobserved characteristics that could be either correlated or caused by gender identity, compared to the marginal male winner (Anzia and Berry 2011). The result implies that, relative to the means, the increase in the probability that a man ever runs for the national legislature if they win a state legislature seat is twice as large as the increase in the equivalent probability for female state legislature winners.<sup>22</sup> In Column 7, we report results from estimating equation (1) on the sample of all mixed-gender elections, including all the controls. When we do not restrict to the close election sample, estimates indicate that female (male) winners are 3.3 (5.9) percentage points more likely to run for a Congressional seat than if they had lost (both p-values <0.01). The gender differential is smaller in this sample, but remains significant at the five percent level. The estimated differences in candidacy among female and male state legislators explain between 10 and 30 percent of the 2016 gender gap in Congressional candidacy.<sup>23</sup>

In Table 4, we disaggregate the dependent variable into separate measures for ever running in a House primary election, a Senate primary election, a House general election, and any general election. The results indicate that men’s increased likelihood of running for higher office is observed in primary and general elections for the House of Representatives, but not the senate. The effect for female state legislators, however, remains small and statistically insignificant across the different election types. In Column 5 we estimate that male state legislators have a statistically significant 5.6 percentage point higher probability of ever running in a general election than men who lost a comparable election, while female state legislators show no evidence of being more likely to ever run in a general election than women who lost a comparable election. Results using the full sample of first-time mixed gender elections (shown in Appendix Table A2) yield similar conclusions.<sup>24</sup>

## B. Effects of State Legislature Experience on Winning a Congressional Election

Given men’s higher propensity to contest for a Congressional seat in response to an additional term in the state legislature, we next estimate the effect of an additional state legislature term on the

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<sup>22</sup>Specifically, winning a state legislature seat increases the probability of running for Congress by 165 percent (0.073/0.044) for men and 78 percent (0.025/0.032) for women, which implies that male state legislators are about twice as likely ( $165/78=2.11$ ) to ever run for a Congressional seat.

<sup>23</sup>See Appendix B for the details of this calculation.

<sup>24</sup>As shown in Appendix Table A3, the results are robust to using the sample of all mixed-gender elections (stacked sample).

unconditional probability of winning a Congressional election. We estimate versions of equation (1) that replace the outcome variable with either an indicator for ever winning any Congressional election (House or Senate) in any type of race (primary or general), an indicator for winning a primary election for the House of Representatives, an indicator for winning a general election for the House of Representatives, or an indicator for winning any Congressional general election. Panels A and B of Figure 5 plot the results for ever winning any Congressional election separately for female and male state legislature candidates within each margin of victory bin. The corresponding estimates in Column 1 of Table 5 show that while winning a state legislature seat increases the probability of winning a Congressional level election by 5.3 percentage points for men, the effect for women is small and statistically insignificant. This is largely due to men winning in House primary elections (column 2), although there is also a smaller statistically significant effect on winning a House general election (column 3). These effects are large relative to the mean rate at which state legislature candidates ever win a Congressional primary or general election: for men, an additional state legislature term increases the likelihood of ever winning a Congressional election by nearly double the average rate at which this occurs in the sample.

### C. Differential Gender Effect Driven by Winners or Losers?

The gender heterogeneity in the career effect of political experience may result from the differential persistence of election losers rather than winners, as found by Wasserman (2018) in local government in California. To examine if our results are due to election winners or losers, Appendix Table A4 uses the sample of mixed-gender election losers, recodes the running variable to be positive if the election was lost by the female candidate, and uses an indicator for female as the independent variable of interest. This specification tests whether there are statistically significant differences in the likelihood of contesting up across men and women who were marginally not elected, and finds no evidence to support this relationship; we obtain analogous results when testing for this relationship in terms of the election winning outcome as well. We view this result as inconsistent with a behavioral interpretation that female candidates are less likely to run for higher office because they are less likely to enter competitive environments against men (Niederle and Vesterlund 2007; Buser and Yuan 2019; Ellison and Swanson 2018).



## V. Explaining the Gender Gap

### A. Differences in Observables

Table 2 shows that marginal female (male) winners are similar, on average, to marginal female (male) losers, which in turn allows us to causally identify the effect of winning a state legislature seat on political career progression. The assumptions underlying the estimation strategy, however, might not carry through when comparing the effect of winning a state legislature seat *across* gender. Importantly, it would be difficult to distinguish if differences between marginal female winners (losers) compared to marginal male winners (losers) represent the mechanism through which societal norms differentially impact a woman’s (man’s) likelihood of promotion or bias-inducing unobserved heterogeneity.

In order to provide guidance for interpreting the gender gap in political career progression that we find, we first test for differences in election, district, and candidate characteristics between female and male winners and between female and male losers. Columns 2 and 3 of Table 6 provide little evidence that election or district characteristics (Panels A and B) vary systematically across female and male candidates. However, the results in Panel C show that female candidates (whether winners or losers) served fewer previous terms, are less likely to be an incumbent, more likely to be first-time candidates, and more likely to be Democrats when compared to male candidates.

Table 7 provides a test for whether these observed differences between marginal female and male candidates explain the gender gap in running for a Congressional seat. To start, Column 1 of Table 7 reproduces the gender gap estimated in Column 1 of Table 4 using the pooled sample of all candidates. As discussed earlier, the results suggest that female state legislators are 4.8 percentage points less likely to run for Congress than male state legislators. In Column 2 we add an interaction between winning a state legislature seat and the number of terms served (experience) to the specification, which has little impact on the estimated gender gap. Similarly, adding interactions between winning a state legislature seat and an indicator for incumbency, being a first time candidate, being a Democrat, or being a Republican in Columns 3-6 has little impact on the estimated gender gap in running for Congress. Finally, adding all interaction terms simultaneously in Column 7 only lowers the gender gap slightly to 4.4 percentage points and the interaction terms of winning a state

legislature seat with other candidate characteristics are not individually or mutually statistically significant.<sup>25</sup>

The lack of heterogeneity by accumulated experience or incumbency indicate the gender gap in pursuing a Congressional career is driven by differential returns to experience, rather than heterogeneous effects based on systematic differences in accumulated experience across male and female candidates. Moreover, the lack of heterogeneity by party affiliation suggests the gender gap in the return to political experience is not an artifact of party-specific effects. Thus, the estimated gender gap is unlikely to be related to explanations that hinge on party differences in the type of candidates that can win the party's support, or the role that party elites play in the recruitment and screening of female and male candidates (Niven 1998; Caul 1999; Sanbonmatsu 2002; Box-Steffensmeier et al. 2004; Sanbonmatsu 2006; 2010; Elder 2012; Thomsen 2015).

To rule out the possibility that the gender gap in the effect of winning a state legislature seat simply reflects differences in district characteristics, we report in Appendix Table A6 specifications where we include interaction terms between winning a state legislature seat and several district characteristics. Including these interaction terms does not impact the estimated gender gap. It is also possible that these gender differences in pursuing a Congressional career might simply be the result of dissimilarities in the types of national elections that our female and male state legislator winners have the opportunity to contest. In particular, if there are systematic differences across gender in the competitiveness of subsequent national elections, our results may erroneously be driven by those unobserved factors. For example, suppose that female state legislators were more likely than their male counterparts to face Congressional incumbents in the subsequent national elections in their state. Such a systematic difference might arise due to endogenous responses to more women winning lower-level seats, which could thus generate the estimated gender differentials above. To investigate this, we estimate the relationship between the gender of the elected state legislator and characteristics of the first Congressional election in the state in which that candidate could run.

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<sup>25</sup>To further examine the role of previous experience and party affiliation, we limit the sample to those close mixed-gender elections in which both the male and female candidates were contesting for the first time. Results from this exercise are presented in Appendix Table A5. Despite the substantially smaller sample, these estimates maintain the magnitude of the differential found in our main results and strongly implies that preexisting experience is not the cause of the patterns of differences across men and women.

We report the results in Appendix Table A7. Columns 1-2 include primary elections for Democratic and Republican candidates while Columns 3-4 contain general elections, regardless of party affiliation. Overall, Appendix Table A7 provides little evidence that, in our sample, men and women face differential competition in subsequent Congressional elections. For example, the gender of the state legislator is not associated with the preponderance of incumbents contesting in the subsequent Congressional elections in their state, the average number of candidates competing, whether Congressional seats are held by the candidate’s party, the share of non-freshman incumbents, the share of sitting incumbents female, nor the share of third-party candidates running. We thus conclude that our estimates of the gender gap in the political return to winning a state legislature term are not a result of differential opportunity to contest for national office.<sup>26</sup>

Although focusing on mixed-gender elections facilitates the comparison across female and male state legislators as the gender-specific samples will be drawn from the same set of elections that had and could have elected a female candidate, we also report results from including same-sex elections from constituencies that ever saw a mixed-gender election. The results in Appendix Table A8 show that winning a state legislature seat has a larger impact on the probability that male state legislators compete for a Congressional seat.

## B. Timing of Running for Congressional Seats

An important consideration is that our main finding of gender differences in the probability of running for a Congressional seat could mask differential timing at which state legislators decide (or are chosen by parties) to contest up. To explore this hypothesis, we estimate the probability of ever running for a higher-level seat at each potential opportunity that a state legislature candidate (or current state legislator) could possibly compete for a Congressional seat. Specifically, we code every two years as representing one opportunity to run for higher office, as the House of Representatives exhibits complete turnover every two years. We include in the set of opportunities

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<sup>26</sup>We calculate Congressional outcomes at the state-level for two reasons. First, while some state legislatures may require their legislators to live in the district they represent, the Constitution makes no such restriction for Congressional House members. Second, computing outcomes at the Congressional district level requires several assumptions due to data constraints. Specifically, in order to execute this analysis at the district level we would need to: 1) assume district boundaries at both levels are held fixed over time, 2) assign the Congressional district with the largest population share of state district population in the intersection for state districts that lie in multiple Congressional districts, 3) exclude those districts in which there are naming differences across the data sets and in crosswalk that, due to changing boundaries and district names over time, may preclude any match. With these caveats in mind, the results of using Congressional district outcomes are broadly similar to Appendix Table A7.

those Congressional elections that occur before the term of office for which they ran is completed. Formally, the number of opportunities for candidate  $i$  in constituency  $c$  to run for a Congressional seat is defined as:

$$Opportunities_{ict} = \frac{1}{2} [Year\ of\ Congressional\ Election_{ict'} - Year\ of\ State\ Election_{ict}] \quad (2)$$

We estimate equation (1) using an indicator equal to one if the state legislator runs for a Congressional seat in the first  $\tau$  opportunities conditional on having had up to  $\tau$  opportunities as the outcome variable.<sup>27</sup> Across values of  $\tau$ , this analysis captures political career outcomes of candidates who continue to serve in their same seat, run for a different state legislature office, or exit politics for a period of time and then re-enter politics to contest for a higher-level position. Because it is a cumulative measure, this variable eventually converges to the “ever run” outcome used in Tables 3 and 4. These estimates allow us to flexibly explore how quickly candidates run for Congressional seats after being elected to the state legislature.

Figure 6 plots the estimates of running for a Congressional seat by the number of cumulative opportunities in which the candidate can do so. Panels A and B plot the likelihood of ever running for any higher-level elections and the likelihood of ever running in any general elections, respectively. Although some of the individual estimates are imprecise, the overall picture presented in the plots provide strong evidence that, relative to the candidate’s first close-won election, the gender gap in running for a higher office appears in the first opportunity to run, gradually increases over time, and never closes.

### C. State Legislative Experience and Persistence in the State Legislature

To further investigate the possible determinants of the gender gap in career progression, we examine the decisions that state legislature candidates are making with regard to re-running at that same

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<sup>27</sup>For example, the first opportunity for a candidate who was elected to a state legislature in 2004 (with a term beginning in early 2005) to run for a Congressional seat would be in 2006, and the second opportunity would occur in 2008. In cases where state legislature elections are held in odd-numbered years (off-year elections, *e.g.* Virginia, New Jersey), we count the first opportunity as occurring in the year in which the state legislator takes office. For example, the first opportunity for a candidate who was elected to the state legislature in 2003 to run for a Congressional seat would be in 2004, the second opportunity occurs in 2006 and the third opportunity would occur in 2008. The first opportunity for legislators from such states to run for higher office thus occurs one year earlier relative to their election year. This implies that if a candidate runs for Congress during their second potential opportunity, the indicator variables takes a value of one  $\forall \tau \geq 2$ .

level. We estimate the relationship between winning a state legislature seat and the probability of recontesting for the same seat in subsequent elections relative to election losers of the same gender using the following OLS regression:

$$incumbent_{ict+k} = \alpha Won\ election_{ict} + \beta f(x_{ict}) + \gamma [Won\ election_{ict} \times f(x_{ict})] + X_{ict}\delta + \tau_c + \phi_t + \theta_{t+k} + \epsilon_{ict} \quad (3)$$

Where  $incumbent_{ict+k}$  is an indicator variable equal to one if state legislature candidate  $i$  in the election at time  $t$  in state constituency  $c$  contests for the same seat in subsequent election cycle  $t+k$ , and zero otherwise. Other regressors are defined similarly to Equation 1, with an additional vector of fixed effects for the year of the subsequent state legislature election  $\theta_{t+k}$ . We estimate equation (3) using our sample of first-time mixed-gender elections. We apply the specification to two outcomes measures: whether the candidate ran for the exact same seat in the same chamber in the subsequent election, and whether the candidate ran for any state legislature election in the same state (inclusive of other chambers).

Estimating equation (3) allows us to quantify differences across just-winning versus just-losing candidates in the likelihood of competing in subsequent state legislature elections. We begin with the sample of narrowly won elections in Column 1 of Table 8, and successively add controls for individual and election characteristics in Columns 2-5 using a simple local linear specification on a sample determined by an optimal bandwidth selection algorithm. The estimates in Panel A suggest that a female candidate closely winning a state legislature seat over a male competitor increases her probability of running for the same seat in subsequent elections by nearly 84 percentage points relative to a female candidate who narrowly lost to a male competitor. In contrast, the results in Panel B suggest that when a male candidate narrowly wins a state legislature seat, his likelihood of running for the same seat in subsequent elections is only about 70 percentage points higher than a narrowly-losing male candidate. The difference by gender of 13.7 percentage points is statistically significant at conventional levels, as shown by the p-value of the test for coefficient equality in a pooled and fully interacted model provided below Panel B. When we alternatively use the full sample of mixed-gender elections in Column 6, the gender differential is smaller (11 percentage points), but remains statistically significant. Panels C and D of Table 8 provide similar results when we broaden the definition of the outcome to include any state legislature seat in the

subsequent election. Overall, the results in Table 8 indicate that male state legislators have a lower likelihood of competing for the same seat in the following election cycle compared to female state legislators. In the context of a politician’s decision to continue contesting or run for higher office, this finding is consistent with a similar pattern in India established by Bhalotra et al. (2018), who show that female state legislators have a higher incumbency rate compared to male legislators.

#### D. Gender Differences in Career-Family Tradeoffs

According to the National Conference of State Legislatures, the average state legislator was 56 years old in 2015. In this same sample, female legislators were about two years older than male legislators (Kurtz 2015).<sup>28</sup> Given these ages, it is reasonable to assume that most female politicians compete in state legislative races after completing their fertility. Although a first-child “penalty” is unlikely to explain gender differences in climbing the political ladder, it is possible that female state legislators face different career-family tradeoffs compared to male legislators when deciding whether to pursue a Congressional career.

We conduct two analyses to evaluate whether gender differences in career-family tradeoffs can explain our results. First, we use cross-state variation in the time commitment expected of state legislators. In general, legislators are required to devote between 60 to 85 percent of an equivalent full-time job’s hours to their legislative duties (legislative positions can be full-time, hybrid, or part-time, depending on the state).<sup>29</sup> Slightly more than half of state legislatures are comprised of hybrid positions, and the rest are almost equally split between full- and part-time. This heterogeneity allows us to provide suggestive evidence on the importance of differential barriers to entry and/or the potential for career-family tradeoffs as mechanisms generating our results. Intuitively, a move from a part-time state legislature seat to Congressional office will represent a larger change in these dimensions than a move from a full-time state legislature position to a similarly full-time Congressional seat. For example, if female politicians do not compete in Congressional elections because electoral success would lead to an increase in their time commitment to work, a part-time state legislator will be more deterred by this potential shift than a full-time state legislator. If

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<sup>28</sup>We are able to collect age information for candidates in our estimation sample from 1996-2008. Consistent with Kurtz (2015), we find that female candidates in this subsample are about two years older than their male counterparts, at 50 and 48 years old, respectively.

<sup>29</sup>These classifications are based on surveys of state legislators from NCSL (2017).

gender differences in these types of factors are important determinants of our results then we would expect our estimates to be driven by states with part-time, rather than full-time, positions.

Table 9 shows that the opposite is the case: effects from part-time state legislatures (Panel A) are far smaller than those in full-time legislatures (Panel B). These results provide strong evidence that the effects found in our main analysis are due to the sample of full-time legislators, despite the fact that they comprise only about 20 percent of the sample. Specifically, the estimated gender differential in ever running for a Congressional seat is 14.2 percentage points ( $p$ -value=0.027); this is relative to the lower commitment states which have a smaller and statistically insignificant difference. The fact that the gender gap in moving to Congress is far smaller for part-time legislators compared to full-time legislators suggests gender differences in opportunity costs via career-family tradeoffs or preferences for part-time or flexible work are unlikely to be the mechanisms behind our primary findings. As expected, the effects on winning a Congressional election also follow this pattern, with a large and statistically significant gender differential for those that ran in full-time state legislature elections, shown in Appendix Table A9.

To further examine the role of career-family tradeoffs, we estimate the results by whether the state legislature seat is above or below median geographical distance to the District of Columbia.<sup>30</sup> Intuitively, if career-family tradeoffs are driving our main results, we would expect the gender difference to be greater for candidates living in states farther from Washington DC as we assume that a household's cost of serving in Congress (*e.g.* relocation, childcare) is smaller for candidates in states that are close to Congress. Table 10, however, does not provide evidence consistent with this mechanism. The gender gap in Congressional candidacy is about 11 percentage points in states located closer to DC, while it is small and statistically insignificant in states located further away from DC. Although distance to DC could simply reflect differences in gender attitudes across locations, taken together, our results suggest that household constraints as captured by the above metrics are likely not the primary explanation for gender differences in the careers of state legislators.

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<sup>30</sup>Distance is calculated from the state centroid to the District of Columbia centroid.

### E. Is There a Glass Ceiling in Politics?

The results above indicate that heterogeneous responses to winning a state legislature seat by female and male candidates due to career-family tradeoffs or political persistence are unlikely to fully account for the estimated gender gap in political career progression. Although we cannot directly test whether female state legislators face discriminatory barriers preventing them from climbing the career ladder, there is evidence that such barriers play an important role in the persistence of female legislators in politics.

For example, Folke and Rickne (2016) examine the career trajectories of female municipal politicians in Sweden across a three-tiered political hierarchy, finding equally qualified women less likely to hold positions at all levels of the hierarchy and that gender inequality is more pronounced in top posts. They also find that women have a substantially lower probability of advancing from one level to the next, and that the lower probability of advancement increases at the top of the hierarchy. These gender differences are present even among politicians who did not have young children during their time as elected representatives. They conclude that the totality of the evidence provide sufficient evidence for the existence of a glass ceiling in politics, even in a country like Sweden which has a long history of improving women’s political representation.

There is also evidence that working in a predominately male environment can influence the performance of female leaders. In a study of mayors in Italy, Gagliarducci and Paserman (2011) find that female mayors are less likely to survive their tenure when working with an all-male council, in areas with less favorable attitudes towards women, and in locations where they were the first elected female mayor. Similarly, Sarsons (2019) finds that female economists are less likely to receive tenure the more they co-author while male economists face no such penalty. This suggests that women are less likely to be equally credited in group-work environments.

To examine the role of this mechanism, we estimate our main results by the share of the male members in the state’s legislature. We calculate the share of men in the state legislature as the fraction of male winners in a state-chamber-year cohort. The results in Table 11 indicate that the gender gap in state legislatures with below the median share of male representatives (Panel A) is small and statistically insignificant. In contrast, the gender gap in state legislatures with above the median share of male representatives is large (about 10 percentage points), and is statistically



significant at the 5 percent level. These results lend support to the hypothesis that working in male-dominated environment may negatively affect the career progression of female politicians, suggesting the gender gap in progression to higher office is at least partly shaped by individuals' specific experience within political institutions.

The results are also consistent with the possibility that voters and party elites evaluate the performance or ability of female state legislators differently than men. For instance, Fourniaies et al. (2018) find that female state legislators are less likely to serve on committees most valued by donors, and are more likely to sponsor legislation related to women's issues compared to legislation on more general issues. Importantly, their results indicate that these patterns are not driven by self-selection of women into activities, but instead are driven by the type of opportunities offered to women by the legislature's leadership.

## VI. Conclusion

Contemporary discourse frequently points to gender imbalances in high-status occupations, but often fails to clearly identify specific causes of how these imbalances arise. In many countries, women are underrepresented in the upper echelon of the political sphere, and these disparities are both large and persistent. In the U.S., state legislatures serve as a primary channel supplying politicians to the national legislature. We test whether the most common career pipeline position to national politics functions as well for men as women.

Using data that track the political careers of the universe of U.S. state legislature candidates since 1967, we estimate the effect of winning a state legislative election on individuals' political career progression to national politics. We use a quasi-experimental empirical design and quantify a substantial gender gap in the effect of winning an additional state legislature term on the likelihood of competing and winning a Congressional seat. Winning an additional legislature term increases the rate at which men eventually contest up by two times the rate at which it does for women, and also increases the rate at which male state legislators ever win a Congressional election compared to female state legislators.

We show that this gender gap in career progression is not explained by candidates' observable characteristics, the congressional districts in which they run, or by the amount of prior legislative

experience. Moreover, the fact that the gender gap in the career effect of state legislative service is found among states with full-time legislatures who face a smaller additional opportunity cost of serving in Congress suggests this gap is not purely a function of differential career-family tradeoff decisions. Instead, the evidence supports the notion that female politicians either face or internalize a “glass ceiling,” resulting in a substantially lower rate of progression up the political career ladder.

These findings indicate that increasing the representation of women at lower-level political offices is unlikely, by itself, to significantly reduce the gender gap in representation in higher-level political offices. Instead, reductions in the barriers to career progression that women face from within political or party institutions would likely result in greater parity in representation among top leadership positions.

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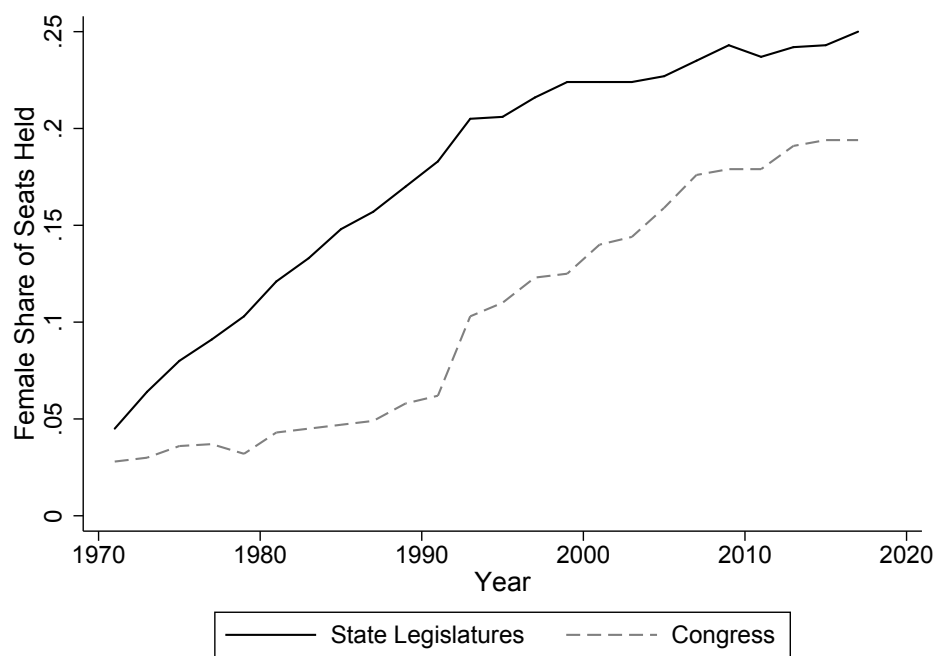
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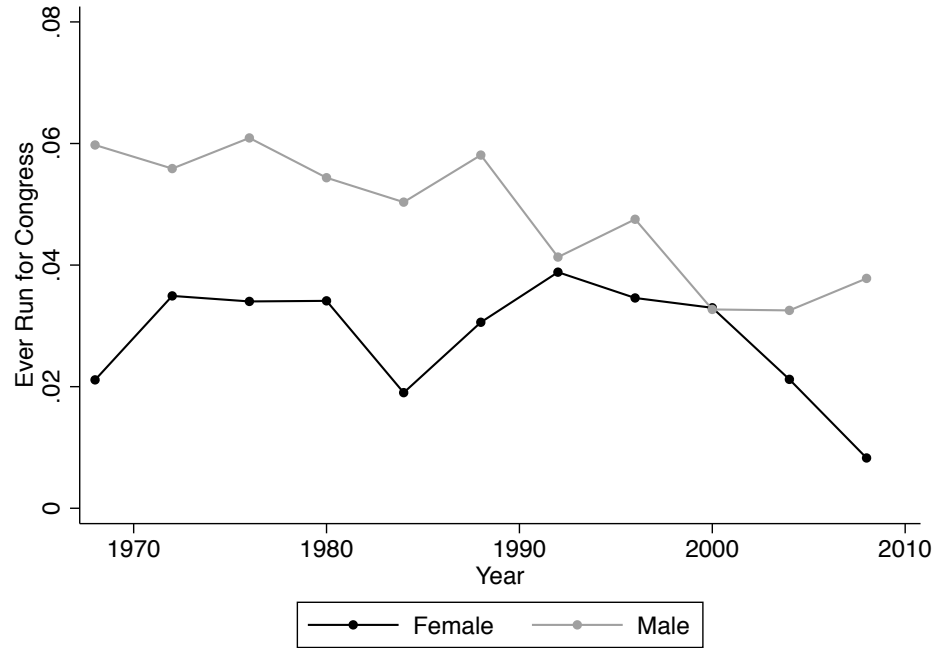
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Figure 1: Female Representation in Politics



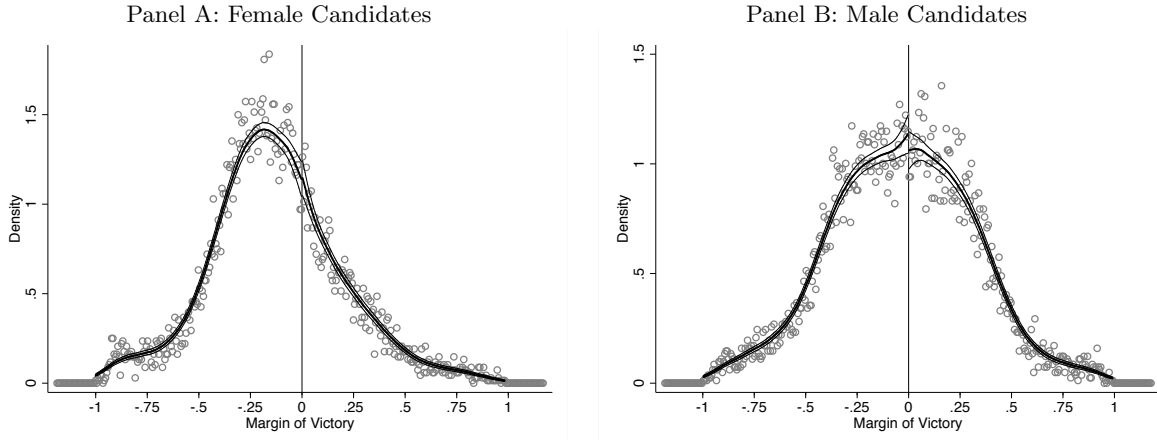
Note: This figure reports the share of seats held by female politicians over the period 1971-2016 in both Congress and the state legislatures. Data come from authors' calculations and the Center for American Women in Politics.

Figure 2: Share of State Legislative Candidates Who Ever Run for Congress



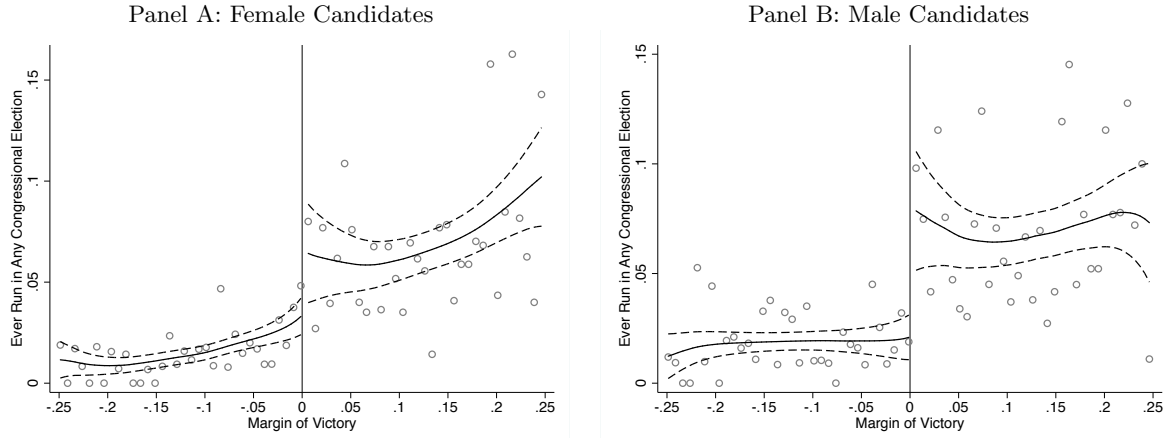
Note: This figure reports the share of state legislative candidates that ever run for Congress separately by gender in four-year bins of state legislative election year. The sample includes all 25,389 candidates from first-time mixed-gender elections.

Figure 3: McCrary Test



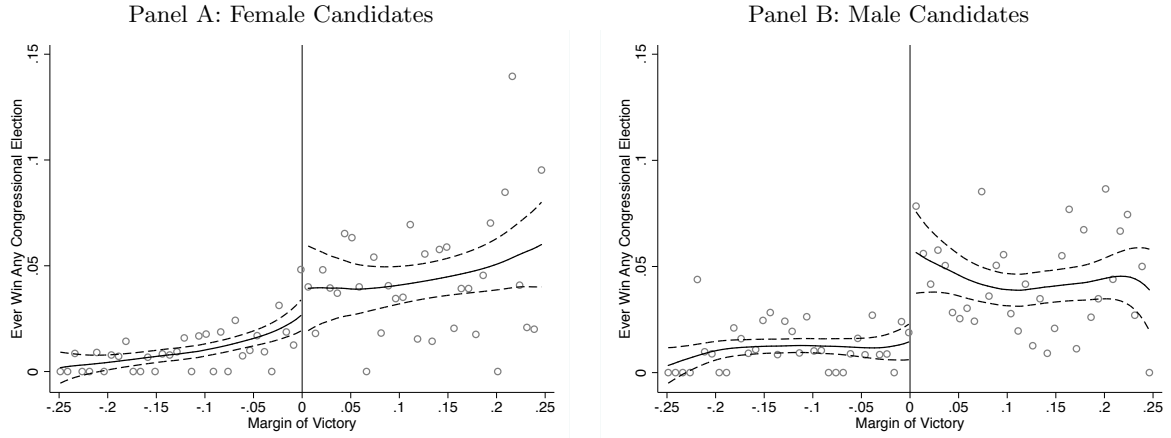
Note: These figures report results from a McCrary (2008) test for a discontinuity in the density of the margin of victory. Panel A plots the victory margin density for female candidates and Panel B plots the victory margin density for male candidates. The sample includes all first-time mixed gender elections. Thin black lines represent 95 percent confidence intervals.

Figure 4: Gender Gap in Congressional Candidacy



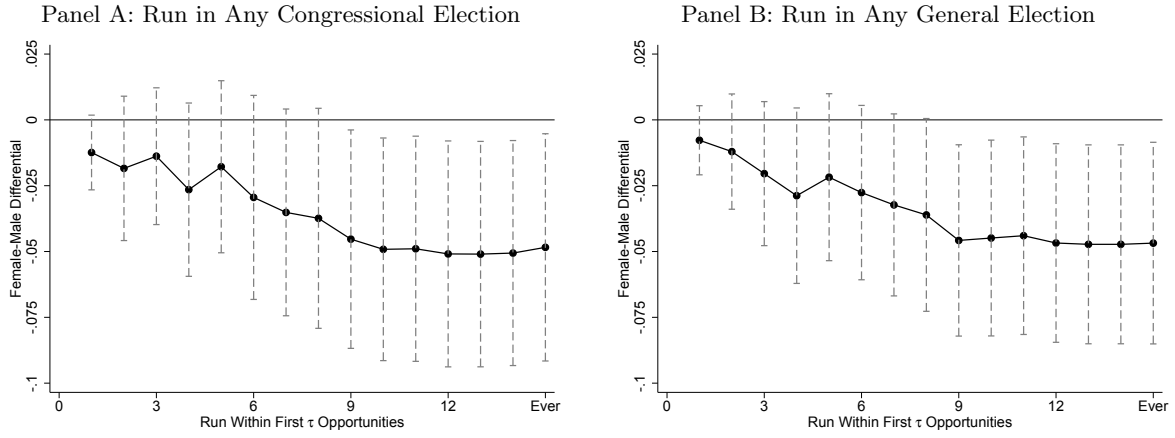
Note: These figures report regression discontinuity estimates of the effect of winning a state legislature election on future Congressional candidacy separately by gender. Panel A reports estimates for female candidates and Panel B reports estimates for male candidates. The sample contains all first-time mixed-gender elections. Each point plots the dependent variable mean within each margin of victory bin. Solid lines represent a local linear regression, estimated separately for winning and losing candidates. Dashed lines represent 90 percent confidence intervals.

Figure 5: Gender Gap in Congressional Representation



Note: These figures report regression discontinuity estimates of the effect of winning a state legislature election on future Congressional representation separately by gender. Panel A reports estimates for female candidates and Panel B reports estimates for male candidates. The sample contains all first-time mixed gender elections. Each point plots the dependent variable mean within each margin of victory bin. Solid lines represent a local linear regression, estimated separately for winning and losing candidates. Dashed lines represent 90 percent confidence intervals.

Figure 6: Congressional Timing Results



Note: These figures report estimates of the gender gap in Congressional candidacy across varying time horizons. All regressions include constituency and year fixed effects, the full set of candidate and election controls, and use the optimal bandwidth from Calonico et al. (2019; forthcoming). Vertical dashed gray lines indicate 90 percent confidence intervals, with standard errors clustered at the state level. See the notes to Table 4 for additional details on the sample and estimation.



Table 1: Summary Statistics

	Estimation Sample		All Elections	
<i>Panel A: Election Characteristics</i>	(1)		(2)	
Term Length	2.296		2.312	
Number of Candidates	2.153		2.156	
Margin of Victory (Abs.)	0.112		0.276	
<i>Panel B: District Characteristics</i>				
Share Incumbent Ran	0.540		0.525	
Share Unopposed Elections	0.208		0.208	
Margin of Victory	0.217		0.258	
Share Mixed-Gender	0.196		0.170	
Number of Candidates	1.895		1.926	
	Female	Male	Female	Male
<i>Panel C: Congressional Outcomes</i>	(1)	(2)	(3)	(4)
Run in Any Primary or General	0.032	0.044	0.037	0.048
Run in House General	0.017	0.023	0.020	0.026
Run in Any General	0.021	0.026	0.024	0.029
Win Any Primary or General	0.021	0.028	0.024	0.029
Win House General	0.005	0.008	0.009	0.011
Win Any General	0.006	0.008	0.010	0.012
Observations	5,734	6,471	22,893	108,317

Note: This table reports summary statistics for our estimation sample (after applying the Calonico et al. (2019; forthcoming) bandwidth) and all contested state legislative elections. In Panels A and B, Column 1 reports means for our estimation sample and Column 2 reports means for all contested state legislative elections. Means in Panels A and B are calculated across gender. Means in Panel B are calculated using all previous state legislative elections. Margin of victory includes only contested elections. In Panel C, Columns 1 and 2 report Congressional outcomes for candidates in our estimation sample and Columns 3 and 4 report Congressional outcomes for candidates in all contested state legislative elections. All candidate-level outcomes are calculated using the top-two candidates. See Section II for additional detailed on sample construction.

Table 2: Balance Tests

	Sample Mean	Woman Won	Man Won
<i>Panel A: Election Characteristics</i>	(1)	(2)	(3)
Term Length	2.282 (0.699)	-0.000 (0.014)	-0.001 (0.015)
Number of Candidates	2.163 (0.418)	0.025 (0.035)	-0.002 (0.022)
<i>Panel B: District Characteristics</i>			
Share Incumbent Ran	0.545 (0.219)	0.004 (0.011)	0.002 (0.006)
Share Unopposed Elections	0.218 (0.263)	0.004 (0.010)	-0.003 (0.009)
Margin of Victory	0.262 (0.141)	-0.008 (0.007)	0.000 (0.004)
Share Mixed-Gender	0.197 (0.213)	-0.003 (0.017)	0.019* (0.011)
Number of Candidates	1.912 (0.402)	0.003 (0.014)	0.008 (0.012)
<i>Panel C: Candidate Characteristics</i>			
Previous Terms Served	0.497 (1.343)	-0.031 (0.021)	-0.074 (0.156)
Sitting Incumbent	0.161 (0.367)	-0.001 (0.019)	-0.074* (0.038)
First-Time Candidate	0.744 (0.437)	0.003 (0.028)	0.104 (0.063)
Democrat	0.456 (0.498)	0.057 (0.055)	0.009 (0.030)
Republican	0.478 (0.500)	-0.061 (0.049)	-0.001 (0.034)
Candidates	25,389	—	—
Elections	16,293	—	—

Note: This table reports sample means and balance tests for state legislative election, district, and candidate characteristics. The dependent variable is listed in each row. Column 1 reports means and standard deviations for the entire first-time mixed-gender sample. Columns 2 and 3 report coefficients from a regression discontinuity of the dependent variable on an indicator for if the male or female candidate won the election. The outcomes in Panel B are calculated as the mean of all previous elections in that district. All specifications are weighted using a triangular kernel, use the optimal bandwidth from Calonico et al. (2019; forthcoming), and include constituency and election year fixed effects, as well as controls for the type of election, and separate winner and runner-up measures of the margin of victory. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 3: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Gender

	Dependent Variable: Ever Run in Congressional Election or Primary						
	Base Model	Add Legis. Experience	Add Party	Add Election Type	Add Term Length	Add Total Candidates	Global RD
<i>Panel A: Women</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Won	0.026 (0.017)	0.025 (0.017)	0.024 (0.017)	0.024 (0.017)	0.024 (0.017)	0.025 (0.017)	0.033*** (0.010)
Dep. Var. Mean	0.032	0.032	0.032	0.032	0.032	0.032	0.030
Observations	5,734	5,734	5,734	5,734	5,734	5,734	11,317
<i>Panel B: Men</i>							
Won	0.074*** (0.020)	0.073*** (0.020)	0.073*** (0.020)	0.073*** (0.020)	0.073*** (0.020)	0.073*** (0.020)	0.059*** (0.011)
Dep. Var. Mean	0.044	0.044	0.044	0.044	0.044	0.044	0.046
Observations	6,471	6,471	6,471	6,471	6,471	6,471	14,072
<i>p-value <math>Won_W = Won_M</math></i>	0.073	0.072	0.070	0.070	0.070	0.071	0.043

Note: This table reports estimates of the gender gap in Congressional candidacy under different specifications. The dependent variable is equal to one if the candidate ever runs in any Congressional election or primary, and is zero otherwise. The sample includes all first-time mixed-gender state legislative elections in our estimation sample. Column 1 presents results using our baseline specification, with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. Columns 2-6 iteratively add candidate- and election-level controls and include all previously added controls. Column 7 uses all first-time mixed gender elections. All specifications are weighted using a triangular kernel, include constituency and election year fixed effects, and control for the margin of victory separately for winning and losing candidates. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 4: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Election Type and Gender

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
<i>Panel A: Women</i>	(1)	(2)	(3)	(4)	(5)
Won	0.025 (0.017)	0.023 (0.015)	-0.001 (0.007)	0.018 (0.014)	0.010 (0.014)
Dep. Var. Mean	0.032	0.026	0.006	0.016	0.019
Observations	5,734	6,645	4,977	6,524	7,182
<i>Panel B: Men</i>					
Won	0.073*** (0.020)	0.066*** (0.020)	0.011 (0.007)	0.049*** (0.014)	0.056*** (0.016)
Dep. Var. Mean	0.044	0.038	0.006	0.022	0.026
Observations	6,471	6,159	7,444	5,718	4,922
<i>p-value <math>Won_W = Won_M</math></i>	0.071	0.108	0.212	0.142	0.050

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. The sample contains all first-time mixed-gender state legislative elections with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. All regressions include constituency and election year fixed effects, and the full set of candidate and election controls. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 5: Effect of Winning a State Legislative Seat on Congressional Representation, by Election Type and Gender

	Dependent Variable: Ever Win			
	Any HLE	House Primary	House General	Any General
<i>Panel A: Women</i>	(1)	(2)	(3)	(4)
Won	0.007 (0.015)	0.016 (0.015)	0.004 (0.007)	0.004 (0.009)
Dep. Var. Mean	0.020	0.017	0.005	0.006
Observations	7,093	6,486	5,525	5,667
<i>Panel B: Men</i>				
Won	0.053*** (0.017)	0.048*** (0.015)	0.011** (0.005)	0.011* (0.006)
Dep. Var. Mean	0.028	0.028	0.009	0.008
Observations	4,967	5,417	6,752	6,234
<i>p-value <math>Won_W = Won_M</math></i>	0.079	0.170	0.458	0.539

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions. The dependent variable is equal to one if the candidate ever wins the election listed in the column header and is zero otherwise. The sample contains all first-time mixed-gender state legislative elections with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. All regressions include constituency and election year fixed effects, and the full set of candidate and election controls. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 6: Testing Characteristics of Marginal Winners and Losers Across Gender

	Sample Mean	Winners	Losers
<i>Panel A: Election Characteristics</i>	(1)	(2)	(3)
Term Length	2.282 (0.699)	-0.015 (0.017)	-0.012 (0.014)
Number of Candidates	2.163 (0.418)	0.003 (0.031)	-0.018 (0.027)
<i>Panel B: District Characteristics</i>			
Share Incumbent Ran	0.545 (0.219)	0.005 (0.008)	0.005 (0.007)
Share Unopposed Elections	0.218 (0.263)	-0.001 (0.011)	-0.001 (0.009)
Margin of Victory	0.262 (0.141)	-0.000 (0.006)	0.006 (0.004)
Share Mixed-Gender	0.197 (0.213)	-0.027 (0.017)	-0.014 (0.014)
Number of Candidates	1.912 (0.402)	-0.002 (0.013)	-0.000 (0.012)
<i>Panel C: Candidate Characteristics</i>			
Previous Terms Served	0.497 (1.343)	-0.458*** (0.088)	-0.599*** (0.085)
Sitting Incumbent	0.161 (0.367)	-0.125*** (0.035)	-0.187*** (0.030)
First-Time Candidate	0.744 (0.437)	0.233*** (0.034)	0.315*** (0.031)
Democrat	0.456 (0.498)	0.246*** (0.057)	0.252*** (0.044)
Republican	0.478 (0.500)	-0.242*** (0.055)	-0.228*** (0.040)
Candidates	25,389	—	—
Elections	16,293	—	—

Note: This table reports results testing whether marginal female and male winning and losing candidates are comparable. Column 1 reports sample means and standard deviations across all candidates. Columns 2 and 3 report coefficients from an indicator for a female candidate. Column 2 is estimated on the sample of winning candidates and Column 3 is estimated on the sample of losing candidates. The outcomes in Panel B are calculated as the mean of all previous elections in that district. The margin of victory is positive for female candidates and negative for male candidates. All specifications are weighted using a triangular kernel, use the optimal bandwidth from Calonico et al. (2019; forthcoming), and include constituency and election year fixed effects, as well as controls for the type of election, and separate winner and runner-up measures of the margin of victory. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 7: Testing for the Presence of Heterogeneous Treatment Effects in Candidate Characteristics

	Dependent Variable: Ever Run in Any Congressional Election						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female-Male Differential	-0.048*	-0.049*	-0.050*	-0.048*	-0.045*	-0.046*	-0.044*
	(0.026)	(0.026)	(0.026)	(0.026)	(0.025)	(0.026)	(0.025)
Win x Experience		-0.001					-0.001
		(0.006)					(0.007)
Win x Incumbent			-0.014				-0.025
			(0.014)				(0.023)
Win x First-Time Candidate				-0.002			-0.017
				(0.014)			(0.020)
Win x Democrat					-0.013		-0.047
					(0.013)		(0.041)
Win x Republican						0.009	-0.035
						(0.013)	(0.040)
Dep. Var. Mean	0.039	0.039	0.039	0.039	0.039	0.039	0.039
Observations	12,205	12,205	12,205	12,205	12,205	12,205	12,205
<i>p</i> -value on Joint F-test	—	—	—	—	—	—	0.595

Note: This table tests for heterogeneous treatment effects by candidate characteristics. Female-Male differential represents the estimated gender gap in Congressional candidacy. Column 1 reports the difference in the gender-specific coefficients from Column 1 of Table 4. Each column adds the listed interaction of an indicator for winning an election and the listed covariate. Column 7 includes all interactions. The listed *p*-value tests the joint significance of all interaction terms. See the notes to Table 4 for additional details. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 8: Effect of Winning a State Legislative Seat on Subsequent State Legislature Candidacy, by Gender

	Dependent Variable: Incumbent Runs In Next Election					
	Base	Add Legis.	Add	Add Term	Add Total	Global
	Model	Experience	Party	Length	Candidates	RD
<i>Same Seat</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Women</i>						
Won	0.837*** (0.022)	0.835*** (0.022)	0.835*** (0.022)	0.835*** (0.022)	0.835*** (0.022)	0.807*** (0.015)
Dep. Var. Mean	0.280	0.280	0.280	0.280	0.280	0.247
Observations	6,295	6,295	6,295	6,295	6,295	11,060
<i>Panel B: Men</i>						
Won	0.700*** (0.030)	0.697*** (0.030)	0.698*** (0.030)	0.698*** (0.030)	0.698*** (0.030)	0.709*** (0.021)
Dep. Var. Mean	0.356	0.356	0.356	0.356	0.356	0.342
Observations	7,159	7,159	7,159	7,159	7,159	13,749
p-val W Win = M Win	0.000	0.000	0.000	0.000	0.000	0.000
<i>Same State</i>						
<i>Panel C: Women</i>						
Won	0.931*** (0.021)	0.929*** (0.021)	0.928*** (0.021)	0.928*** (0.021)	0.929*** (0.022)	0.904*** (0.015)
Dep. Var. Mean	0.321	0.321	0.321	0.321	0.321	0.271
Observations	5,338	5,338	5,338	5,338	5,338	11,060
<i>Panel D: Men</i>						
Won	0.792*** (0.021)	0.790*** (0.021)	0.791*** (0.021)	0.790*** (0.021)	0.790*** (0.021)	0.805*** (0.021)
Dep. Var. Mean	0.397	0.397	0.397	0.397	0.397	0.381
Observations	7,499	7,499	7,499	7,499	7,499	13,749
p-val W Win = M Win	0.000	0.000	0.000	0.000	0.000	0.000

Note: This table reports estimates of the gender gap in state legislature incumbent candidacy under different regression specifications. The dependent variable is equal to one if the incumbent candidate runs for the same seat or in the same state in the next election cycle and is zero otherwise. The sample includes state legislature first-time mixed-gender general elections with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. Columns 2-5 iteratively add candidate- and election-level controls and include all previously added controls. Column 6 uses all first-time mixed-gender general elections. All regressions are weighted using a triangular kernel, include constituency, election year, and outcome year fixed effects, and control for margin of victory separately for winning and losing candidates. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.



Table 9: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Gender and Time Commitment

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
<i>Less than Full-Time</i>	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Women</i>					
Won	0.024 (0.020)	0.026 (0.017)	-0.001 (0.008)	0.016 (0.012)	0.011 (0.013)
Dep. Var. Mean	0.030	0.024	0.006	0.013	0.017
Observations	4,448	5,098	3,885	5,015	5,453
<i>Panel B: Men</i>					
Won	0.057*** (0.017)	0.047*** (0.016)	0.008 (0.007)	0.043*** (0.013)	0.046*** (0.016)
Dep. Var. Mean	0.039	0.034	0.006	0.019	0.022
Observations	5,160	4,918	5,868	4,587	3,951
<i>p</i> -value $Won_W = Won_M$	0.197	0.333	0.373	0.133	0.082
<i>Full Time</i>					
<i>Panel C: Women</i>					
Won	0.020 (0.041)	0.009 (0.037)	0.000 (0.012)	0.018 (0.034)	0.003 (0.032)
Dep. Var. Mean	0.041	0.036	0.007	0.027	0.025
Observations	1,286	1,547	1,092	1,509	1,729
<i>Panel D: Men</i>					
Won	0.162*** (0.045)	0.166*** (0.045)	0.024 (0.017)	0.087** (0.036)	0.104** (0.041)
Dep. Var. Mean	0.065	0.056	0.010	0.034	0.041
Observations	1,311	1,241	1,576	1,131	971
<i>p</i> -value $Won_W = Won_M$	0.027	0.011	0.267	0.163	0.055

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions by expected time commitment. We classify states based on expected time commitments from NCSL surveys of state legislators. Full-time states are on average 84 percent of a full-time job, and all other states are less on average. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. All regressions use the estimation sample of first-time mixed gender elections with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. All regressions include constituency and election year fixed effects, and the full set of candidate and election controls. Standard errors clustered at the constituency level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Table 10: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Gender and Distance to DC

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
<i>Low Distance</i>	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Women</i>					
Won	-0.005 (0.024)	0.000 (0.020)	-0.001 (0.014)	0.017 (0.015)	-0.001 (0.016)
Dep. Var. Mean	0.031	0.025	0.007	0.016	0.018
Observations	3,456	3,843	2,293	3,325	3,906
<i>Panel B: Men</i>					
Won	0.115*** (0.027)	0.084*** (0.023)	0.026** (0.012)	0.072*** (0.020)	0.090*** (0.023)
Dep. Var. Mean	0.043	0.042	0.005	0.021	0.024
Observations	3,336	3,731	3,375	3,221	2,920
<i>p</i> -value $Won_W = Won_M$	0.001	0.006	0.158	0.024	0.001
<i>High Distance</i>					
<i>Panel C: Women</i>					
Won	0.045* (0.024)	0.047* (0.025)	0.003 (0.008)	0.030 (0.023)	0.032 (0.024)
Dep. Var. Mean	0.032	0.030	0.005	0.018	0.023
Observations	2,783	2,539	2,068	2,335	2,348
<i>Panel D: Men</i>					
Won	0.039** (0.018)	0.035* (0.019)	0.003 (0.007)	0.028** (0.013)	0.025 (0.016)
Dep. Var. Mean	0.045	0.035	0.009	0.024	0.028
Observations	3,070	2,666	3,475	3,271	2,757
<i>p</i> -value $Won_W = Won_M$	0.852	0.709	0.985	0.932	0.809

Note: This table reports estimates of the gender gap for any Congressional candidacy by distance to Washington DC. Low distance is defined as below median distance in the sample and high distance is above median distance in the estimation sample. Distance is calculated from the state centroid to the District of Columbia centroid. See the notes to Table 4 for additional details on the sample and estimation. Standard errors clustered at the constituency level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

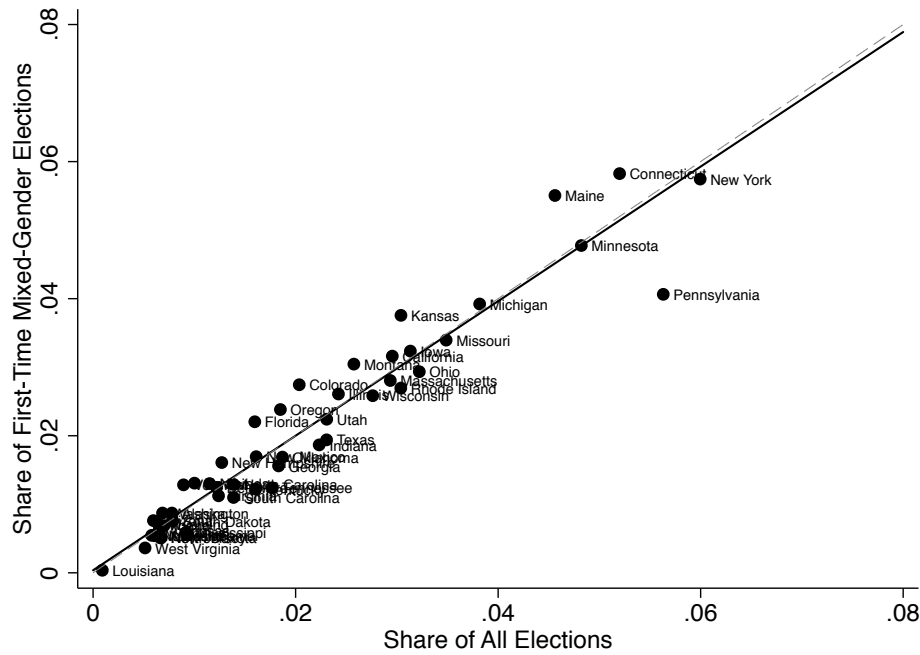
Table 11: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Gender and Male Share of Legislature

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
<i>Low Male Share</i>	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Women</i>					
Won	0.051* (0.028)	0.049* (0.027)	-0.002 (0.006)	0.017 (0.024)	0.022 (0.026)
Dep. Var. Mean	0.032	0.029	0.004	0.018	0.021
Observations	2,958	3,163	2,573	3,634	3,177
<i>Panel B: Men</i>					
Won	0.044** (0.020)	0.047** (0.021)	-0.005 (0.003)	0.043*** (0.016)	0.041** (0.016)
Dep. Var. Mean	0.039	0.033	0.006	0.020	0.022
Observations	3,307	3,057	3,507	2,741	2,661
<i>p</i> -value $Won_W = Won_M$	0.814	0.954	0.551	0.378	0.544
<i>High Male Share</i>					
<i>Panel C: Women</i>					
Won	-0.011 (0.031)	-0.039 (0.027)	0.029* (0.017)	0.012 (0.020)	0.023 (0.021)
Dep. Var. Mean	0.032	0.024	0.009	0.015	0.019
Observations	2,897	3,298	2,409	2,641	2,962
<i>Panel D: Men</i>					
Won	0.099*** (0.023)	0.074*** (0.021)	0.039** (0.015)	0.043** (0.018)	0.094*** (0.023)
Dep. Var. Mean	0.050	0.043	0.008	0.027	0.030
Observations	3,484	3,394	3,849	4,129	3,021
<i>p</i> -value $Won_W = Won_M$	0.009	0.004	0.674	0.304	0.031

Note: This table reports estimates of the gender gap for any Congressional candidacy by the male share of the legislature. Male share of the legislature is defined as the fraction of winners in a state x chamber x year cohort that are male. Low male share is below median and high male share is above median. See the notes to Table 4 for additional details on the sample and estimation. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

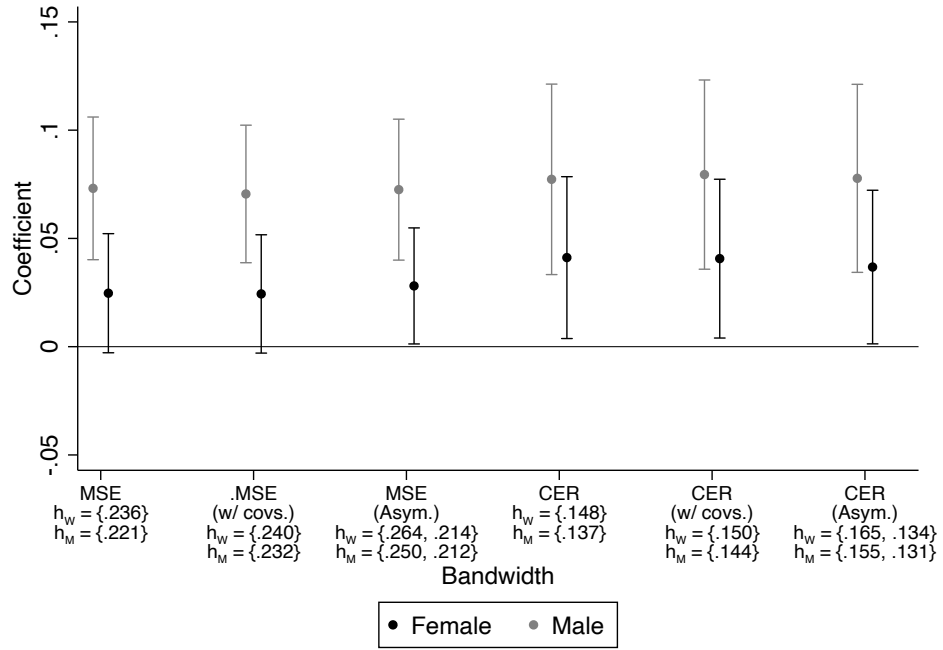
## Appendix A: Additional Results

Appendix Figure A1: Share of All Elections Versus Share of Mixed-Gender Elections by State



Note: This figure plots the share of first-time mixed-gender single-member district elections against the share of all single-member district elections by state. The dashed line is the 45-degree line. The solid line plots the OLS line of best fit, the slope of which is statistically indistinguishable from 1 ( $\beta = 0.981$  (se = 0.040)).

Appendix Figure A2: Testing Robustness of Estimates to Varying Bandwidths



Note: This figure reports estimates of the effect of winning a legislative seat on the probability of ever running for Congressional office separately for men and women across varying bandwidths. All bandwidths are calculated use the procedures from Calonico et al. (2019; forthcoming). MSE and CER respectively denote mean squared error- and coverage error rate-optimal bandwidths. Covariates included in the calculation are listed in Table 3. Vertical lines indicate 90 percent confidence intervals with standard errors clustered at the state-level. See the notes to Table 3 for additional details on the sample and estimation.

Appendix Table A1: Balance Tests - Full Sample

	Sample Mean	Woman Won	Man Won
<i>Panel A: Election Characteristics</i>	(1)	(2)	(3)
Term Length	2.282 (0.699)	-0.009 (0.006)	0.002 (0.007)
Number of Candidates	2.163 (0.418)	0.016 (0.014)	-0.019 (0.012)
<i>Panel B: District Characteristics</i>			
Share Incumbent Ran	0.545 (0.219)	0.009 (0.006)	-0.004 (0.004)
Share Unopposed Elections	0.218 (0.263)	0.003 (0.006)	-0.004 (0.005)
Margin of Victory	0.262 (0.141)	-0.004 (0.003)	0.002 (0.002)
Share Mixed-Gender	0.197 (0.213)	-0.011 (0.008)	0.002 (0.006)
Number of Candidates	1.912 (0.402)	0.001 (0.009)	0.004 (0.007)
<i>Panel C: Candidate Characteristics</i>			
Previous Terms Served	0.497 (1.343)	0.060*** (0.021)	0.416*** (0.081)
Sitting Incumbent	0.161 (0.367)	0.024** (0.010)	0.154*** (0.018)
First-Time Candidate	0.744 (0.437)	-0.063*** (0.014)	-0.171*** (0.019)
Democrat	0.456 (0.498)	-0.087*** (0.027)	-0.108*** (0.023)
Republican	0.478 (0.500)	0.048 (0.030)	0.055** (0.027)
Candidates	25,389	25,389	25,389
Elections	16,293	16,293	16,293

Note: This table reports sample means and balance tests for state legislative candidate, election, and district characteristics using the entire sample of first-time mixed-gender elections. The dependent variable is listed in each row. Column 1 reports means and standard deviations. Columns 2 and 3 report coefficients from a regression of the dependent variable on an indicator for if the male or female candidate won the election. The outcomes in Panel B are calculated as the mean of all previous elections in that district. All specifications are weighted using a triangular kernel, and include constituency and election year fixed effects, as well as controls for the type of election and separate winner and runner-up measures of the margin of victory. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A2: Gender Gap in Congressional Candidacy - Global RD

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Women</i>					
Won	0.033*** (0.010)	0.031*** (0.009)	0.003 (0.003)	0.019** (0.008)	0.021** (0.008)
Dep. Var. Mean	0.030	0.025	0.006	0.016	0.019
Observations	11,317	11,317	11,317	11,317	11,317
<i>Panel B: Men</i>					
Won	0.059*** (0.011)	0.052*** (0.010)	0.006 (0.004)	0.034*** (0.008)	0.037*** (0.008)
Dep. Var. Mean	0.046	0.040	0.008	0.025	0.028
Observations	14,072	14,072	14,072	14,072	14,072
<i>p</i> -value $Won_W = Won_M$	0.043	0.081	0.621	0.170	0.142

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. The sample contains all first-time mixed-gender state legislative elections. All regressions include constituency and election year fixed effects, and the full set of candidate and election controls. See the notes to Table 3 for additional details. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A3: Gender Gap in Congressional Candidacy - Stacked Sample

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Women</i>					
Won	0.020*** (0.007)	0.020*** (0.007)	-0.001 (0.003)	0.013* (0.007)	0.012 (0.007)
Dep. Var. Mean	0.033	0.028	0.007	0.018	0.022
Observations	9,974	10,805	8,353	9,741	9,065
<i>Panel B: Men</i>					
Won	0.048*** (0.012)	0.043*** (0.011)	0.006 (0.004)	0.032*** (0.009)	0.037*** (0.009)
Dep. Var. Mean	0.044	0.039	0.007	0.023	0.025
Observations	11,362	11,312	11,274	8,338	7,145
$p$ -value $Won_W = Won_M$	0.024	0.052	0.105	0.063	0.031

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. The sample contains all mixed-gender state legislative elections, allowing for multiple observations per candidate. All regressions include constituency and election year fixed effects, the full set of candidate and election controls, and use the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.



Appendix Table A4: Testing Loser vs. Winner Hypotheses - Election Losers Single RD

	Dep. Var.: Ever Run in		
	Any HLE	House	Any
		General	General
	(1)	(2)	(3)
Female	0.012 (0.009)	0.005 (0.008)	0.006 (0.008)
Dep. Var. Mean	0.015	0.008	0.009
Observations	8,781	7,890	7,585

Note: This table reports estimates of the gender gap for any Congressional candidacy for losing candidates. The sample includes losing candidates of first-time mixed-gender elections. We re-define the running variable to be positive for women and negative for men. All regressions include year and constituency fixed effects, the full set of candidate and election controls, and use the optimal bandwidth from Calonico et al. (2019; forthcoming). Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A5: Gender Gap in Congressional Candidacy for First-Time Candidates

	Dependent Variable: Ever Run in				
	Any HLE	House Primary	Senate Primary	House General	Any General
<i>Panel A: Women</i>	(1)	(2)	(3)	(4)	(5)
Won	0.028 (0.027)	0.031 (0.027)	0.011 (0.012)	0.000 (0.018)	0.008 (0.020)
Dep. Var. Mean	0.035	0.029	0.007	0.018	0.025
Observations	1,992	1,892	1,631	1,893	1,908
<i>Panel B: Men</i>					
Won	0.082* (0.044)	0.072* (0.039)	0.007 (0.015)	0.059* (0.033)	0.047 (0.035)
Dep. Var. Mean	0.040	0.033	0.009	0.021	0.027
Observations	1,712	1,554	2,308	1,693	1,649
<i>p-value <math>Won_W = Won_M</math></i>	0.228	0.285	0.857	0.122	0.353

Note: This table reports estimates of the gender gap in Congressional candidacy for different positions in the sample where both candidates are contesting for the first time. We consider a candidate a first-time candidate when we first observe them in a single-district election. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. All regressions include constituency and election year fixed effects, the full set of candidate and election controls, and use the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A6: Testing for the Presence of Heterogeneous Treatment Effects in District Characteristics

	Dependent Variable: Ever Run in Any Congressional Election						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female-Male Differential	-0.051*	-0.051*	-0.051*	-0.051*	-0.050*	-0.051*	-0.050*
	(0.028)	(0.028)	(0.028)	(0.028)	(0.027)	(0.028)	(0.027)
Win x Share Incumbent Won		-0.019					-0.020
		(0.033)					(0.036)
Win x Share Unopposed			0.002				-0.019
			(0.027)				(0.061)
Win x Average Victory Margin				0.023			0.031
				(0.055)			(0.055)
Win x Share Mixed-Gender					0.019		0.021
					(0.034)		(0.034)
Win x Average Number of Candidates						-0.010	-0.023
						(0.023)	(0.046)
Dep. Var. Mean	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Observations	11,162	11,162	11,162	11,162	11,162	11,162	11,162
p-value on Joint F-test	—	—	—	—	—	—	0.937

Note: This table tests for heterogeneous treatment effects by district characteristics. Female-Male differential represents the estimated gender gap in Congressional candidacy. Column 1 reports the difference in the gender-specific coefficients from Column 1 of Table 4 for the set of elections where we have non-missing data on all district characteristics. Each column adds the listed interaction of an indicator for winning an election and the listed covariate. Column 7 includes all interactions. The listed p-value tests the joint significance of all interaction terms. See the notes to Table 2 for additional details on covariate construction and the notes to Table 4 for additional details on the sample and estimation. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A7: State Congressional Characteristics Of Winning Candidates

	Primary Elections		General Elections	
	Sample Mean	Female-Male Differential	Sample Mean	Female-Male Differential
	(1)	(2)	(3)	(4)
Share with Female Incumbent	0.050 (0.119)	0.009 (0.009)	0.095 (0.156)	0.005 (0.008)
Share with Incumbent	0.491 (0.271)	0.004 (0.024)	0.859 (0.203)	0.012 (0.013)
Share Opposed Races	0.397 (0.294)	-0.009 (0.024)	0.921 (0.141)	0.006 (0.005)
Candidates per Race	1.792 (0.849)	-0.040 (0.060)	1.959 (0.231)	0.006 (0.008)
Share Held by Own Party	0.552 (0.274)	-0.003 (0.025)	0.519 (0.275)	-0.030 (0.024)
Share Non-Freshman Incumbents	0.813 (0.213)	-0.018 (0.017)	- -	- -
Share Third-Party Candidates	- -	- -	0.018 (0.072)	0.000 (0.002)
Observations	9,522	-	10,045	-

Note: This table reports state-level characteristics of House Congressional races in the first opportunity a winning candidate has to run. The sample contains all first-time mixed-gender election winning candidates. Primary elections include only Democrat and Republican winners and general elections include all winning candidates. Columns 1 and 3 report sample means and standard deviations for all winners of first-time mixed gender elections. Columns 2 and 4 test differences between male and female winners using a regression discontinuity design, with the running variable re-defined to be positive for female winners and negative for male winners. All regressions use the optimal bandwidth from Calonico et al. (2019; forthcoming) and include year and state fixed effects. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A8: Effect of Winning a State Legislative Seat on Congressional Candidacy, by Gender Using Same and Mixed Gender Elections

Dependent Variable: Ever Run in Congressional Election or Primary								
Base Model		Add Legis. Experience	Add Party	Add Election Type	Add Term Length	Add Total Candidates	Global RD	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	
<i>Panel A: Women</i>								
Won	0.030*** (0.010)	0.030*** (0.010)	0.030*** (0.010)	0.030*** (0.010)	0.030*** (0.010)	0.030*** (0.010)	0.042*** (0.007)	
Dep. Var. Mean	0.032	0.032	0.032	0.032	0.032	0.032	0.031	
Observations	8,888	8,888	8,888	8,888	8,888	8,888	14,379	
<i>Panel B: Men</i>								
Won	0.045*** (0.007)	0.046*** (0.007)	0.046*** (0.007)	0.046*** (0.007)	0.046*** (0.007)	0.046*** (0.007)	0.050*** (0.007)	
Dep. Var. Mean	0.041	0.041	0.041	0.041	0.041	0.041	0.044	
Observations	23,340	23,340	23,340	23,340	23,340	23,340	36,870	
<i>-valW = Won<sub>M</sub></i>		0.131	0.114	0.117	0.117	0.119	0.327	

Note: This table reports estimates of the gender gap in Congressional candidacy using the hybrid sample of first-time mixed gender elections and first-time same-gender elections that occurred within a four year window around the mixed-gender election from the primary analysis sample. Each candidate appears at most twice. Each column iteratively adds the controls listed in the column header. Column 1 presents results using our baseline specification, with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. Columns 2-6 iteratively add candidate- and election-level controls and include all previously added controls. Column 7 uses all elections without a bandwidth restriction. All specifications are weighted using a triangular kernel, include constituency and election year fixed effects, and control for the margin of victory separately for winning and losing candidates. Standard errors clustered at the state level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

Appendix Table A9: Gender Gap in Congressional Representation - Time Commitment

	Dependent Variable: Ever Win			
	Any HLE	House	House	Any
		Primary	General	General
<i>Less than Full-Time</i>	(1)	(2)	(3)	(4)
<i>Panel A: Women</i>				
Won	0.008 (0.013)	0.013 (0.013)	0.004 (0.007)	0.005 (0.008)
Dep. Var. Mean	0.018	0.014	0.004	0.006
Observations	5,403	4,990	4,295	4,402
<i>Panel B: Men</i>				
Won	0.036** (0.016)	0.036** (0.014)	0.007 (0.007)	0.007 (0.007)
Dep. Var. Mean	0.024	0.021	0.006	0.006
Observations	3,990	4,336	5,365	4,976
<i>p</i> -value $Won_W = Won_M$	0.164	0.224	0.739	0.839
<i>Full Time</i>				
<i>Panel C: Women</i>				
Won	0.003 (0.032)	0.019 (0.034)	0.003 (0.005)	0.003 (0.005)
Dep. Var. Mean	0.026	0.027	0.008	0.008
Observations	1,690	1,496	1,230	1,265
<i>Panel D: Men</i>				
Won	0.134*** (0.045)	0.118*** (0.040)	0.026 (0.019)	0.027 (0.020)
Dep. Var. Mean	0.043	0.038	0.018	0.016
Observations	977	1,081	1,387	1,258
<i>p</i> -value $Won_W = Won_M$	0.019	0.060	0.245	0.224

Note: This table reports estimates of the gender gap in Congressional representation for different positions by expected time commitment. We classify states based on expected time commitments from NCSL surveys of state legislators. Full-time states are on average 84 percent of a full-time job, and all other states are less on average. The dependent variable is equal to one if the candidate ever runs in the election listed in the column header and is zero otherwise. All regressions use the estimation sample of first-time mixed gender elections with the optimal bandwidth from Calonico et al. (2019; forthcoming) calculated separately by gender. All regressions include constituency and election year fixed effects, and the full set of candidate and election controls. Standard errors clustered at the constituency level are reported in parentheses. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

## Appendix B: Additional Calculations and Data Sources

This appendix describes the relevant details on how we map our empirical estimates on career progression to explaining a portion of the gender gap in Congressional candidacy in 2016. We also discuss our data sources and the process we use to match state legislative candidates to Congressional elections and construct our estimation sample.

### A. Explaining the Gap in Congressional Candidacy

While we have established that the effect of winning a state legislature election on the probability that they compete for (win) a Congressional race is twice (five times) larger for men than women, it is also instructive to assess its importance relative to the overall gender gap in Congressional candidacy. To calculate such a figure, we first observe the gender gap in candidacy in the 2016 national elections: there were 1,820 men and 360 women who ran in either a primary or general election, resulting in the 2016 gender gap of 1,460 more men than women.<sup>1</sup> If we apply our point estimates to the number of women (6,264) and men (6,003) who won mixed-gender state legislature elections from 1988 to 2008, this results in an estimated 438.2 and 162.8 additional male and female Congressional candidates, respectively, arising from the set of state legislature elections to which our estimates apply. Thus, this predicted difference of 275.3 explains about 19 percent of the 2016 gender gap in Congressional candidacy.<sup>2</sup>

### B. Data Sources

*State Legislative Elections:* Our primary data source comes from Inter-university Consortium for Political and Social Research No. 34297. This dataset contains the near-universe of state legislative elections for 1967-2010. Importantly, the data are organized at the candidate-by-year level, and include information on the seat contested (district and chamber), victory margin, winning status, party, number of votes received, candidate name, and number of other candidates in the race, among other relevant details.

*Congressional Elections:* We procure data on Congressional elections from two sources. We first source House of Representatives primary data for 1968-2010 from Pettigrew, Owens, and Wanless (2014). We supplement these data with extracts from the CQ Elections database, covering 2012-2016. We also combine the House primary data with information on Senate primary races, as well as both House and Senate general elections from 1968-2016, all from CQ Elections. Similar to the state legislative data, these data are organized at the candidate-by-year level and include information on the seat contested, victory margin, winning status, party, and number of votes received. Impor-

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<sup>1</sup>See Kamarack et al. (2017) for more details.

<sup>2</sup>We chose the 20 year time horizon based on the fact that the experience effect dissipates after ten opportunities or 20 years, see Figure 6. If instead this window were shortened to only consider state legislators in the prior ten years, from 1998 to 2008, our effects explain 10 percent of the gap. When considering a 30 year window, we explain 27 percent of the 2016 gap.

tantly, these data also include candidate names, which allow for linking across levels of government.

*Congressional Biographical Data:* Our data on the backgrounds of Congressional legislators come from two sources. First, we use the digitized records (ICPSR 7803) of the United States Congressional Biographical Data Series from 1789-1996. These data provide demographic information on all sitting Congressional members in both the House and the Senate. We supplement these records with contemporary data from the VoteSmart Biographical database, which provides demographic information for both Congressional and state legislative candidates post-1996.

### C. Data Assembly

We implement the following procedure to create our estimation sample and main outcomes of interest.

1. We begin by determining the gender of each candidate in the state legislative data. We cross-reference each candidate's first name against records from the Census Bureau and the Social Security Administration (SSA) to obtain the probability that a candidate is male or female. We code a candidate as female if *both* the Census Bureau and SSA records return a probability of greater than 70 percent and follow a similar process for male names. We can successfully determine a candidate's gender for over 95 percent of all candidates in the raw data. We hand code the remaining five percent where gender is ambiguous based on first name.
2. Next, we restrict the sample of state legislative elections to elections where the winner was awarded a seat in the next legislative session (e.g., we drop primary races). We then drop a handful of duplicate candidate observations. To improve the interpretability of our estimates, we further restrict the sample to single-member districts. That is, district-chamber combinations that elect a single member to the legislative assembly. Ten states have at least one multi-member district.
3. We then rank candidates based on their vote share within each state legislative election, where the winning candidate receives the largest vote share, the runner-up receives the second largest, and so on. Formally, an election is defined as the unique state-year-chamber-district-election-type combination. During this step, we also drop any races where we do not know the gender of one of the top two candidates. For example, an election may be dropped if only the candidate's first initial is listed as a first name and we are unable to determine the candidate's gender during the hand-coding process. We define a mixed-gender election as one where the top two candidates contained both a male and a female candidate.
4. We now turn to matching candidates across levels of government. We perform these processes separately for the House of Representatives and the Senate, and separately for primary and



general elections. Specifically, we match candidates using first and last name, and the first letter of the last name. To decrease the probability of spurious matches, we match candidates within-state and place greater weight on the last name and require that the first letter of the last name matches across datasets. We keep all perfect matches (i.e., where the first and last names both match perfectly) and manually review less-than-perfect matches.

5. Having merged state and Congressional records at the candidate level, we now turn to constructing our outcomes of interest. Specifically, we define a candidate as having “ever” run in a Congressional election if we match them across datasets and their candidacy occurs after the election of interest (e.g., they run for a Congressional seat in 1972 after having participated in a state legislative election in 1968). We zero-out any matches that occur before a state legislative election, although in practice this affects only a small handful of observations. We then construct dynamic measures of Congressional candidacy using the procedure outlined in the main text, that is based on the difference in years between when the candidate runs for a Congressional seat and the year they participate in a state legislative election. We also construct similar measures for winning a Congressional election or primary. Because our measures of Congressional general and primary election candidacy come from two sources, there may be differences in name quality across the two datasets, which can manifest themselves during the matching process. To ensure that we are accurately tracking a candidate’s election history throughout all stages of the career, we assume that the primary is a stepping stone for the general election for Democrat and Republican candidates. Specifically, for candidates from these parties, we assume that if they appear in the general election, that they must also have run in (and won) the corresponding primary election. Note that this allows for independent and third-party candidates to run in the general election without participating (or being observed) in the primary process. This last step only affects a handful of observations, primarily in states where primaries were closed and we only observe the party’s nominee.
6. Finally, we perform the following restrictions to construct our estimation sample. First, we construct indicators for mixed-gender elections using the gender composition of the top-two vote-earning candidates. We then identify the first time a candidate participates in a mixed gender election, which yields the “first-time mixed-gender” sample. Note that because mixed-gender elections can occur at different points in a candidate’s career, the number of candidates will not be exactly equal to twice the number of elections in the estimation sample. Second, we use only state-level elections through 2008, since we are unlikely to correctly link candidates across levels in this later time period given the short time horizon for the outcomes of interest.