LEARNING ABOUT WOMEN'S COMPETENCE: THE DYNAMIC RESPONSE OF POLITICAL PARTIES TO GENDER QUOTAS IN SOUTH KOREA*

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We study the dynamic responses of political parties to gender quotas in South Korean municipal councils, a setting with nearly zero women pre-quota. We exploit two unique institutional features: the quota intensity is discontinuous in council size; the quota regulates only one of two election arms. Political parties initially counteract the quota by nominating fewer women in the unregulated arm, but gradually reverse this response over time. Guided by a dynamic model of discrimination, we uncover statistical discrimination with incorrect beliefs about women's competence as the main mechanism driving party behavior. The quota triggers learning through exposure to competent women.

JEL codes: D72, D83, J16, J71, J78

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I. INTRODUCTION

Gender quotas in politics are currently used by 130 countries (International IDEA, 2023). Proponents of quotas see them as a method to break down negative biases against female politicians.[1] However, it is precisely where these biases are the greatest, and therefore quotas are needed the most, that these measures also run the highest risk of being ineffective. The critical risk is strategic counteraction by political parties. Voters, too, may resist quotas (Le Barbanchon and Sauvagnat, 2022; Clayton, 2015; Fréchette et al., 2008), but political parties as a first step act as gatekeepers who control the set of candidates available for voter selection (Dahlerup, 1998;Fujiwara et al., 2022; Esteve-Volart and Bagues, 2012).

Strategic counteraction against quotas by parties has been documented, as part of a large literature evaluating the effect of gender quotas on female representation and policy outcomes. Despite quotas increasing the total number of female candidates, their ability to increase elected female councilors has been hampered by parties placing women far down the party list or in less-winnable positions (Lippmann, 2021; Bagues and Campa, 2021; Casas-Arce and Saiz, 2015). Lippmann (2021) also shows that the extent of counteraction can decrease over time. However, little is known about why parties want to subvert quotas and why they might change such behavior.

In this paper, we study how highly male-dominated political parties react to quotas in their nomination of candidates for municipal councils in South Korea, where the share of women as politicians was as low as 2.2%. Our key contribution is to distinguish between taste-based and statistical discrimination by parties, which typically exhibit observably similar static outcomes (Bohren et al., 2019). We do so by studying parties' *dynamic* strategies, leveraging a novel dataset containing information on the universe of candidates and elected councilors over 7 election cycles.

We find statistical discrimination with downward-biased priors about women's competence to be the main barrier against female nomination. In such a context, a quota design that restricts parties' counteraction enough to ensure the initial election of competent women can kickstart a process of belief updating. Then, as beliefs on women's competence evolve, female representation in politics snowballs.

In our empirical analysis, we take advantage of the fact that the gender quota regulates only one of the two separate arms through which councilors get elected. In South Korea's mixed electoral system, 80-90% of councilors are elected by plurality vote in the municipality's constituent wards ("ward arm") while the rest are elected by party-list proportional representation ("PR arm"). The gender quota regulates only the PR arm, stipulating that all odd-number candidates in the party list be female.[2] By studying the rich set of endogenous party responses in the unregulated ward

[1] For example, Beaman et al., 2009 and De Paola et al., 2010 provide direct and suggestive evidence that female representation breaks down the negative attitudes that voters hold towards women in politics.

[2] Parties determine the set of candidates running for election. The case is obvious for the PR arm because one

arm, we can characterize what is typically unobservable: the nature of political parties' attitudes toward female candidates. We track these responses over four election cycles post-quota. It is the evolution of parties' responses over time, coupled with the extensive information on candidates and councilors, that helps us uncover the reasons behind the initial under-representation of women.

Our identification strategy is a regression discontinuity design that exploits the cross-sectional variation in the intensity of the quota. The number of PR seats increases as a step function of a municipality's council size, creating discontinuities in the intensity of the quota at certain cutoffs of council size. We study the effect of quotas on political parties' candidate nomination strategy by comparing councils on either side of the cutoffs.

In the first cycle after the introduction of the quota, we find that parties counter the quota by nominating fewer female candidates in the unregulated ward arm. The reduction in the number of female candidates is especially pronounced when the probability of winning is higher – in favorable ballot positions, in wards where a party has a stronghold, and among the two largest parties. Hence, although the quota successfully increases the number of women elected through the regulated PR arm, its effect is diluted as fewer women get elected in the ward arm.

This pattern gradually reverses over time. Over the following three election cycles, parties in the treated municipalities gradually increase the number of female candidates in the ward arm. By the last election, these parties had entirely reversed their initial reaction and, in fact, had a *greater* number of female ward candidates than parties in control municipalities. These patterns are echoed in the election outcomes. Treated municipalities elect significantly more female councilors and significantly fewer male councilors from election cycle 5 onward.

What is driving the initial counteraction and gradual change in the response to quotas? Before we zoom into party strategies, we first rule out non-party drivers: voters and potential candidates. We show that the estimated patterns cannot be reconciled with parties responding to a faster change in voter preferences for women, or with a faster growth in the supply of qualified experienced female candidates, in treated relative to control municipalities. Indeed, we find no evidence that the gender gaps in candidate vote shares or background characteristics evolve differently in treated and control municipalities.

Then, to unpack party strategies, we build and test a dynamic model of discrimination that incorporates both taste-based and statistical discrimination. We merge models of electoral competition (Galasso and Nannicini, 2011, Le Barbanchon and Sauvagnat, 2022) with standard models of statistical discrimination (Aigner and Cain, 1977) to describe how parties select candidates and allocate them to different candidate positions. The novelty of our model is to formalize a dynamic process of updating of incorrect beliefs where the learning occurs about the group of women, as

cannot be elected without being a member of a party in that arm. However, also in the ward arm, it is the parties that nominate the candidates to run for election. A candidate may run as an independent, but very rarely will they win.

opposed to individuals. We check that the key assumptions of the model are met in the data and use the model predictions to guide our empirical analysis.

Our evidence shows that parties statistically discriminate against women due to a lack of information and downward biased beliefs about their competence. Parties therefore initially counter the quota to bring the number of women down to their preferred level. However, they gradually increase female ward candidates as they update their beliefs after the quota forces them to be exposed to new highly-qualified female councilors.

First, we show that the gradual increase in female candidates is driven by weakening statistical discrimination rather than taste-based discrimination. While the two sources of discrimination deliver observationally equivalent predictions on the parties' nomination strategy immediately after the quota, we can distinguish them from how strategies *evolve* across election cycles. Specifically, the increase in female candidates is observed solely in contestable ("unsafe") wards, where candidate quality matters more. This points towards an increase in the perceived competence of women. With weakening distaste for women, in contrast, the additional women would have been concentrated in strongholds ("safe" wards), as they would have lower competence than incumbent women. Moreover, in line with statistical discrimination, the change in candidates' selection is related to the acquisition of new information about women as politicians. We find that the quota effectively promotes the election of a higher number of rookie female councilors in the PR arm in treated municipalities, exposing parties to new information about women's competence as political leaders. Furthermore, the initial counteraction and the subsequent reversal occur primarily in municipalities where female councilors were entirely absent before the quota, i.e. with a greater lack of information on women.

We next investigate the source of the statistical discrimination. New information on female politicians can correct downward-biased beliefs about their competence. New information can also reduce statistical discrimination by decreasing the *uncertainty* around the competence of women, even when beliefs are accurate, as formalized in Beaman et al. (2009).[3] Two pieces of evidence support the presence of biased beliefs. First, we find that the shift towards female candidates is stronger when the first female PR councilors have above-median levels of education.[4] This is not consistent with new information merely reducing the uncertainty around the competence of women, which should happen irrespective of ability. Second, winning the election significantly improves a woman's chances to be renominated in the next election cycle, but only in parties likely to have more downward-biased beliefs – parties that fill the second position on the PR list, where gender is unrestricted, with a man. While all parties would experience a fall in uncertainty about the competence of the elected woman, only parties with biased beliefs would be positively surprised

[3]NBER Working Paper 14198.

[4]Education is often used as a proxy of competence, e.g. Bagues and Campa, 2021, Baltrunaite et al., 2014.

by how competent she turns out to be and therefore would be much more likely to renominate her.

We close our empirical analysis by showing that parties update their beliefs about the group of women as a whole, rather than just about the individual elected women whom they experience. The gradual increase in female ward candidates does not come only from incumbent women, but also rookie women with zero councilor experience. The exposure to competent women leads parties to appraise women in general differently, creating positive spillovers for rookie females whom parties lack information on. This is the piece of evidence most directly tied to the novel part of our model, the party learning about the group of women.

From a policy perspective, our findings imply that quotas can be effective in the long run when designed appropriately, even in the prevalence of biased beliefs against female politicians. With nearly zero females before the quota and over 60% of the population agreeing with the statement that men make better political leaders than women (see Figure A.1), South Korea would have been such a context. We do observe parties and their leaders counteracting the quota initially. Yet, by requiring the first candidate in parties' PR lists to be women, the quota design i) incentivized parties to nominate *competent* women,[5] and ii) ensured those women got elected[6], thereby paving the path for learning to take place. This is different from other types of quotas that do not ensure women end up elected, such as quotas on the minimum share of women in candidate lists, which have been found to be limited in increasing female representation to appreciable levels even in countries with less conservative gender norms (Lippmann, 2021; Bagues and Campa, 2021; Dahlerup and Freidenvall, 2013; Esteve-Volart and Bagues, 2012). At the same time, the quota need not be as stringent as reservations for women, as implemented in a similarly conservative setting of India (Beaman et al., 2009), to deliver long-lasting change.[7]

Our paper contributes to a large and growing literature that studies the effect of political gender quotas, with mixed results.[8] While many papers study various party responses to quotas,[9] only a few study strategic counteraction due to the difficulty of finding data on candidates. Among these, Lippmann (2021) shows that strategic counteraction is partly motivated by the incumbency advantage of men and the lack of political experience of women. We go beyond reasons embedded within individuals and into investigating whether parties have a bias for the larger group of women

[5]Similarly, a zipper quota in Sweden has been found to increase the probability that women reach leadership position (O'Brien and Rickne, 2016; Besley et al., 2017)

[6]By regulating the PR arm, the quota ties women's election probability to party popularity.

[7]Quotas targeting voters might also be effective. Baltrunaite et al. (2019) documents that a gender quota that coupled the requirement of a minimum number of women in the list with double preference voting conditional on gender significantly improved female representation in Italy by creating incentives for voters to vote for them. The effectiveness of these types of quotas might, however, be challenged in contexts characterized by conservative gender roles, due to the presence of voter bias (Clayton, 2015).

[8]See Hessami and da Fonseca, 2020 and Bhalotra and da Fonseca, 2023 for a review.

[9]Bagues and Campa, 2021; Bagues and Campa, 2020; Casas-Arce and Saiz, 2015; Esteve-Volart and Bagues, 2012; O'Brien and Rickne, 2016; Lippmann, 2021.

that could trigger a snowball effect if corrected. Moreover, most studies of party reactions to quotas are set in countries characterized by generally progressive attitudes toward women, such as France, Sweden, and Spain. To the best of our knowledge, the only paper that focuses on parties in countries with conservative gender norms is Bhavnani (2009), which provides tentative evidence that reserving seats for women helped parties learn that women can win elections. We contribute to this literature by clearly identifying statistical discrimination as the reason why parties nominate so few women to start, and the conditions for statistical discrimination to weaken. Our results complement Beaman et al. (2009)'s finding of exposure to female politicians reducing statistical discrimination among *voters*. However, we delve deeper into whether the statistical discrimination was based on accurate or inaccurate beliefs.

We also contribute to the literature on discrimination, studied both theoretically and empirically in various contexts.[10] Theoretical frameworks on the dynamics of discrimination have focused on how the degree of discrimination changes over time in response to a series of signals about the ability of an individual (Bohren et al., 2019; Fryer, 2007). Our model contributes by taking this to the group level. Instead of multiple signals about an individual's ability, the revealed abilities of elected females act as multiple signals that are aggregated to update beliefs on the mean ability of women. Empirically, we connect to the set of papers that demonstrate the difficulty of disentangling different sources of discrimination, namely taste-based discrimination and statistical discrimination with accurate and inaccurate beliefs (Bohren et al., 2023; Hull, 2021). We find evidence supporting the presence of biased beliefs.

More broadly, this paper also relates to the literature on the determinants of the under-representation of women in politics. Besides parties acting as gatekeepers[11], existing studies have brought attention to the institutional context[12], the supply of perspective candidates[13], differences in career paths and incumbency advantage[14], voter bias[15], and lower demand for female politicians[16]. We add to this literature by documenting that in countries characterized by a pervasive absence of women, lack of information and biased beliefs about women's competence may induce parties to select a *suboptimally low* number of women due to statistical discrimination.

[10]See for example, Conde-Ruiz et al., 2022; Bertrand and Mullainathan, 2004; Altonji and Pierret, 2001; Coate and Loury, 1993; Phelps, 1972; Krueger, 1963).

[11]Fox and Lawless, 2010; Kunovich and Paxton, 2005; Lovenduski, 1997, as well as the studies already discussed.

[12]For instance, electoral rules (Profeta and Woodhouse, 2022), and political competition (Folke and Rickne, 2016; Lawless and Pearson, 2008; Escobar-Lemmon and Taylor-Robinson, 2005).

[13]Women have been shown to shy away from politics due to lack of self-confidence or political ambition (Fox and Lawless, 2014, 2011, 2004; Lawless and Fox, 2010), lower returns (Júlio and Tavares, 2017), childcare duties (Schlozman et al., 1994), or lack of role models (Gilardi, 2015).

[14]Examples are Wasserman, 2023;Labonne et al., 2021;Brollo and Troiano, 2016;Gagliarducci and Paserman, 2012

[15]For references see Le Barbanchon and Sauvagnat, 2022; Baskaran and Hessami, 2018; Dolan and Lynch, 2016; Clayton, 2015; Dolan, 2014; De Paola et al., 2010; Beaman et al., 2009; Fréchette et al., 2008.

[16]Bhalotra et al., 2018

Lastly, our paper contributes to the literature on women in South Korean municipal councils. We provide causal evidence that quantitatively supports many arguments made in qualitative studies (Shin, 2014; Yoon and Shin, 2017): i) parties, not voters, dictate electoral success; ii) the quota was resisted by party gatekeepers; iii) the PR women who demonstrated their caliber during their term allowed parties and voters to revise their perceptions on women's capabilities and were renominated in the ward arm. Joo and Lee (2018) do causally estimate the effect of the election of women on female candidate nomination, using an instrumental variables strategy based on an arbitrary name-order advantage on the ballot. Their finding of null spillover effects on other females one election cycle later contrasts to ours. This highlights two points we make: the importance of electing *competent* women to propel the process of learning about women,[17] as well as the importance of examining effects over the long term.

The remainder of the paper is organized as follows. Section II. describes the institutional setting and data. Section III. lays out our empirical strategy, and Section IV. discusses the results. In Section V., we present a model and we discuss the pieces of evidence that point towards learning as an explanation for the results. Finally, Section VI. concludes.

II. INSTITUTIONAL SETTING AND DATA

II.A. The role of municipal councils, electoral rules, and gender quotas

There are 226 municipal councils in South Korea. Municipal councils represent the legislative branch that works with municipal governments, the executive branch, to oversee local matters. Councils have several legally defined responsibilities, which include reviewing and approving the spending of municipal governments, adopting and revising local bills, monitoring the municipal governments' administrative functions, and examining petitions submitted by residents. Municipal governments administer around a third of South Korea's total public expenditure (Ministry of the Interior and Safety, 2018).

Municipal councils were established in the mid-1990s, and since then, elections have taken place every four years. Our sample covers seven elections, with 2018 as the last election year. Up to the third election in 2002, all councilors were directly elected through plurality vote in single-member constituent wards. It was extremely rare to find candidates affiliated with a political party.

However, major reforms were made to the electoral rules from the fourth election in 2006. We describe below the two main reforms of interest for our analysis. While there were other reforms introduced simultaneously, as summarized in Table B.1 and described in Appendix C.1., none

[17] The compliers in their IV method are females who only got elected thanks to the name-order advantage, and therefore would not be of high competence.

conflicts with our identification strategy.

First, a double-arm voting system was introduced. Candidates could be elected through two alternative arms[18]: a party-list proportional representation arm ("PR arm") and a multi-member plurality vote arm in constituent wards ("ward arm"). Each ward elected between 2 and 4 councilors, and therefore multiple candidates from the same party could run in the same ward.[19] Figure A.2 illustrates what the ballot papers look like for the two arms.

Second, a gender quota was put in place: all odd-number candidates in the party list for the PR arm needed to be female. As the number of PR seats is small, such as 1 out of 10 total seats in the council, most elected PR councilors turned out to be the first candidates on the lists and therefore female. As a consequence, the introduction of quotas sharply increased the proportion of female councilors.

Municipal councils were severely male-dominated prior to the reform, with only 2.2% of councilors being female. Since the introduction of quotas in 2006, however, the female share of councilors grew and exceeded 30% by 2018. Figure I illustrates the development of the female share over time. The most striking feature is the sharp rise immediately after the reform. Over time the increase in female representation even went beyond what was strictly stipulated by the quota. Figure II shows that more females started running in wards as the sole candidates of their parties (plot [b]), and more females took the highest ballot positions even when multiple same-party candidates were running (plot [c]). Moreover, more females took the even-number party-list slots in the PR arm, which would not happen with a strong preference for men (plot [d]).

Background behind the adoption of gender quotas If some parties had pro-female ideology and led the movement for the reform against opposition from other parties, then we might expect parties' strategic responses to the quota to be very heterogeneous in nature. Yet, both major parties led the passage of the gender quota in the National Assembly. It has also been argued that the quota was merely a political tactic to expand the number of politicians (Jeon, 2013) and to strengthen the power of parties[20] (Kim, 2005), unrelated to any genuine interest in female representation. Appendix C.2. elaborates on the background behind the quota's adoption. It is unlikely parties were highly divided in their support of the quota.

II.B. Data

Two sources of data are used. First, data related to the execution of the elections are collected by scraping the website of the National Election Commission. The website posts detailed data on all past elections, including population, candidate information, and vote outcomes. Second, we

[18]The same person could only be on one arm.

[19]A party could nominate candidates for a ward up to the preset number of seats allotted for that ward.

[20]The quota was tied to party-list proportional representation, after all.

use the data on municipal government budgets from the Local Finance Disclosure System of the Ministry of the Interior and Safety.

Population Because ward divisions are centrally determined based on population size, population data is published. The number of residents is available by ward, voting eligibility, gender, and citizenship status. Moreover, the data includes the number of households by ward.

Candidates Various background characteristics of all candidates are also made publicly available by the National Election Commission. These are election arm (ward or PR) classification, ward name, candidate number, party affiliation, name, gender, date of birth, age, occupation, education, and pertinent work experience. Whether a candidate is favored by his or her party is revealed by the election arm and candidate number. Typically, candidates that are deemed less competitive are placed on the PR election arm, and the candidate numbers directly translate to the position on the ballot paper, in which higher positions attract more votes.

Votes The website of the National Election Commission also includes vote counts by ward. According to the vote count obtained by each party, wards can be categorized into safe and contestable ones from the perspective of the political parties. Moreover, we can learn by which margin the winners won. Lastly, electoral outcomes determine the gender ratio of the elected councilors. Table I provides descriptive statistics on the gender composition of councils by election cycle. The table also depicts how the reform in 2005 introduced the PR arm as well as the gender quota in that arm.

Municipal budget The budget of a municipal government reflects the economic prosperity of the municipality, as around half is sourced from local tax and non-tax revenue. In addition, data is available on the share of the municipality's expenditures spent on running the municipal council, which we use as a measure of council performance.[21] These data are used to perform balance checks to validate our identification strategy.

III. EMPIRICAL STRATEGY

III.A. Regression discontinuity design around the number of PR seats

To get at the causal effect of the gender quota, we make use of the fact that the gender quota affects municipalities at different intensities depending on the number of PR seats in the council.

[21] There have been numerous accusations in the past of councilors misappropriating large sums of the municipal budget for their private use (Local Decentralization Bureau – Election and Local Council Division, 2019). For instance, some councilors have been reported for making international policy-research trips where the itinerary largely consisted of sightseeing. Another example is councilors ordering member pins made of pure gold. Consequently, a measure of council performance is the frugality of its operating costs. Newspapers have traditionally included it in their assessments of councils (Jang, 2008).

The number of PR seats is important as the gender quota only applies to the PR arm, and the quota stipulates that all odd-number candidates in the party list be female. The number of PR seats increased as a step function of the total council size, which is pre-determined centrally by the National Election Commission based on population size and regional representativeness. The step function, depicted by the navy dots in Figure III, provides discontinuities in the number of PR seats at given thresholds of council size. For all councils with up to 10 total seats, one councilor must be elected through proportional representation. For councils with 11-20 total seats, two councilors must be elected through proportional representation, etc.

We exploit this discontinuous change in the number of PR seats as a function of council size in a regression discontinuity design that compares the characteristics of candidates in municipalities on each side of the thresholds while controlling for council size. In order to account for the fact that there is not just one but many thresholds (11, 21, 31), we categorize councils into bins based on the proximity to thresholds, as illustrated in Figure III. We compare treated municipalities to the right of the thresholds to control municipalities to the left.[22]

We define treatment status based on council size at election cycle 4, instead of contemporaneous council size. This definition allows us to compare the estimated treatment effects across election cycles and identify the long-term effect of quotas. As the composition of treated municipalities across election cycles is held fixed, differences in treatment effects over time can be attributed to differences between immediate and follow-up effects for the same councils, not to councils switching treatment status. In practice, it makes barely any difference even if we used contemporaneous council size because council sizes are extremely stable.[23]

The regression discontinuity specification is given by:

$$Y_{cbt} = \alpha_b + \alpha_t + \sum_{s=4}^{7} \beta_s \times (\textit{Treat at cycle } 4)_{cb} + f(x_{cb}) + X'_{cbt}\gamma + \epsilon_{cbt} \tag{1}$$

where Y_{cbt} denotes the outcome variable for municipal council c belonging to bin b in election cycle t. As we are interested in characterizing parties' candidate nomination strategies, the outcomes we consider are the number of ward and PR candidates and councilors by gender. The running variable is $x_{cb} \equiv (\text{council size})_{cb} - \text{threshold}_b$ at cycle 4, with $\text{threshold}_b \in \{11, 21, 31\}$. When the outcome variable relates to ward elections, we change the running variable to $\tilde{x}_{cb} \equiv (\text{N. of ward councilors})_{cb} - (\text{N. of ward councilors at the threshold})_b$ at cycle 4 for ease of interpretation.[24] $(\textit{Treat at cycle 4})_{cb} \equiv \mathbb{1}(x_{cb} \geq 0)$, signifies an additional PR councilor. Therefore, β_s estimates the effect of having an additional PR councilor, pooling all the bins together, in election cycle s. Moreover, the baseline function form of f is linear, and we do not allow for the effect

[22] The robustness of the estimated treatment effect to different bandwidths for bins definition is displayed in Table B.5.

[23] If based on contemporaneous council size, the treatment status changes after cycle 4 for only 3.7% of the councils.

[24] Appendix D.3. explains why this is important.

of x_{cb} to differ to the left and right of the threshold. The reason for this choice is that making f quadratic or allowing for differential trends on either side of the threshold barely makes a difference, as it can be seen in Table B.8- B.10 in Appendix. In addition, X_{cbt} denote control variables such as council size or the number of ward seats.

The standard errors are clustered by municipality. This is motivated by two considerations. First, the variation of the treatment assignment is at the level of the municipality. Second, parties formulate strategies chiefly within a municipality and very rarely move around candidates across municipalities. In fact, several factors bind a candidate to a specific municipality, such as a legal residency requirement for nomination, and the electoral advantages of familiarity with local matters and voters. See Appendix D.1. for elaboration on these factors.

III.B. Did the quota bite?

Our strategy identifies the effect of an additional PR councilor, rather than an additional *female* PR councilor. However, an additional PR councilor strongly implies an increase in the number of female PR councilors. While the gender quota does not regulate the gender of the second PR candidate, in practice almost all PR councilors end up being female.[25] This is due to PR candidates even in even-number positions frequently being female, and elected PR councilors frequently being the number-1 candidates of multiple parties.[26]

Table II reports the results of equation (1) with the number of female PR councilors as the outcome variable, separately for each bin. Indeed, having an additional PR councilor at cycle 4 significantly increases the number of female PR councilors over all the cycles at bins 1 and 2. There is no such effect at bin 3 though, where we also have very few observations. The regression results of Table II are echoed by Figure IV, which shows that the average number of female PR councilors sharply increases at the thresholds of bins 1 and 2, but not at bin 3. Therefore, in the reduced-form results that follow, we restrict the sample to bins 1 and 2.[27]

Furthermore, for both bins 1 and 2 (columns (1) and (2) of Table II) the effect of the treatment at cycle 4 on the number of female PR councilors remains constant across election cycles. This is not surprising as the vast majority (96.3%) of the initially treated municipalities continue to get treated each cycle. However, it is important as it confirms that if we see an evolution of the treatment effect on party strategies over time, this could be safely attributed to the initial treatment leading treatment and control groups on different paths.

[25] Table I shows that among PR councilors, 87-98% are female each election.

[26] Appendix Table B.2 shows that it is relatively rare to find multiple PR seats getting allocated to the same party.

[27] We additionally restrict our sample to include municipalities for which we can observe a univocal link between ward arm and PR arm for all election cycles. This is not a balanced panel of municipalities. Robustness to this choice of sample is provided in Tables B.6 and B.7 in Appendix.

As a way to buttress the validity of the regression discontinuity design, Appendix Section D.2. formally tests and confirms that as council size increases, there is a change in the number of female PR councilors only at the thresholds and at no other point.

III.C. Validity of the regression discontinuity design

The critical identifying assumption behind the identification strategy is the smoothness of the relationship between the outcome variable and council size apart from the discontinuity of interest. This section provides evidence in support of this assumption.

Balance Tests We first show that there are no discontinuities in pre-determined characteristics at the threshold in cycle 4. The sample consists of councils at election cycle 4, and the results of estimating equation (1) are presented in Table B.4.

Panels A, B, and C confirm that the population characteristics are indeed balanced. In particular, the voting age population by gender is no different, alleviating the concern that the preference for female councilors among voters may be different between the treated and control municipalities. Furthermore, education and labor force participation by gender are not systematically different.[28] In Panel D, we confirm that ideological leaning, economic prosperity, and council performance are balanced between treated and control municipalities (columns (1)-(4)). These are measured by the vote shares of the two main parties in the PR arm of the National Assembly Election of 2004, the municipal government budget size, and the share of municipal spending on council operations, respectively. Columns (5)-(6) demonstrate that the structure of the ward election arm, i.e. the number and size of wards, are balanced as well.

Bunching Secondly, we check for the presence of bunching at the council size threshold. The concern here is that councils might be able to manipulate their constituent areas to affect their council's size and, therefore, influence their treatment status.

Figure A.3 displays the histogram of the frequency of municipalities by council size. Visually, it is hard to say there is bunching around the thresholds of 11 and 21. Due to the coarseness of the council size variable, even the discrete version of the McCrary (2008) density test proposed by Frandsen (2017) does not perform well; while no bunching is rejected at the thresholds of 11 and 21, it is also rejected with similar p-values for randomly selected cutoffs of council size.

Nonetheless, the evidence from the previous balance tests and the electoral rules support the hypothesis that municipalities do not manipulate their council size around the threshold. Municipalities are found not to be systematically different above and below the threshold, which we would expect to find if manipulation was possible. In addition, strict electoral rules make it difficult

[28]The data for panels B and C are at the province level (16 provinces), so the results there should be taken with more caution.

to gerrymander. The division of election constituencies is determined by the Municipal Council Election Committee, which municipal councilors or party members are not allowed to be on.[29] The committee determines the council size based on population, administrative districts, topography, transportation, and other conditions. The committee also cannot split the smallest administrative district and make it a part of another ward.

Placebo Test In order to check that the discontinuity thresholds are meaningful only after and not before the electoral reform, we run a placebo test where we estimate the effect of being above the threshold (specification (1)) on the gender composition of candidates and elected councilors in the three election cycles before the introduction of the quota.[30]

If the probability of getting an additional PR seat upon the reform is correlated with other underlying factors that affect the number of male and female candidates, then we would see a non-zero treatment effect in election cycles 1-3, even before the quota. Table B.11 shows that up to cycle 3, the treatment effect is not statistically significantly distinguishable from zero. It is in election cycle 4 that the treatment effect emerges, as expected. This test serves as an additional validation exercise of our identification strategy; we are estimating the effect of the introduction of the quota, as opposed to capturing ex-ante differences between treatment and control municipalities.

IV. MAIN RESULTS

IV.A. The evolution of councils' gender composition

Did the reform have the intended effect? The results of equation (1) on the number of councilors elected in each municipality are reported in Table III. Two interesting patterns emerge.

In the first cycle after the introduction of the quota (cycle 4), treated municipalities display an overall higher number of elected female councilors (columns (7)-(9)), but the effect is not significantly different from zero. It cannot be that the quota failed in bringing in women, as we previously saw in Table II. Indeed, columns (5) and (6) of Table III show that a higher number of women – 0.76 women for every additional PR seat – do get elected in treated councils through the PR arm due to the quota. Yet, in treated councils fewer women and significantly more men are elected in cycle 4 through the ward arm, the arm unregulated by the quota (columns (1)-(3)).

However, the initial treatment effect does not persist across election cycles. Starting from election cycle 5 onward, treated municipalities display significantly more female councilors and significantly fewer male councilors (columns (7)-(9)). As columns (5) and (6) confirm that a

[29]The committee consists of up to 11 members appointed by the district mayor among the individuals nominated by the media, legal and academic communities, civic groups, the district council, and the District Election Committee.

[30]Before the introduction of the quota in 2006, there was no proportional representation arm and all the candidates were elected through a plurality vote (as in the ward arm after the introduction of the quota).

constant number of additional women is elected through the PR arm, this reversal cannot be due to the intensity of the quota effect changing over time. On the contrary, it can be traced back to fewer men and more women getting elected through the unregulated ward arm starting from cycle 5, and increasingly so over time.

IV.B. Party strategies and candidate selection

As these are election outcomes, the above results could arise either from the voter's side or the party's side. They may be driven by voters expressing their gender preferences among a given set of candidates or may be driven by parties expressing gender preferences in their selection of candidates. Given the strong tendency of voters to vote for the candidates of their preferred party,[31] we delve into parties' candidate selection. We return to the discussion of voter preferences in Section V.A..

Table IV displays the results of equation (1) on the gender composition of the candidates in each municipality in each arm. The results on candidates mirror the previous results on elected councilors. The most interesting finding is captured by columns (1) and (2). In response to the treatment at cycle 4, parties initially nominate more male ward candidates but gradually reduce the number across election cycles. Eventually, by the last election cycle, the parties in the treated municipalities nominate fewer male candidates than those in control municipalities. As for female ward candidates, the opposite pattern holds: the coefficient sign changes from negative (albeit statistically insignificant) in cycle 4 to positive from cycle 5 onward.

Parties initially counteract the quota by placing fewer female candidates in the unregulated arm, but they gradually reverse their candidate selection strategy over time.

IV.C. Focusing on candidates likely to get elected

Table IV provides evidence on the composition of the overall pool of ward candidates in each municipality in each election cycle. However, pooling all participating parties obstructs the study of dynamic changes in party strategies when many small parties emerge and soon disappear. Therefore, our empirical analysis focuses on the two main parties from now. The two main parties – the Conservative Party and the Progressive Party – dominate South Korean municipal elections, producing at least 74% of ward councilors and 82% of PR councilors every election (Appendix Table B.3).

Moreover, changes in the composition of ward candidates may not be meaningful if they are

[31] The predicted vote share of a candidate in the ward arm, based on i) the popularity of their party – measured by the party's vote share in the PR arm – and ii) the historical tendency of voters to vote more for candidates higher up on the ballot paper, has a correlation coefficient of 0.90 with the actual vote share.

driven by candidates in positions that have no hope of getting elected. Hence we next turn our attention to candidates in ballot positions characterized by a high probability of election. We determine positions likely to win based on two concepts: (i) high-up positions in the ballot list, since candidates high up on the ballot (within-party) win more votes, and (ii) positions in wards where a party has a stronghold.

Table V shows that when we restrict our attention to candidates for whom election is probable, not only do we see the same patterns, but the patterns are even stronger. We consider candidates placed in "useful" positions – position 1 if the ward elects 1-2 councilors and positions 1 and 2 if the ward elects 3-4 councilors; and "rank 1" positions – the first candidate of the party in the ward. Main parties in treated municipalities nominate a higher number of male candidates and a smaller number of female candidates in cycle 4 (columns (1)-(3)), especially in pivotal positions in the ballot (columns (4)-(9)). However, the initial counteraction in the ward arm is reversed already from cycle 5.

As political parties can choose the number of candidates to nominate,[32] columns (3), (6), and (9) report how the number of female ward candidates compares between treatment and control municipalities when we control for the total number of ward candidates in the positions considered (all positions, useful positions, rank 1 candidates). One may argue that the total number of candidates is a "bad control" in the regression because it is an outcome of the treatment (Angrist and Pischke, 2009). However, as the total number of candidates equals the sum of the number of male and female candidates, columns (3), (6), and (9) inform us of whether the additional woman is placed in the ballot list as a substitute for men or in addition to men. We can clearly see that *substitution* between the two genders occurs.

We observe the same patterns when we look at parties' nomination strategies across wards of different types. We categorize wards based on whether the party had a stronghold in the previous election, in which case we call the ward "safe."[33] These are wards where we can assume the party candidates have a very high probability of being elected. Since whether a ward is safe is dependent on the party at hand, the regressions in Table VI are at the municipality $\times$ party level. We estimate equation (1), controlling for the number of safe and unsafe wards, and the average margin of victory for the party in the municipality. These variables are based on the previous election results and are known to the party when allocating candidates across wards. Again, in even columns we control for the total number of ward candidates in the positions considered, to provide evidence of

[32]The maximum number of ward candidates for a party is the total number of ward seats in the council, but there is no minimum.

[33]A party is considered to have a stronghold in a ward if the party won the greatest vote share in the ward, with a margin of over 10 percentage points than the next popular party, in the PR arm of the previous election. For cycle 4, we use vote shares from the PR arm of the National Assembly Election of 2004 as there is no previous PR election at the municipal level.

the substitution between women and men.

We can see that parties in treated municipalities reduced the number of female candidates in safe wards in cycle 4, especially in high-up positions in the ballot – useful seats and rank 1 positions. From cycle 5 onward, however, the decrease in women in safe wards disappears and treated parties nominate more women than control parties in unsafe wards. This is what is driving the overall increase in the number of female candidates observed at the municipality level. Therefore, although the number of female ward candidates increases faster over time in treatment than in control municipalities, they remain bound to the wards with a lower likelihood of election. We provide an interpretation of this result at the end of Section V.D., tying it with our model in Section V.B..

V. MECHANISMS

V.A. Non-party factors: supply of women and voter preferences

The evidence provided so far indicates that parties react to more stringent quota requirements in the PR arm by reducing the number of female ward candidates immediately after the reform, particularly in ballot positions and wards with higher chances of election. However, from cycle 5 onward, parties in treatment municipalities increase the number of female ward candidates. By the last election cycle, they nominate *more* female ward candidates than parties in control municipalities.

These results may stem from any of the three groups of agents involved: potential candidates, voters, and parties. First, this pattern might be driven by a change in the pool of potential candidates available to parties. Second, parties might be responding to a shift in voter preferences. Exposure to female politicians might diminish anti-female voter bias, inducing parties to nominate more female candidates. Third, being exposed to women might change parties' nomination strategy in favor of women. We show in this section that neither a change in the supply of available competent women nor a change in voter preferences is supported in the data as the main explanation for the observed patterns.

Change in the supply of women As a result of the quota, more women might have decided to come forward as potential candidates. Indeed, the female councilors introduced by the quota might have served as role models, affecting women's political ambition, risk aversion, or expectations on the probability of success or the cost of entering the profession. A change in the pool of women relative to the pool of men may trigger parties to select a different gender composition of candidates.

While role modeling might take place overall, it does not appear to be occurring differently *above and below the threshold*. We do not observe the entire pool of potential candidates, so we cannot test this directly. Yet, if there is a change in the pool we would also detect a change among

the characteristics of nominated candidates. Whether the pool of women saw an increase in quality on average or merely expanded while maintaining average quality, parties would be able to choose a larger number of qualified females from the top distribution of the pool. Empirically, however, we do not see a differential change in the characteristics of female candidates in treated compared to control municipalities. Table B.12 presents the results of an individual-level version of equation (1) with education and political experience as dependent variables.[34] Treatment status does not affect the gender gap in candidates' education or political experience; the coefficient of the interaction between the treatment dummy and the female dummy is never statistically significantly different from zero. Hence, the gender gap in characteristics directly related to the quality of candidates does not evolve in a systematically different way between treatment and control municipalities.

Change in voter preferences for women The observed gradual increase in the number of female candidates could be explained by parties responding to a change in voter preferences for women. Voters might be the ones learning about women's competence, or they might increase their taste for women after experiencing female councilors. Then parties could adapt their nomination strategy towards females to trail voter preferences, for electoral success.

To test this hypothesis, we follow Esteve-Volart and Bagues (2012) and compare the gender gap in votes received by ward candidates in treated and control municipalities over time. Ward candidates run as individuals, unlike PR candidates. Therefore, voter preferences for females would manifest as higher vote shares won by female ward candidates relative to male contenders with comparable characteristics and ballot positions.

We estimate an individual-level version of equation (1) with the vote share a ward candidate obtained as the outcome variable.[35] Columns (1)-(5) of Table B.13 show that coefficients on the treatment dummy interacted with the female dummy are statistically insignificant. There is no evidence of a treatment effect on the gender gap in vote share both immediately after the quota and over time. The only scenario where voter preferences drive our main results but do not show up in vote shares is if parties can align their nomination strategy with voter preferences *perfectly* – nominate just the right number of females in the right positions. However, we negate this possibility as there *is* a gender gap in vote shares on the whole, from the statistically significant coefficients on the female dummy.

V.B. Dynamic model of party's discrimination against women

As we do not see a differential evolution of the supply of women or voter preferences between treatment and control municipalities, we next turn to the nomination strategy of political parties.

[34] More details on the estimation strategy can be found in Appendix E..

[35] A detailed description of the estimation strategy can be found in Appendix E..

We argue that our results can be reconciled with a reduction in parties' statistical discrimination against women.

To show this, we proceed by building a model of electoral competition featuring discrimination. We innovate from Le Barbanchon and Sauvagnat (2022)'s model of electoral competition by enriching the candidate selection process and adding in the aspect of candidate allocation to different election wards. Moreover, we allow for two types of discrimination, taste-based discrimination and statistical discrimination. There is no room for statistical discrimination in Le Barbanchon and Sauvagnat (2022), as they assume perfect information about the ability of potential candidates. In modeling statistical discrimination, we extend standard models (Aigner and Cain, 1977) with a dynamic process of belief updating. Dynamic models of statistical discrimination with biased beliefs have been proposed by e.g. Bohren et al. (2019) and Fryer (2007). However, differently from these models, in our model belief updating occurs not just about the individual but also about the group.

We use the predictions of the model to guide our empirical analysis in the next section.

Setup Consider party $p \in \{L, R\}$ in a municipality with constituent wards $1, ..., W$. Party ideology I_p is fixed. The two parties participate in the ward and the PR election arms in election cycle t. For simplicity, we assume that each party has only one ward candidate position in each ward and one PR candidate position on the PR party list. A party selects candidates from a group of potential candidates and allocates them to different candidate positions. Potential candidate i is characterized by their gender $g \in \{m, f\}$ and their competence a_i:

$$a_i \sim N(\mu_g, \sigma^2)$$

where μ_g is the mean ability of gender g.

Parties have imperfect information regarding the competence of a new potential candidate. Their true competence is only revealed if they get elected and serve as councilors. However, at the time of candidate selection, parties observe a signal of competence:

$$s_i = a_i - \mu_g + \epsilon_i, \quad \epsilon_i \sim N(0, \sigma_s^2)$$

$E(s_i) = 0$, so the signal is informative about the *relative* competence of i within gender g.

Party's beliefs at candidate selection Parties have imperfect information not only on the ability of individual candidates but also on the group mean ability, μ_g.[36] A party's prior belief about the value of μ_g, before the election in election cycle t, follows a normal distribution with mean $\tilde{\mu}_{g,t}$, variance $\tilde{\sigma}^2_{g,t}$.

[36]Note that the signals are not informative about the value of μ_g because they provide information on only the *relative* ability within gender. Hence, the party cannot find out about the average ability of each gender g from the set of signals of the potential candidates.

For a potential candidate i with signal s_i, the party expects i's ability to be

$$\tilde{E}(a_i|s_i, g, t) = \tilde{\mu}_{g,t} + \frac{\sigma^2}{\sigma_s^2 + \sigma^2} s_i$$

where $\tilde{E}$ indicates expectation taken over the prior distribution. Statistical discrimination against women implies that for a man and a woman with the same signal s_i, his perceived ability is higher than hers: $\tilde{E}(a_i|s_i, m, t) > \tilde{E}(a_i|s_i, f, t)$.

Party's problem In election cycle t, party p nominates candidates to win as many seats as possible, but it also cares about the gender ratio among its candidates. From what follows, we denote the PR arm as ward "0" for notational convenience. Party p maximizes[37]

$$U_p = \mathbb{E}\left(\sum_{w=0}^{W} V_{p,w}\right) - b\left|\frac{1}{W+1}\sum_{w=0}^{W} F_{p,w} - f_p^*\right|$$

where $V_{p,w}$ is an indicator for party p winning the seat in ward w, $F_{p,w}$ is an indicator for party p's candidate in ward w being female, f_p^* is party p's desired female share among its candidates, and b regulates how much the gender ratio matters for the party relative to winning seats. Taste-based discrimination against women implies a low f_p^*. If $b = 0$, then gender does not factor into the candidate nomination strategy.

Voters vote according to party ideology and councilor quality. We assume that voters have single-peaked preferences for candidates such that the Median Voter Theorem holds. To fix ideas, consider party R. The median voter in ward w with ideology I^w gets the following utility if party R's candidate with ability a_i wins:

$$U_{R,w} = a_i - |I^w - I_R| - \delta_w$$

where $\delta_w \sim N(0, 1)$ is the relative voter preference shock for party R, unforeseen at the time of candidate nomination. For the PR arm, I^0 is the ideology of the median voter in the whole municipality.

We assume party R takes the probability of winning in ward w with candidate i to be[38,39]

$$\mathbb{E}(V_{R,w}) = \Phi\left(\tilde{E}(a_i|s_i, g, t) - A_{L,w}\underbrace{-|I^w - I_R| + |I^w - I_L|}_{\equiv R_w \text{(popularity of party } R)}\right)$$

where Φ denotes the cumulative distribution function of the standard normal distribution, and $A_{L,w}$ is party R's expectation of the ability of the party-L candidate in ward w. High R_w indicates that

[37] Subscript t is omitted for notational convenience because candidate nomination is a static problem.

[38] We assume the party believes that voters assess the expected competence of candidate i in the same way as it does. However, it suffices for all our model implications that the party believes that voter beliefs on the competence of candidates are *increasing* in party beliefs.

[39] For simplicity we assume that the party assesses the likelihood of winning by taking the perceived ability of candidate i as fixed. Model predictions are qualitatively the same if we instead had $\mathbb{E}(V_{R,w}) = \tilde{E}\left[\Phi\left(a_i - A_{L,w} - |I^w - I_R| + |I^w - I_L|\right)|s_i, g, t\right]$.

w is party R's stronghold.

Note here that $\frac{\partial^2 \mathbb{E}(V_{R,w})}{\partial \tilde{E}(a_i|s_i,g,t)\partial |R_w|} < 0$. Candidate competence increases the likelihood of victory, but more so in contestable wards and less so in strongholds (or the opposition's strongholds).

Party learning Once candidate i is elected and serves as councilor, the party learns about their competence. We assume for simplicity that learning is complete and the true competence of the candidate $\mathbf{a} = \{a_i\}$ is revealed.[40]

Given the observed abilities, the party also learns about the average ability of each gender μ_g. The party makes an inference about the value of μ_g via maximum likelihood, considering that these councilors were positively selected with signals $\mathbf{s} = \{s_i\}$. Put simply, the party solves, "What must μ_f be for females with signals $\mathbf{s}$ to have true abilities $\mathbf{a}$?"

The maximum likelihood estimator, derived in Appendix F.1., is

$$\hat{\mu}_g = \frac{1}{n}\sum_{i=1}^{n}\left(a_i - \frac{\sigma^2}{\sigma_s^2+\sigma^2}s_i\right) \sim N\left(\mu_g, \frac{1}{n}\left(\frac{\sigma^2\sigma_s^2}{\sigma_s^2+\sigma^2}\right)^2\right) \tag{2}$$

Call $V = Var(\hat{\mu}_g)$. Then, the posterior distribution about the value of μ_g is normal with mean $\tilde{\mu}_{g,t+1}$ and variance $\tilde{\sigma}_{g,t+1}$, which are weighted averages of the prior and the maximum likelihood estimator:

$$\tilde{\mu}_{g,t+1} = \frac{V\tilde{\mu}_{g,t} + \tilde{\sigma}_{g,t}^2\hat{\mu}_g}{V+\tilde{\sigma}_{g,t}^2}, \quad \tilde{\sigma}_{g,t+1}^2 = \frac{V\tilde{\sigma}_{g,t}^2}{V+\tilde{\sigma}_{g,t}^2}$$

The updating speed of party beliefs about the value of μ_g is given by

$$\tilde{\mu}_{g,t+1} - \tilde{\mu}_{g,t} = \frac{\tilde{\sigma}_{g,t}^2}{V+\tilde{\sigma}_{g,t}^2}(\hat{\mu}_g - \tilde{\mu}_{g,t})$$

Timing At election cycle t, nature first determines the group of potential candidates available to each party, and parties only know about their own groups. Then the two parties play a simultaneous game: to select candidates, based on their beliefs on the mean ability by gender ($\tilde{\mu}_{g,t}$) and the within-gender competence signals ($\{s_i\}$), and to allocate them to wards $1, ..., W$ and the PR arm. Next, the relative voter preference shock δ_w is realized, and voters vote. The true competence of each elected councilor ($\{a_i\}$) is revealed during their term. Based on this, the parties update their beliefs on the mean group ability to $\tilde{\mu}_{g,t+1}$.

Party's selection of candidates The party selects candidates taking into account the value of $\tilde{E}(a_i|s_i, g, t)$. Within gender, it chooses the potential candidate with the highest value of s_i first, then moves on to the one with the next highest value of s_i, etc.

For simplicity of exposition, we consider the scenario where the Nash equilibrium allocation of candidates to wards is for each party to place the most competent candidate in the most contestable

[40]This assumption could be relaxed. An extension of the model with imperfect belief updating regarding councilors' competence can be found in Appendix F.5..

ward, the second-most competent candidate in the second-most contestable ward, etc.[41,42] The intuition is that candidate competence increases the likelihood of victory disproportionately more in more contestable wards.

To describe the candidate selection strategy more clearly, we make an innocuous tweak that circumvents the randomness of the draws of potential candidates. Instead of selecting $W+1$ candidates from the group of potential candidates, parties choose the minimum signal threshold for each gender $\bar{s}_g$, and $W+1$ candidates are drawn randomly from the part of the signal distribution above $\bar{s}_g$. The female share of candidates is then $\frac{1-\Phi(\bar{s}_f/\sigma_s^2)}{2-\Phi(\bar{s}_f/\sigma_s^2)-\Phi(\bar{s}_m/\sigma_s^2)}$.

We formalize how parties select candidates:

- [Only statistical discrimination] If $b=0$, a party selects the most competent $W+1$ individuals, regardless of gender. Hence, the marginal male and marginal female candidates have the same perceived ability: $\tilde{E}(a_i|\bar{s}_m,m,t)=\tilde{E}(a_i|\bar{s}_f,f,t)$. If men are perceived to have a higher mean ability than women, i.e. $\tilde{\mu}_{m,t}>\tilde{\mu}_{f,t}$, then the marginal female candidate has a higher signal than the marginal male candidate: $\bar{s}_f>\bar{s}_m$. Call the female share in this benchmark case $f^{benchmark}$. A diagrammatic illustration of candidate selection is presented in Appendix F.4..

- [Both taste-based and statistical discrimination] If $b>0$ and $f^{benchmark}>f_p^*$, a party selects a smaller female share than $f^{benchmark}$. There is a trade-off between gender preference and candidate competence. A party nominates some male candidates even if they have a lower perceived ability than the marginal female candidate: $\tilde{E}(a_i|\bar{s}_m,m,t)<\tilde{E}(a_i|\bar{s}_f,f,t)$. The gap in the signals of the marginal female and male candidates ($\bar{s}_f-\bar{s}_m$) is higher than in the benchmark case.

Evidence on model assumptions Two features of the model are critical. The first is that voters care about councilor competence. We show in Appendix F.3. that indeed, candidates with high education levels and prior political experience get higher vote shares in practice. The second is that parties place competent candidates in more contestable wards – a model implication that follows from parties caring about winning seats as opposed to, say, ensuring that competent candidates get elected. Figure A.4 confirms that candidates in contestable wards are indeed more educated than those in strongholds.

Implications – Taste-based vs. statistical discrimination Both sources of discrimination decrease the share of female candidates and raise the minimum signal of women compared to men's. Taste-based discrimination does this by raising the lowest perceived ability of women a party would

[41]The conditions underlying this Nash equilibrium are formally described in Appendix F.2..

[42]Empirically, we only distinguish wards by whether they are strongholds ("safe") or not, and we only care that more competent candidates *tend* to be in less safe wards.

accept above that of men's, i.e. $\tilde{E}(a_i|\bar{s}_f, f, t) > \tilde{E}(a_i|\bar{s}_m, m, t)$. So even if the group mean abilities were perceived to be the same, $\bar{s}_f > \bar{s}_m$. Statistical discrimination does this by raising the female signal required to equate the perceived ability of the marginal man and woman; $\bar{s}_f > \bar{s}_m$ when $\tilde{E}(a_i|\bar{s}_f, f, t) = \tilde{E}(a_i|\bar{s}_m, m, t)$.

However, they do have different implications for how a party *allocates* candidates. If taste-based discrimination weakens – f_p^* increases – then the additional women will be of lower ability than the existing women and therefore would get placed in stronghold wards. On the other hand, if the quota leads parties' statistical discrimination to weaken – $\tilde{E}(a_i|s_i, F, t)$ increases – then all women (existing and additional) would get increasingly placed in more contestable wards.

Comparative statistics – Speed of belief updating When the prior belief about the group mean ability is biased down ($\tilde{\mu}_{g,t} < \mu_g$), updating toward the truth is faster

1. The larger the number of female councilors:
$$\frac{\partial(\tilde{\mu}_{g,t+1} - \tilde{\mu}_{g,t})}{\partial n} > 0$$
2. The higher the ability of female councilors encountered:
$$\frac{\partial(\tilde{\mu}_{g,t+1} - \tilde{\mu}_{g,t})}{\partial a_i} = \frac{\partial(\tilde{\mu}_{g,t+1} - \tilde{\mu}_{g,t})}{\partial \hat{\mu}_g} \frac{\partial \hat{\mu}_g}{\partial a_i} > 0$$
3. The larger the bias in the prior belief:
$$\frac{\partial(\tilde{\mu}_{g,t+1} - \tilde{\mu}_{g,t})}{\partial \tilde{\mu}_{g,t}} < 0$$

V.C. Empirical corroboration: parties' statistical discrimination based on biased beliefs about women's competence

The model formalizes the idea that the change in candidate selection could be explained by parties updating their expectations about women's competence as the quota forces them to experience female councilors. With so few female councilors before the quota and over 60% of the population agreeing with the statement that men make better political leaders than women do (see Figure A.1), it is quite likely that party leaders might have started with imperfect information and biased beliefs regarding the competence of women as politicians.

This section presents the empirical evidence that supports this hypothesis. We rule out alternative mechanisms at the end.

The discrimination framework Before we jump into interpreting the treatment effects of quotas through the model, we establish through a descriptive exercise that the discrimination framework is an appropriate perspective to study party strategies.

The model predicts that if parties discriminate, either due to distaste or statistical discrimination, the lowest signal observed among female candidates is higher than the lowest signal among men. Following an approach widely used in the literature, we test this prediction using candidates' education as a proxy for competence.[43] Education can be seen as one of the information that composes the signal that the party observes about candidates at selection.

Figure V shows that this prediction is empirically met in the data. We plot a binned scatterplot of the lowest education level among three groups of candidates – male, female ward, and female PR candidates – of each municipality×party×election cycle. As we want to get at parties' candidate selection strategy based on signals of quality and not incumbency advantage, we restrict the sample to rookies.[44] We further control for the age of the youngest rookie within the group, to get around the general trend of increasing education over time in Korea. We also control for municipality fixed effects.

In the first cycle after the introduction of the quota, the marginal woman clearly has higher education than the marginal man. Furthermore, the education of the marginal female *ward* candidate is the highest, in line with the observed initial counteraction of the quota in the ward arm. The model predicts that when parties remove women from the ward arm, the lowest-ability ones would be removed first. Lastly, the gender gap narrows over time. Interpreted through the lens of the model, it suggests that discrimination against women is decreasing in municipal councils.

Taste-based vs. statistical discrimination We now return to the treatment effects of quotas. What is the source of the discrimination explaining our main results? Distinguishing between statistical discrimination and taste-based discrimination is challenging because both deliver observationally equivalent predictions regarding the selection of candidates in the first cycle after the introduction of the quota. Both lead to a reduction in the share of female ward candidates and an increase in the minimum signal of women compared to men. It is the dynamic response of parties across election cycles that allows to shed light on which mechanism prevails (Bohren et al., 2023).

The model predicts that if the quota leads parties' taste-based discrimination to weaken, the additional women will be of lower ability than the existing women and therefore would get placed in strongholds ("safe" wards) – wards where the electoral success is virtually secured regardless of candidate quality. On the other hand, if the quota leads parties' statistical discrimination to weaken, i.e. women's perceived ability rises, then women would get increasingly placed in more unsafe wards. These are wards where races are expected to be close and hence, withholding the best candidates is more costly (Esteve-Volart and Bagues, 2012; Folke and Rickne, 2016). The latter is exactly what we see happening.

[43] For example, Bagues and Campa (2021) and Baltrunaite et al. (2014)

[44] Incumbents are on average older, less educated, and mostly male. If we included incumbents anyway, the patterns remain unchanged.

Table VI displays the evolution in the gender composition of candidates selected by parties for "safe" and "unsafe" wards. A ward is considered safe for a party if the party won the greatest vote share in the ward, with a margin of over 10 pp. than the next popular party, in the PR arm of the previous election. Unsafe wards are all remaining wards. We can clearly see that the increase in the number of women is concentrated in unsafe wards, where political competition is stronger. This suggests that a reduction in taste-based discrimination is not able to reconcile the reversal in party strategies across election cycles. They are consistent with a reduction in statistical discrimination instead.[45] In the following sections we present additional evidence supporting this hypothesis.

Statistical discrimination: lack of information about women Statistical discrimination is directly tied to information; there would be no statistical discrimination with perfect information on ability. The reversal of parties' strategic counteraction in treated municipalities could be explained by quotas bringing in new information on women's competence. This idea corresponds to the model prediction that the reversal in strategies happens faster the greater the number of newly elected female councilors (comparative static 1). We check if this prediction is empirically met.

First, we show that the quota is effective in promoting the election of a higher number of rookie female councilors in treated municipalities, exposing parties to new information about women's competence as political leaders. Table VII looks at the effect of being above the threshold on the number of elected rookie and incumbent female councilors in the two arms.[46]. We can see that the additional women elected through the PR arm in treated municipalities are predominantly rookie women. In fact, up until cycle 5, these additional women are solely rookie women. As a consequence, despite parties' counteraction of the quota resulting in a lower number of female rookie ward councilors (column (4)) in cycle 4, the *total* number of female rookie councilors in treated municipalities is higher overall (column (6)), even if not significantly so. Hence, the quota was successful in forcing parties to experience new female politicians in action.

Second, we document that the initial counteraction and following reversal are concentrated in municipalities with a greater scarcity of information about women. In Table VIII, we look at heterogeneous treatment effects by whether female councilors were ever present before the quota. Columns (2) and (4), where we control for the total number of ward candidates, indicate that parties substitute away from females in the unregulated arm in cycle 4 only in municipalities with no female councilor before the quota. This counteraction is not present in municipalities where female councilors were present before the quota. Furthermore, only these municipalities display a steady reversal in candidate selection in favor of women from cycle 5 onward.

[45] Beaman et al. (2009) find a similar lack of change in (dis)taste for women as a result of reserving seats for women in India. Deep preferences and social norms remain difficult to erode, while beliefs on effectiveness are much more malleable.

[46] A candidate or a councilor is defined as an incumbent if they have been elected in at least one previous election.

Statistical discrimination: biased beliefs New information about women can reduce statistical discrimination in two ways. Firstly, it can correct downward-biased beliefs about women's competence. Secondly, even if beliefs are accurate and women are truly less competent than men on average, it can weaken statistical discrimination by reducing the noisiness of signals of ability. The perceived ability of candidate i increases with a lower σ_s^2.[47]

In this section, we present two pieces of evidence demonstrating the existence of downward-biased beliefs, which are updated toward the truth in response to the quota. Once again, we use candidates' education as a proxy for competence, and, once again, it is parties' follow-up, not initial, responses that shed light on the nature of the discrimination against women.

First, we show that not only the number of women but also the competence of the women experienced matters. Table IX displays the results of a heterogeneity analysis by the quality of the first female PR councilors. We divide municipalities into two groups by whether the average years of schooling of the cycle-4 PR women was above or below the median of all municipalities, and track the evolution of the treatment effect after cycle 4. We find that the shift towards female ward candidates is more apparent and stronger when the first elected PR women are more educated (column (7)). This is confirmed also when we control for ex-ante characteristics of the pool of women in the two groups of municipalities (column (8)).[48]

This is a key piece of evidence supporting the presence of biased beliefs. Indeed, if experiencing new women solely reduces the noisiness of the signal, it would happen irrespective of ability. This contrasts with our result that the strength of the shift toward female candidates depends on the competence of the first experienced women. The model prediction matching this result is comparative static 2: belief updating toward the truth is faster when more able women are encountered.

Second, we show that experiencing women in action is pivotal for a change in candidate nomination strategy. Here we deviate from our main identification strategy. We conduct a *party*-level analysis in close electoral races where we compare the strategies of parties that marginally won or lost the election of their first – and therefore female – PR candidate in the previous election cycle. This comparison gives us the causal effect of experiencing a woman from one's own party in action.[49] Critically, we distinguish how the effect of winning varies between two different types of parties: those that placed men as the number-2 candidate in the party list, and those that did not. As parties can place a candidate of any gender in even positions in their lists, the parties that

[47] Conditional on $s_i > 0$, which it will be since candidates are positively selected.

[48] To ensure that any difference in the evolution of the treatment effect over time cannot be attributed to ex-ante differences in the overall pool of women available, columns (2), (4), (6), and (8) add controls for the average education level of all female candidates affiliated with the two main parties in cycle 4 and for the total number of ward female candidates affiliated to two main parties in the municipality in cycle 4.

[49] In close electoral races in which the outcome of the election is uncertain, the winner is typically determined by factors that are beyond the control of parties and candidates, so which party wins the seat can be considered random (Lee, 2008). Details on the estimation strategy can be found in appendix G..

place women in even positions can be expected to have a greater female preference ex-ante. The outcome variable is whether the number-1 PR candidate in cycle $t-1$ is renominated as a ward candidate in cycle t.

Table X reports the result of this party-level analysis. The probability that the number-1 PR candidate in cycle $t-1$ runs in the ward arm in cycle t is significantly higher for parties where she actually won (Columns (1)-(4) of Panel A). However, comparing Panel B to C, we can see that the effect is completely driven by parties that placed a man in the second position on the party list (Panel B). Hence, it is not the case that an elected woman is renominated because she acquired experience as a councilor or visibility among voters (incumbency advantage) or because the uncertainty around her ability fell, as the same is true for the PR woman elected from parties that placed a woman in the second position.

Rather, the result points to exposure to female councilors from within the party correcting biased beliefs. Indeed, if beliefs about women's competence were correct, observing a woman in action would not alter the party's perception of her ability. The party would therefore not change their candidate nomination strategy much. In contrast, if beliefs were downward-biased, parties would be positively surprised by the woman that got elected, and become much more likely to renominate her. Thus, the evidence can be interpreted as follows: the parties that placed a woman in the second position had less biased beliefs and renominated a woman in the ward arm whether or not she was elected previously in the PR arm, while parties that placed a man had more biased beliefs and renominated a woman only if she proved her capability after election. This result parallels comparative static 3 of the model: parties with larger (downward) bias in prior beliefs about the competence of women respond more – update their beliefs more – to new information about a woman's capability that gets revealed after election.[50]

Belief updating for women as a whole We argue in this section that parties learn about the group of women as a whole. We return to specification (1) to analyze the effect of being above the threshold on the number and gender composition of the incumbent and rookie ward candidates. The results are presented in Table XI.

We can see that one of the explanations for the faster growth of women in treatment municipalities is parties being able to access a larger pool of known and verified, experienced female candidates. Columns (1) to (3) show that parties nominate more incumbent women in the ward arm over time.[51]

[50]To be precise, the third model prediction is about the updating speed about the value of μ_g, i.e. learning about the competence of women as a whole, as opposed to learning about individual councilors. But the same prediction would hold for learning about individual councilors if we relax the model simplification that the true ability of councilors is fully revealed after the election.

[51]Columns (2) and (5) present the results for female candidates, while the results in columns (3) and (6) can be interpreted as the change in the share of women keeping the total number of candidates constant.

However, this cannot be the only mechanism in place. The evidence is consistent with parties updating their expectations about the competence of women as a group. Columns (4)-(6) of Table XI show that parties in treated municipalities also start nominating an larger number of rookie women over time. These are women whom the party has not experienced in action and for whom information regarding competence is imprecise. Also recall that in Section V.A. we show that the pool of women does not change differentially in treatment municipalities, as measured by the gender gap in the education of candidates. Hence, the evidence points to a change in the belief on the competence of women as a whole creating positive spillovers for rookie females.

V.D. Alternative mechanisms

Difficulty in finding qualified women An alternative explanation for the initial counteraction to quotas that is unrelated to statistical discrimination is a shortage of qualified women. A party that is short on women to choose candidates from might have to move women from the ward arm to the PR arm just to fulfill the quota requirements.

If this was true, we should find evidence that parties in treatment municipalities have greater trouble finding female candidates. To test this hypothesis, we define a party as "unconstrained" in female candidate choice if it nominates strictly more female candidates in the PR arm than the quota requirement.[52] The statistically insignificant coefficients in Table B.14 show that parties above the threshold are not more constrained in finding women, particularly in cycle 4.

Women becoming more powerful The faster growth of women in treatment municipalities may also be due to a compounding effect, where an initial (small) increase in women strengthens their power in the candidate nomination process and further brings in more women. This might occur in different ways. For example, a growing number of lab and field experiments provide evidence that group composition affects women's perceived expertise, influence, and willingness to take on leadership roles (Dupas et al., 2021; Miller and Sutherland, 2021; Gloor et al., 2020; Born et al., 2020; Karpowitz and Stoddard, 2021; Coffman and Shurchkov, 2019; Bordalo et al., 2019; Chen and Houser, 2017; Coffman, 2014). Alternatively, gender quotas can expand the supply of qualified women available for leadership positions (O'Brien and Rickne, 2016).

Although we cannot completely rule out this mechanism, the evidence provided in Table VI is not consistent with it being the *main* reason for the change in party strategies over time. As mentioned in Section IV.C., the increase in the number of women is concentrated in "unsafe" wards, where the party does not have a stronghold and political competition is stronger. Hence, if women become more powerful across election cycles, they are not powerful enough to alter the

[52]For example, the number of women a party needs to include in the party list is 1 if the number of PR seats for the municipality is 1 or 2, and 2 if the number of PR seats is 3 or 4.

party objective to one that secures electoral success for more women.

To sum up, we argue that the initial counteraction to quotas and the subsequent reversal of political parties' nomination strategies are driven by statistical discrimination that weakens over time. This explanation matches interpretations provided by South Korean political scientists. According to Shin (2014) and Yoon and Shin (2017), parties viewed the quotas merely as a rule to comply, without any intention of making long-term commitments towards women. However, the quota managed to foster positive impacts on female representation in the long run. On top of offering women the incumbency advantage, confidence, and resources to run for election again, the quota allowed parties to revise their perceptions regarding women's capabilities as legislators. This is exemplified by the fact that only half of the women elected in the ward arm had been previously elected in PR seats by 2012.

VI. Conclusion

This paper highlights that gender quotas can still be effective over the long run despite initial backlashes, as long as they are designed appropriately. The key is to create incentives that ensure that competent women are elected. Then quotas can work even in settings where women comprise an extremely small minority among incumbents and conservative attitudes prevail.

By forcing exposure to qualified women, quotas offer incumbents an opportunity to acquire new information about women. Therefore, gender quotas are needed not only for equal representation's sake but also from an efficiency standpoint. If informational failure leads parties to statistically discriminate based on biased beliefs and nominate a suboptimally low number of female politicians, quotas can aid in rectifying this source of inefficiency. Once the learning takes off, the policy itself might not be needed.

Although gender quotas in parliaments have been adopted broadly worldwide, there are still many countries that have none in place, such as Egypt, India, Liberia, Mauritius, Sao Tome and Principe, Sierra Leone, and Sri Lanka. Unsurprisingly, these countries also suffer from low levels of female representation in national parliaments. The South Korean setting of this paper is unique in that it studies the effect of a gender quota in the legislative body from a starting point of practically zero women. Therefore, this paper is informative about the effect of gender quotas where they are most needed. Moreover, this paper informs the design of quotas also in other settings such as company boards (e.g. Global Gender Gap Report, 2021), where the incumbents are similarly if not more, male-dominated and attitudes are similarly male-friendly (Figure A.5).

What remains to be crystallized is exactly which aspect of women's competence parties are learning about. Is it campaigning skills, loyalty to the party, keenness as legislators, or their ability to meet the demands of the electorate? Further evidence is needed in this direction. This paper is

part of a bigger agenda that attempts to study how gender quotas might trigger a gradual process of learning in favor of women. To tackle the precise mechanisms through which the learning takes place, we plan to study in future work the interactions among councilors recorded in the transcripts of council meetings.

REFERENCES

Aigner, D. J. and G. G. Cain (1977). Statistical theories of discrimination in labor markets. *Industrial and Labor Relations Review 30*(2), 175–187.

Altonji, J. G. and C. R. Pierret (2001). Employer learning and statistical discrimination. *The Quarterly Journal of Economics 116*(1), 313–350.

Angrist, J. and J.-S. Pischke (2009). *Mostly Harmless Econometrics: An Empiricist's Companion* (1 ed.). Princeton University Press.

Bagues, M. and P. Campa (2020). Women and Power: Unpopular, Unwilling, or Held Back? A Comment. *Journal of Political Economy 128*(5), 2010–2016.

Bagues, M. and P. Campa (2021). Can gender quotas in candidate lists empower women? evidence from a regression discontinuity design. *Journal of Public Economics 194*, 104315.

Baltrunaite, A., P. Bello, A. Casarico, and P. Profeta (2014). Gender quotas and the quality of politicians. *Journal of Public Economics 118*(C), 62–74.

Baltrunaite, A., A. Casarico, P. Profeta, and G. Savio (2019). Let the voters choose women. *Journal of Public Economics 180*, 104085.

Baskaran, T. and Z. Hessami (2018, August). Does the election of a female leader clear the way for more women in politics? *American Economic Journal: Economic Policy 10*(3), 95–121.

Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topalova (2009). Powerful women: Does exposure reduce bias? *The Quarterly Journal of Economics 124*(4), 1497–1540.

Bertrand, M. and S. Mullainathan (2004, September). Are emily and greg more employable than lakisha and jamal? a field experiment on labor market discrimination. *American Economic Review 94*(4), 991–1013.

Besley, T., O. Folke, T. Persson, and J. Rickne (2017). Gender quotas and the crisis of the mediocre man: Theory and evidence from sweden. *American Economic Review 107*(8), 2204–42.

Bhalotra, S., I. Clots-Figueras, and L. Iyer (2018). Pathbreakers? women's electoral success and future political participation. *The Economic Journal 128*(613), 1844–1878.

Bhalotra, S. and M. L. da Fonseca (2023, June). Women politicians and public health. In J. Costa-Font, A. Batinti, and G. Turati (Eds.), *Handbook on the Political Economy of Health Systems*, Chapters, Chapter 11, pp. 157–176. Edward Elgar Publishing.

Bhavnani, R. R. (2009). Do electoral quotas work after they are withdrawn? evidence from a natural experiment in india. *The American Political Science Review 103*(1), 23–35.

Bohren, J. A., K. Haggag, A. Imas, and D. G. Pope (2023, 09). Inaccurate Statistical Discrimination: An Identification Problem. *The Review of Economics and Statistics*, 1–45.

Bohren, J. A., A. Imas, and M. Rosenberg (2019, October). The dynamics of discrimination: Theory and evidence. *American Economic Review 109*(10), 3395–3436.

Bordalo, P., K. Coffman, N. Gennaioli, and A. Shleifer (2019). Beliefs about gender. *American Economic Review 109*(3), 739–73.

Born, A., E. Ranehill, and A. Sandberg (2020). Gender and willingness to lead: Does the gender composition of teams matter? *The Review of Economics and Statistics 0*(ja), 1–46.

Brollo, F. and U. Troiano (2016). What happens when a woman wins an election? evidence from close races in brazil. *Journal of Development Economics 122*(C), 28–45.

Casas-Arce, P. and A. Saiz (2015). Women and power: Unpopular, unwilling, or held back? *Journal of Political Economy 123*(3), 641 – 669.

Chen, J. and D. Houser (2017). Gender composition, stereotype and the contribution of ideas. Technical Report 17-26.

Cho, H.-O. and E. H. Kim (2010). A Study of Historical Context and Institutionalization Process of Gender Quota System and Women's Political Empowerment Movement in Korea 2000-2010. *Journal of Korean Social Trend and Perspective* (79), 110–139.

Clayton, A. (2015). Women's political engagement under quota-mandated female representation: Evidence from a randomized policy experiment. *Comparative Political Studies 48*(3), 333–369.

Coate, S. and G. Loury (1993). Will affirmative-action policies eliminate negative stereotypes? *American Economic Review 83*(5), 1220–40.

Coffman, Katherine Baldiga, C. B. F. and O. Shurchkov (2019). Gender stereotypes in deliberation and team decisions. Harvard Business School Working Paper 19-069. January 2019. (Revised January 2021.).

Coffman, K. B. (2014). Evidence on Self-Stereotyping and the Contribution of Ideas. *The Quarterly Journal of Economics 129*(4), 1625–1660.

Conde-Ruiz, J. I., J. J. Ganuza, and P. Profeta (2022). Statistical discrimination and committees. *European Economic Review 141*, 103994.

Dahlerup, D. (1998). Using quotas to increase women's political representation. In A. Karam (Ed.), *Women in Politics: Beyond Numbers*. Stockholm: IDEA.

Dahlerup, D. and L. Freidenvall (2013). Electoral gender quota systems and their implementation in europe. Technical report, The European Parliament, the Committee on Women's Rights and Gender Equality.

De Paola, M., V. Scoppa, and R. Lombardo (2010). Can gender quotas break down negative stereotypes? evidence from changes in electoral rules. *Journal of Public Economics 94*(5), 344 – 353.

Dolan, K. (2014). Gender stereotypes, candidate evaluations, and voting for women candidates: What really matters? *Political Research Quarterly 67*(1), 96–107.

Dolan, K. and T. Lynch (2016). The impact of gender stereotypes on voting for women candidates by level and type of office. *Politics amp; Gender 12*(3), 573–595.

Dupas, P., A. S. Modestino, M. Niederle, J. Wolfers, and T. S. D. Collective (2021, February). Gender and the dynamics of economics seminars. Working Paper 28494, National Bureau of Economic Research.

Escobar-Lemmon, M. and M. M. Taylor-Robinson (2005). Women ministers in latin american government: When, where, and why? *American Journal of Political Science 49*(4), 829 – 844.

Esteve-Volart, B. and M. Bagues (2012). Are women pawns in the political game? evidence from elections to the spanish senate. *Journal of Public Economics 96*(3), 387–399.

Folke, O. and J. Rickne (2016). Electoral competition and gender differences in political careers. *Quarterly Journal of Political Science 11*(1), 59–102.

Fox, R. L. and J. L. Lawless (2004). Entering the arena? gender and the decision to run for office. *American Journal of Political Science 48*(2), 264–280.

Fox, R. L. and J. L. Lawless (2010). If only they'd ask: Gender, recruitment, and political ambition. *The Journal of Politics 72*(2), 310–326.

Fox, R. L. and J. L. Lawless (2011). Gendered perceptions and political candidacies: A central barrier to women's equality in electoral politics. *American Journal of Political Science 55*(1), 59–73.

Fox, R. L. and J. L. Lawless (2014). Uncovering the origins of the gender gap in political ambition. *The American Political Science Review 108*(3), 499–519.

Frandsen, B. R. (2017). *Party Bias in Union Representation Elections: Testing for Manipulation in the Regression Discontinuity Design when the Running Variable is Discrete*, Volume 38. Emerald Group Publishing Limited.

Fryer, R. (2007). Belief flipping in a dynamic model of statistical discrimination. *Journal of Public Economics*.

Fréchette, G. R., F. Maniquet, and M. Morelli (2008). Incumbents' interests and gender quotas. *American Journal of Political Science 52*(4), 891–909.

Fujiwara, T., H. Hilbig, and P. Raffler (2022, May). Party Nominations and Female Electoral Performance: Evidence from Germany. Technical report, Working Paper.

Gagliarducci, S. and M. D. Paserman (2012). Gender interactions within hierarchies: Evidence from the political arena. *The Review of Economic Studies 79*(3), 1021–1052.

Galasso, V. and T. Nannicini (2011). Competing on good politicians. *The American Political Science Review 105*(1), 79–99.

Gilardi, F. (2015). The temporary importance of role models for women's political representation. *American Journal of Political Science 59*(4), 957–970.

Global Gender Gap Report (2021). Technical report, World Economic Forum.

Gloor, J., M. Morf, S. Paustian-Underdahl, and U. Backes-Gellner (2020, 01). Fix the game, not the dame: Restoring equity in leadership evaluations. *Journal of Business Ethics 161*.

Hessami, Z. and M. L. da Fonseca (2020). Female political representation and substantive effects on policies: A literature review. *European Journal of Political Economy 63*, 101896.

Hull, P. (2021, February). What marginal outcome tests can tell us about racially biased decision-making. Working Paper 28503, National Bureau of Economic Research.

International IDEA (2023). Gender quotas database. Global Database of Gender Quotas in parliaments worldwide by International Institute for Democracy and Electoral Assistance, Inter-Parliamentary Union and Stockholm University.

Jang, G. S. (2008). Busan Provincial Council gets "Poor Report Card". *"No-cut" News*.

Jeon, J. Y. (2013). Political Dynamics of Adopting Gender Quota in Korea. *Journal of Korean Politics 22*(1), 29–52.

Jin, J. W. (2018). Female nomination subsidy monopolized by two major parties. *Women News*.

Joo, H. H. and J. Lee (2018). Encountering female politicians. *Journal of Economic Behavior Organization 151*, 88–122.

Júlio, P. and J. Tavares (2017). The good, the bad and the different: Can gender quotas raise the quality of politicians? *Economica 84*(335), 454–479.

Karpowitz, Chris, J. P. and O. Stoddard (2021). Strength in numbers: A field experiment on gender, influence and group dynamics. IZA Discussion Paper No. 13741.

Kim, S. H. (2005). Local Council Elections - "Reformed" or "Deformed"? *Pressian News*.

Kim, W. H., M. J. Kim, H. C. Lee, and H. K. Kim (2003). *Research on measures to expand female candidate nomination by political parties*. Korea Women's Development Institute.

Krueger, A. O. (1963). The economics of discrimination. *Journal of Political Economy 71*(5), 481–486.

Kunovich, S. and P. Paxton (2005). Pathways to power: The role of political parties in women's national political representation. *American Journal of Sociology 111*(2), 505–552.

Labonne, J., S. Parsa, and P. Querubin (2021). Political dynasties, term limits and female political representation: Evidence from the philippines. *Journal of Economic Behavior Organization 182*, 212–228.

Lawless, J. and R. Fox (2010, 01). It still takes a candidate: Why women don't run for office. *It Still Takes a Candidate: Why Women don't Run for office*, 1–239.

Lawless, J. L. and K. Pearson (2008). The primary reason for women's underrepresentation? reevaluating the conventional wisdom. *Journal of Politics 70*(1), 67 – 82.

Le Barbanchon, T. and J. Sauvagnat (2022, 07). Electoral Competition, Voter Bias, and Women in Politics. *Journal of the European Economic Association 20*(1), 352–394.

Lee, D. S. (2008). Randomized experiments from non-random selection in u.s. house elections. *Journal of Econometrics 142*(2), 675 – 697. The regression discontinuity design: Theory and applications.

Lee, J. J. (2019). *The Legislative Impact Analysis of Gender Quota in Local Council District Elections*. Number 44. National Assembly Research Service.

Lee, M. S. (2003). Measures to expand female political representation in preparation for the 17th general election. Panel discussion in the Meeting of Female Members of the National Assembly and Municipal Councils To Increase the Participation of Women in Politics.

Lim, H. K. (2018). Women's political representation and the current state of Gyeonggido: Focused on local elections in 2018. (102). Gyeonggido Family and Women Research Institute [Issue Analysis].

Lippmann, Q. (2021). Are gender quotas on candidates bound to be ineffective? *Journal of Economic Behavior Organization 191*, 661–678.

Local Decentralization Bureau – Election and Local Council Division (2019). Ministry of the Interior and Safety to Block "Self-Assessment" of Overseas Training for Local Councils and to Redeem Unjust Spending. Ministry of the Interior and Safety.

Lovenduski, J. (1997). Women and party politics in western europe. *PS: Political Science and Politics 30*(2), 200–202.

McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics 142*(2), 698–714.

Miller, M. G. and J. L. Sutherland (2021). The effect of gender on interruptions at congressional hearings. Technical report.

Ministry of the Interior and Safety (2018). Municipal councilor's activities guide. Publication Registration Number: 11-1741000-000101-15.

National Election Commission (2018). Election subsidy payments by year (2001-2018). National Election Commission Data Resource Archive.

O'Brien, D. Z. and J. Rickne (2016). Gender quotas and women's political leadership. *American Political Science Review 110*(1), 112–126.

Phelps, E. S. (1972). The statistical theory of racism and sexism. *The American Economic Review 62*(4), 659–661.

Profeta, P. and E. F. Woodhouse (2022). Electoral rules, women's representation and the qualification of politicians. *Comparative Political Studies 55*(9), 1471–1500.

Schlozman, K. L., N. Burns, and S. Verba (1994). Gender and the pathways to participation: The role of resources. *The Journal of Politics 56*(4), 963–990.

Shin, K. (2014). Women's sustainable representation and the spillover effect of electoral gender quotas in south korea. *International Political Science Review 35*(1), 80–92.

Wasserman, M. (2023, 03). Gender Differences in Politician Persistence. *The Review of Economics and Statistics 105*(2), 275–291.

Yoon, J. and K. Shin (2017). Opportunities and challenges to gender quotas in local politics: The case of municipal council elections in south korea. *Asian Journal of Women's Studies 23*(3), 363–384.

VII. TABLES

Table I - Descriptive Statistics on Municipal Councils' Gender Composition

	Election cycle (year)						
	1 (1995)	2 (1998)	3 (2002)	4 (2006)	5 (2010)	6 (2014)	7 (2018)
Total number of councilors							
Min.	7	7	7	7	7	7	7
Mean	19.9	15.0	15.0	12.6	12.6	12.8	12.8
Max.	50	40	41	36	34	43	44
Number of PR councilors							
Min.	-	-	-	1	1	1	1
Mean	-	-	-	1.63	1.63	1.67	1.70
Max.	-	-	-	4	4	5	5
Gender ratio							
Min.	0	0	0	0	0.06	0.08	0.10
Mean	0.01	0.01	0.02	0.15	0.21	0.25	0.29
Max.	0.43	0.22	0.28	0.46	0.57	0.86	0.64
Gender ratio among PR councilors							
Min.	-	-	-	0*	0*	0.50	0.50
Mean	-	-	-	0.87	0.96	0.97	0.98
Max.	-	-	-	1	1	1	1
Minimum number of women required							
Min.	-	-	-	0	1	1	1
Mean	-	-	-	1.12	1.12	1.13	1.13
Max.	-	-	-	2	2	3	3

Notes: The table provides information regarding the total number of councilors and the councilors elected through the party-list proportional representation arm across election cycles. The gender ratio is calculated as the share of women over the overall number of councilors. The minimum number of required women indicates the minimum number of women that must be elected in each council due to the quota. *Gender quotas were introduced in 2005. However, during the election of 2006, they remained merely a strong recommendation, so it was still legal to place a male in slot 1 of party lists. Most municipalities complied, but 14 of them had no female PR councilors. In election year 2010, the minimum of the gender ratio among PR councilors is 0 because in one council the elected woman was invalidated for being a member of multiple parties.

Table II - The Effect of An Additional PR Seat on The Number of Female PR Councilors

	Number of female PR councilors		
	Bin 1	Bin 2	Bin 3
	(1)	(2)	(3)
Treat at cycle 4 x Cycle 4	0.84***	0.52***	-0.23
	(0.09)	(0.18)	(0.54)
Treat at cycle 4 x Cycle 5	0.84***	0.32*	0.44
	(0.07)	(0.19)	(0.37)
Treat at cycle 4 x Cycle 6	0.77***	0.58***	0.04
	(0.08)	(0.18)	(0.39)
Treat at cycle 4 x Cycle 7	0.77***	0.57***	0.16
	(0.08)	(0.16)	(0.39)
Running variable form	council	council	council
N	670	198	33

Notes: This table displays the effect of having an additional PR seat (treatment) on the number of female councilors elected through the PR arm. It reports the results of regressing equation (1), separately for each bin. The sample includes all bins and all parties participating in municipal elections. Standard errors (in parenthesis) are clustered at municipality level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table III - Treatment Effect on The Number of Councilors

	All political parties								
	Ward			PR			All		
	Male	Female	Female	Male	Female	Female	Male	Female	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat at cycle 4 x Cycle 4	0.45*	-0.34	-0.36*	0.09	0.76***	0.76***	-0.29	0.29	0.29
	(0.26)	(0.22)	(0.22)	(0.08)	(0.09)	(0.08)	(0.33)	(0.28)	(0.28)
Treat at cycle 4 x Cycle 5	-0.13	0.31	0.28	0.10	0.71***	0.71***	-0.87**	0.88***	0.88***
	(0.29)	(0.23)	(0.23)	(0.06)	(0.08)	(0.08)	(0.35)	(0.29)	(0.28)
Treat at cycle 4 x Cycle 6	-0.22	0.52*	0.47*	0.08	0.71***	0.70***	-0.97**	1.09***	1.06***
	(0.33)	(0.27)	(0.26)	(0.06)	(0.08)	(0.08)	(0.38)	(0.32)	(0.31)
Treat at cycle 4 x Cycle 7	-0.28	0.82***	0.73**	0.04	0.72***	0.69***	-1.08***	1.41***	1.33***
	(0.36)	(0.29)	(0.29)	(0.06)	(0.08)	(0.08)	(0.41)	(0.35)	(0.33)
N. of ward councilors			0.17*						
			(0.09)						
N. of councilors						0.09***			0.24***
						(0.02)			(0.09)
Running variable form	ward	ward	ward	council	council	council	council	council	council
N	868	868	868	868	868	868	868	868	868

Notes: This table reports the effect of being above the threshold on councils' gender composition across election cycles. The regression specification is given by equation (1). The sample includes bins 1 and 2, and all parties participating in municipal elections. The outcome variable is the number of councilors elected overall and separately through the two arms - ward warm and PR arm, by gender in each municipality in each election cycle. In columns (3), (6), and (9), we control for the number of ward councilors (column (3)), and total councilors (columns (6) and (9)). This is done to control for the change in councils size across election cycles and will constitute the specification used in the following tables. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table IV - Treatment Effect on The Number of Candidates

	All political parties					
	Ward		PR		All	
	Male	Female	Male	Female	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	3.70***	-0.24	0.94***	0.96***	1.89***	0.51
	(1.16)	(0.35)	(0.22)	(0.22)	(0.28)	(0.49)
Treat at cycle 4 x Cycle 5	0.56	0.49	0.63***	1.20***	1.83***	1.51***
	(0.91)	(0.36)	(0.17)	(0.22)	(0.28)	(0.49)
Treat at cycle 4 x Cycle 6	-1.39*	0.91**	0.25*	1.02***	1.28***	1.76***
	(0.84)	(0.42)	(0.15)	(0.22)	(0.25)	(0.54)
Treat at cycle 4 x Cycle 7	-2.23**	1.10**	0.21	1.27***	1.49***	2.22***
	(1.00)	(0.44)	(0.16)	(0.22)	(0.24)	(0.58)
Running variable form	ward	ward	council	council	council	council
N	868	868	868	868	868	868

Notes: This table reports the effect of being above the threshold on the gender composition of candidates across election cycles. The regression specification is given by equation (1). The sample includes bins 1 and 2, and all parties participating in municipal elections. The outcome variable is the number of candidates put through by parties overall and separately in the two arms - PR and ward arms, by gender in each municipality in each election cycle. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table V - Treatment Effect on The Number of Candidates Likely To Be Elected

	Main political parties								
	All ward candidates			Useful positions			Rank 1 candidates		
	Male (1)	Female (2)	Female (3)	Male (4)	Female (5)	Female (6)	Male (7)	Female (8)	Female (9)
Treat at cycle 4 x Cycle 4	1.43*	-0.28	-0.43*	0.63	-0.40**	-0.44**	0.80*	-0.39**	-0.47***
	(0.76)	(0.23)	(0.22)	(0.46)	(0.18)	(0.17)	(0.47)	(0.18)	(0.17)
Treat at cycle 4 x Cycle 5	0.39	0.48*	0.36*	-0.47	0.43**	0.43**	-0.25	0.42**	0.38**
	(0.65)	(0.25)	(0.22)	(0.48)	(0.18)	(0.17)	(0.48)	(0.18)	(0.17)
Treat at cycle 4 x Cycle 6	0.57	0.76**	0.59**	-0.02	0.44*	0.36*	0.07	0.45*	0.35*
	(0.64)	(0.29)	(0.27)	(0.45)	(0.23)	(0.20)	(0.45)	(0.23)	(0.20)
Treat at cycle 4 x Cycle 7	-0.54	1.17***	1.09***	-0.20	0.70***	0.61**	-0.13	0.68***	0.58**
	(0.65)	(0.32)	(0.31)	(0.46)	(0.25)	(0.23)	(0.46)	(0.25)	(0.23)
N. of ward candidates			0.13***						
			(0.02)						
N. of ward candidates in useful positions						0.19***			
						(0.02)			
N. of rank 1 candidates									0.19***
									(0.02)
Running variable form	ward	ward	ward	ward	ward	ward	ward	ward	ward
N	867	867	867	867	867	867	867	867	867
N. relevant ward candidates	No	No	Yes	No	No	Yes	No	No	Yes

Notes: This table reports the effect of being above the threshold on the gender composition of ward-candidates likely to be elected across election cycles. The regression specification is given by equation (1). The sample includes only bins 1 and 2 and is restricted to the two main parties - Liberal Korean party and Democratic party. In columns (1) to (3), the outcome variable is the total number of candidates put forward by the two main parties in the ward arm by gender in each municipality in each election cycle. In columns (4) to (6), the outcome variable concerns the number of candidates put forward in useful positions in the ward arm by the two main parties by gender. Useful positions refer to candidates in the high-up positions on the ballot for the party in a ward (position 1 if the ward elects 1-2 councilors, and positions 1 and 2 if the ward elects 3-4 councilors). In columns (7) to (9), the outcome variable concerns "rank 1 candidates". Rank 1 candidates refer to solo candidates or the first candidate for the party in each ward. The number of observations is 867 instead of 868 since in one municipality main parties only have proportional candidates. In columns 3, 6, and 9, we control for the total number of ward candidates in the considered positions – column (3): total number of ward candidates, column (6): number of ward candidates in useful position, column (9): number of rank 1 ward candidates. As the total number of candidates equals the sum of the number of male and female candidates, columns (3), (6), and (9) inform us on whether the additional woman is placed in the ballot list as a substitute for men or in addition to men. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table VI - Treatment Effect on The Number of Ward Candidates in Safe and Unsafe Wards

	Main political parties, (municipality×party)-level regressions											
	All ward candidates				Useful ward candidates				Rank 1 ward candidates			
	Female Safe (1)	Female Safe (2)	Female Unsafe (3)	Female Unsafe (4)	Female Safe (5)	Female Safe (6)	Female Unsafe (7)	Female Unsafe (8)	Female Safe (9)	Female Safe (10)	Female Unsafe (11)	Female Unsafe (12)
Treat at cycle 4 x Cycle 4	-0.16	-0.18	-0.07	-0.09	-0.21*	-0.23**	-0.14	-0.14	-0.20*	-0.20*	-0.14	-0.14
	(0.15)	(0.15)	(0.12)	(0.12)	(0.12)	(0.12)	(0.10)	(0.10)	(0.12)	(0.12)	(0.10)	(0.10)
Treat at cycle 4 x Cycle 5	0.16	0.21	0.39***	0.34**	0.05	0.03	0.39***	0.39***	0.03	0.03	0.39***	0.39***
	(0.17)	(0.17)	(0.14)	(0.14)	(0.15)	(0.14)	(0.11)	(0.11)	(0.15)	(0.15)	(0.11)	(0.11)
Treat at cycle 4 x Cycle 6	0.10	0.08	0.43***	0.42***	0.10	0.08	0.22*	0.22*	0.12	0.12	0.22*	0.22*
	(0.21)	(0.21)	(0.15)	(0.15)	(0.17)	(0.17)	(0.11)	(0.11)	(0.17)	(0.17)	(0.11)	(0.11)
Treat at cycle 4 x Cycle 7	0.35*	0.32	0.62***	0.66***	0.08	0.08	0.44***	0.44***	0.09	0.09	0.42***	0.42***
	(0.21)	(0.20)	(0.15)	(0.16)	(0.17)	(0.17)	(0.13)	(0.13)	(0.17)	(0.17)	(0.13)	(0.13)
Running variable form	ward	ward	ward	ward	ward	ward	ward	ward	ward	ward	ward	ward
N	542	542	1171	1171	542	542	1171	1171	542	542	1171	1171
N. relevant party ward candidates	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Party fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. of safe wards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. of unsafe wards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average past margin of victory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effect of being above the threshold on the gender composition of ward-candidates put forward in different wards across election cycles. The regression specification is given by equation (1). The sample includes only bins 1 and 2 and is restricted to the two main parties. The level of observation is party ward. In columns (1) to (4), the outcome variable is the total number of female candidates put forward by each of the two main parties in the ward arm in each municipality in each election cycle. In columns (5) to (8), the outcome variable concerns the number of female candidates put forward in useful positions in the ward arm by each of the two main parties. Useful positions refer to candidates in the high-up positions on the ballot for the party in each ward (position 1 if the ward elects 1-2 councilors, and positions 1 and 2 if the ward elects 3-4 councilors). In columns (9) to (12), the outcome variable concerns "rank 1 candidates". Rank 1 candidates refer to solo candidates or the first candidate for the party in each ward. Columns (1), (2), (5), (6), (9), and (10) consider candidates put forward by the party in safe wards. A ward is considered as safe for a party if the party won the greatest vote share in the PR arm in the ward in the previous election cycle, and it got over 10 percentage points more vote share than the next popular party (margin of victory). Columns (3), (4), (7), (8), (11), and (12) consider candidates put forward by the party in unsafe wards, which are all the other wards. In even columns, we control for the total number of ward candidates in the considered positions – columns (2) and (4): number of ward candidates for the party in safe and unsafe wards respectively, column (6) and (8): number of ward candidates in useful position for the party in safe and unsafe wards respectively, column (10) and (12): number of rank 1 ward candidates for the party in safe and unsafe wards respectively. In each column we add a control for the number of safe and unsafe wards for the party, the average margin of victory for the party in the past election cycle, and party fixed effects. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table VII - Treatment Effect on Rookie and Incumbent Female Councilors

	Main political parties					
	Incumbent Councilors			Rookie Councilors		
	Ward Female	PR Female	All Female	Ward Female	PR Female	All Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	-0.10	0.00	-0.16	-0.24*	0.44***	0.19
	(0.11)	(0.02)	(0.13)	(0.12)	(0.11)	(0.20)
Treat at cycle 4 x Cycle 5	0.14	0.02	0.09	0.11	0.41***	0.50**
	(0.14)	(0.02)	(0.16)	(0.13)	(0.10)	(0.20)
Treat at cycle 4 x Cycle 6	0.41**	-0.00	0.34*	0.07	0.68***	0.74***
	(0.18)	(0.02)	(0.19)	(0.14)	(0.10)	(0.20)
Treat at cycle 4 x Cycle 7	0.39**	-0.00	0.32*	0.38**	0.63***	1.00***
	(0.17)	(0.02)	(0.18)	(0.18)	(0.10)	(0.22)
Running variable form	ward	council	council	ward	council	council
N	867	865	868	867	865	868

Notes: This table reports the effect of being above the threshold on the gender composition of councilors with different experience across election cycles. The outcome variable is the number of councilors elected through the ward and PR arms in each municipality and election cycle, by gender and previous experience. Candidates are defined as incumbent if they have been elected in at least one of the previous election cycles. Rookies are the remaining candidates. The regression specification is given by equation (1). The sample includes bins 1 and 2 and only councilors affiliated with the two main parties. The number of observations is 867 in columns (1) and (4) since in one municipality main parties only have PR candidates, and 865 in columns (2) and (5) as in 3 municipalities main parties only have ward candidates. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table VIII - Treatment Effect by Number of Women Elected Before The Quota

	Main political parties			
	Ward candidates			
	No Elected Woman Before Quota		Female Councilors Before Quota	
	Female	Female	Female	Female
	(1)	(2)	(3)	(4)
Treatment at cycle 4	-0.24	-0.46**	0.50	0.59
	(0.24)	(0.23)	(0.62)	(0.58)
Treat at cycle 4 x Cycle 5	0.78***	0.81***	0.43	0.57
	(0.21)	(0.20)	(0.38)	(0.34)
Treat at cycle 4 x Cycle 6	0.87***	0.84***	1.09**	1.10**
	(0.28)	(0.28)	(0.51)	(0.52)
Treat at cycle 4 x Cycle 7	1.77***	1.81***	0.30	0.27
	(0.36)	(0.39)	(0.49)	(0.55)
Running variable form	ward	ward	ward	ward
N	652	652	215	215
Control: N. ward candidates	No	Yes	No	Yes

Notes: This table reports the effect of being above the threshold on the number of female candidates nominated by the two main parties in the ward arm in each municipality and election cycle. We divide municipalities into two groups depending on whether at least one woman was elected in the municipality before the introduction of the quota. Columns (1)-(2), and (3)-(4) display the results of equation (1) for the sample of councils in which no female councilor and at least one female councilor was present before the introduction of the quota, respectively. Columns (2), and (4) include a control for the total number of candidates nominated by the two main parties. As the total number of candidates equals the sum of male and female candidates, this exercise informs us on whether the additional woman is placed in the ballot list as a substitute for men or in addition to men. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table IX - Treatment Effect by Years of Schooling of The First Female PR Councilors

	Main political parties							
	Ward candidates							
	Below Median Education				Above Median Education			
	Male	Male	Female	Female	Male	Male	Female	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat at cycle 4 x Cycle 5	0.09	-0.04	-0.20	-0.04	-0.20	0.09	0.86**	0.92***
	(1.07)	(1.04)	(0.49)	(0.47)	(0.97)	(1.00)	(0.38)	(0.34)
Treat at cycle 4 x Cycle 6	0.07	-0.07	0.22	0.38	0.10	0.39	0.98**	1.04**
	(0.93)	(0.90)	(0.50)	(0.43)	(0.95)	(1.00)	(0.45)	(0.41)
Treat at cycle 4 x Cycle 7	-1.02	-1.15	0.74	0.90*	-0.63	-0.34	1.04**	1.10***
	(1.04)	(1.02)	(0.56)	(0.49)	(0.91)	(0.95)	(0.45)	(0.39)
Running variable form	ward	ward	ward	ward	ward	ward	ward	ward
N	272	272	272	272	269	269	269	269
Cycle 4 female candidates avg. education	No	Yes	No	Yes	No	Yes	No	Yes
N. ward cycle 4 female candidates	No	Yes	No	Yes	No	Yes	No	Yes

Notes: This table reports the effect of being above the threshold on the gender composition of ward-candidates across election cycles. The outcome variable is the number of candidates nominated by the two main parties in the ward arm in each municipality and election cycle, by gender. We divide municipalities into two groups by whether the average years of schooling of the PR women elected in the municipality in cycle 4 are above or below the median. Columns (1)-(4), and (5)-(8) display the results of equation (1) for the sample of councils below-median and above-median years of schooling, respectively. Columns (2), (4), (6), and (8), include a control for the average education level of all female candidates affiliated with the two main parties in cycle 4 and for the total number of ward female candidates affiliated to two main parties in the municipality in cycle 4. The sample includes bins 1 and 2 and cycles 5, 6, and 7. The analysis is restricted to municipalities with at least one PR elected woman among main party candidates in cycle 4 for which we have information on education. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table X - The Effect of Marginally Winning a PR Woman in The Previous Election

Main political parties				
$\mathbb{1}$(Number-1 PR candidate in $t-1$ is a ward candidate in t)				
Bandwidth ($\lvert v_{cpt} \rvert$)	0.20	0.15	0.10	0.05
	(1)	(2)	(3)	(4)
Panel A: All parties				
$Winner_{t-1}$	0.41***	0.42***	0.35***	0.42***
	(0.07)	(0.08)	(0.09)	(0.13)
N	414	313	216	114
Panel B: 2nd PR candidate = Man				
$Winner_{t-1}$	0.44***	0.49***	0.40***	0.45***
	(0.08)	(0.08)	(0.10)	(0.14)
N	308	241	165	90
Panel C: 2nd PR candidate = Woman				
$Winner_{t-1}$	0.35*	0.21	0.07	-0.21
	(0.19)	(0.20)	(0.23)	(0.37)
N	106	72	51	24

Notes: This table reports the effect of marginally winning a PR-woman in the previous election cycle. The table reports the result of specification (10) on the probability that the number-1 PR candidate for the party in cycle $t-1$ is one of the ward candidates for the party in cycle t. The sample includes all election cycles after the introduction of the quota (4,5,6,7). The unit of analysis is a party in election cycle t. The results are provided for all parties (Panel A), parties for which the second PR candidate in cycle $t-1$ was a man (Panel B), and parties where the second PR candidate was a woman (Panel C). Each column shows the coefficient of the $Winner_{t-1}$ dummy (equal to 1 if the party won the election of its first PR candidate in cycle $t-1$) considering different margins of victory (bandwidths). The analysis is restricted to candidates put forward by the two main parties. The standard errors are clustered at the municipality $\times$ party level. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

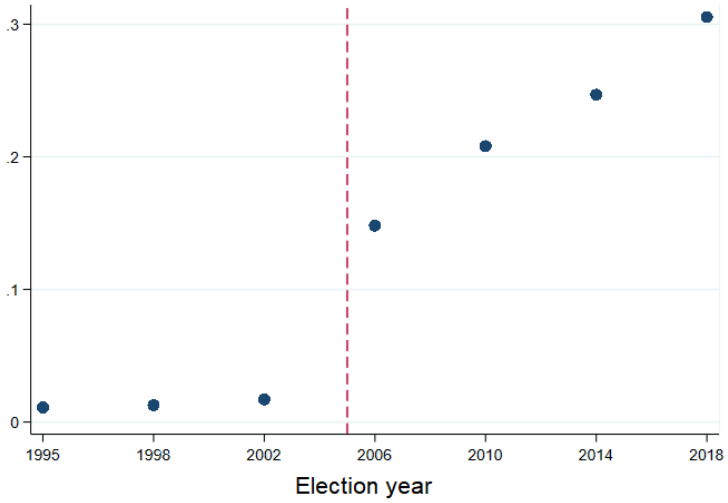
Table XI - Treatment Effect for Incumbent and Rookie Ward Candidates

	Main political parties					
	Incumbent Ward Candidates			Rookie Ward Candidates		
	Male	Female	Female	Male	Female	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	0.67*	-0.00	-0.09	0.76	-0.28*	-0.33**
	(0.40)	(0.13)	(0.12)	(0.62)	(0.17)	(0.15)
Treat at cycle 4 x Cycle 5	1.04***	0.47***	0.26	-0.65	0.01	0.08
	(0.38)	(0.17)	(0.16)	(0.60)	(0.16)	(0.14)
Treat at cycle 4 x Cycle 6	0.86**	0.61***	0.41**	-0.30	0.15	0.16
	(0.37)	(0.21)	(0.19)	(0.50)	(0.18)	(0.16)
Treat at cycle 4 x Cycle 7	-0.08	0.79***	0.69***	-0.46	0.38*	0.39*
	(0.40)	(0.20)	(0.19)	(0.52)	(0.21)	(0.20)
N. ward incumbent candidates			0.14***			
			(0.02)			
N. ward rookie candidates						0.12***
						(0.01)
Running variable form	ward	ward	ward	ward	ward	ward
N	867	867	867	867	867	867

Notes: This table reports the effect of being above the threshold on the gender composition of ward-candidates. The outcome variable is the number of candidates put forth by the two main parties in the ward arm in each municipality and election cycle, by gender and previous experience. A candidate is defined as incumbent if they have been elected in at least one of the previous election cycles. Rookies are the remaining candidates. The regression specification is given by equation (1). The sample includes only bins 1 and 2 and is restricted to the two main parties. The number of observations is 867 since in one municipality main parties only have PR candidates. In columns (3) and (6), we control for the total number of incumbent and rookie ward candidates respectively. As the total number of incumbent (rookie) candidates equals the sum of the number of male and female incumbent (rookie) candidates, columns (3), and (6) inform us on whether the additional incumbent (rookie) woman is placed in the ballot list as a substitute or in addition to an incumbent (rookie) man. Standard errors (in parenthesis) are clustered at municipality level; *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

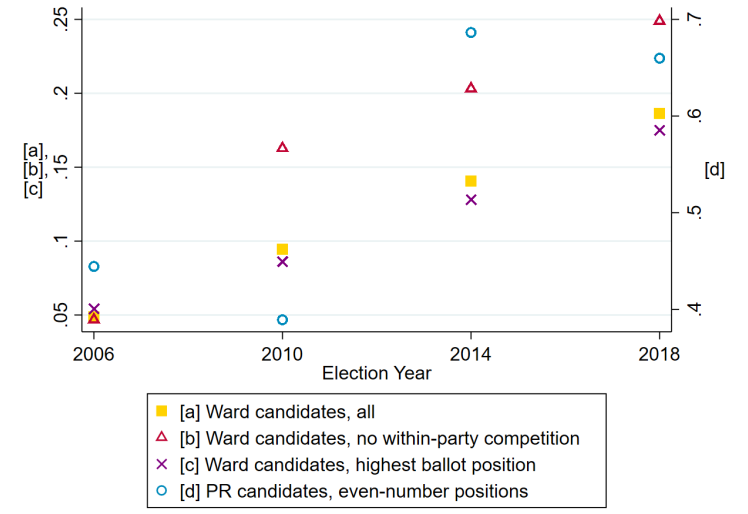
VIII. FIGURES

Figure I - Proportion of Females in Municipal Councils, Nationwide Average



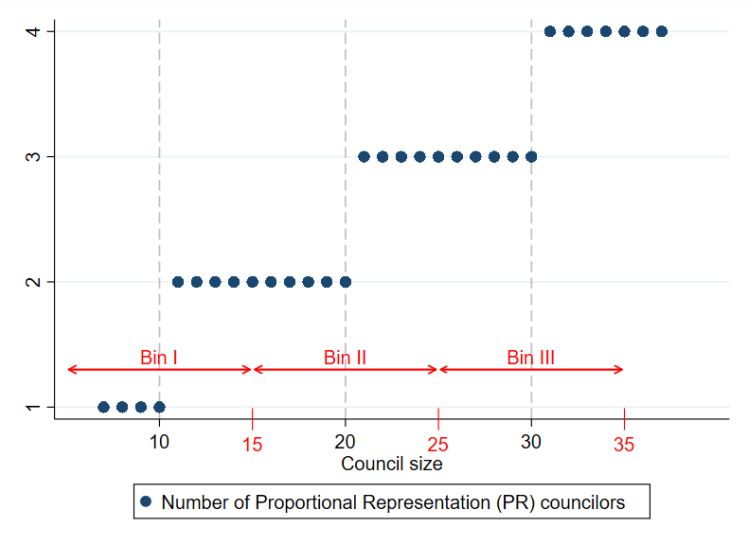
Notes: This figure illustrates the nationwide average of the gender ratio in municipal councils, for every election cycle since their emergence. The red dotted line indicates the year of the major reform that instituted the gender quota. The sample includes all councilors and municipal councils.

Figure II - The Share of Females Among Non-Quota Candidates



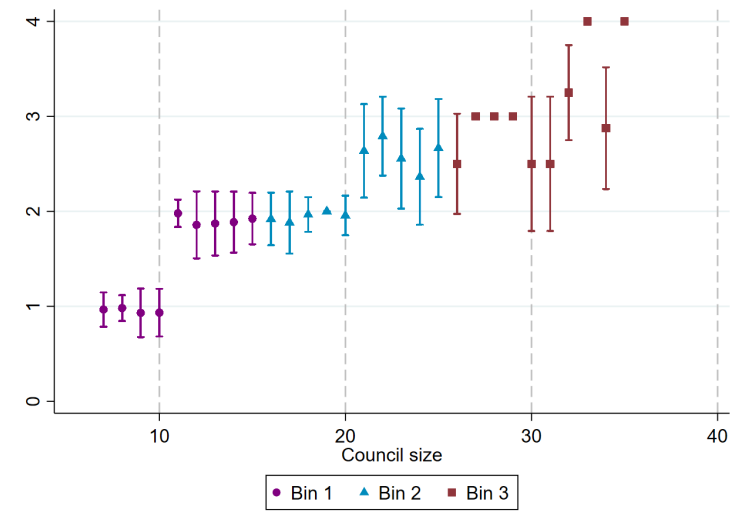
Notes: This figure plots the share of females among [a] all ward candidates, [b] ward candidates with no within-party competition, [c] ward candidates that have within-party competition but is ranked the highest, and [d] PR candidates in even-number party list positions. The left-hand vertical axis corresponds to [a], [b], and [c], whereas the right-hand one corresponds to [d]. The sample includes all councilors and municipal councils.

Figure III - Councils by Bins Around Each Threshold



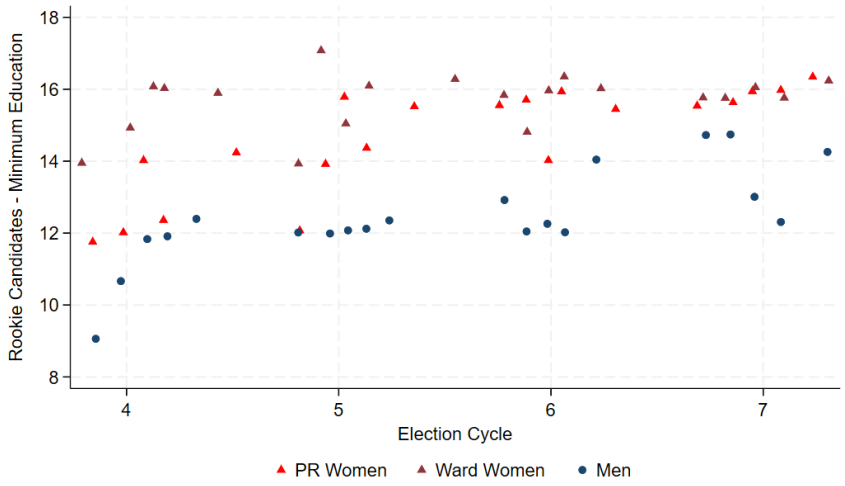
Notes: This figure depicts how the number of seats reserved for the PR arm increases as a step function of the total number of councilors in a municipality. The figure depicts how a council is categorized into a bin based on its most proximate threshold. The thresholds for each bin are indicated by the grey dashed lines, and indicate the maximum council size for which the same number of seats are elected through the PR arm. In the empirical strategy, councils within the same bin above and below the threshold are assigned to treatment and control groups respectively. The municipalities that do not correspond to the step function because they are formed by the union of multiple municipalities *after* the election took place are excluded from the sample as outliers and are not shown in this figure.

Figure IV - The Average Number of Female PR Councilors by Council Size



Notes: This figure plots the average number of female PR councilors by council size. The error bars indicate the standard deviation in the number of female PR councilors by council size. A council is categorized into a bin based on its most proximate threshold. The thresholds for each bin are indicated by the grey dashed lines, and indicate the maximum council size for which the same number of seats are elected through the proportional arm. Municipal councils belonging to the same bin are indicated with the same color. Where the error bars are missing, there is only one municipality for that council size. Only a small number of municipal councils belong to bin 3.

Figure V - Minimum Education of Rookie Female and Male Candidates Across Election Cycles

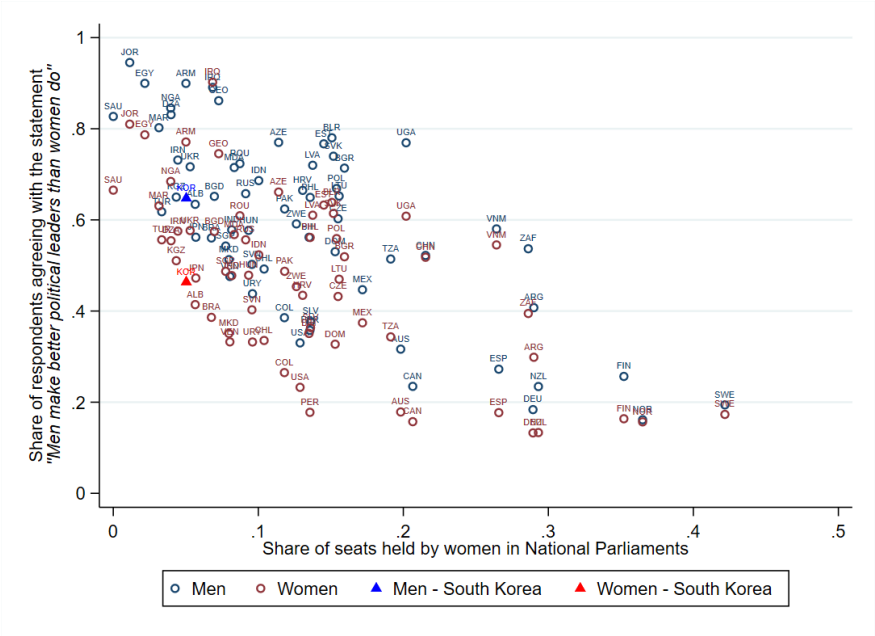


Notes: This figure illustrates the evolution of the education of the marginal female and male candidates over time. It plots the binned scatterplot, for each election cycle, of the education of the male rookie candidate with the lowest education level in the municipality (in blue), the female rookie ward candidate with the lowest education level in the municipality (in dark red), and the female rookie PR candidate with the lowest education level in the municipality (in light red), for each municipality and election cycle, controlling for municipality fixed effects and the age of the youngest male rookie, female ward rookie, and female PR rookie candidates in the municipality. The figure includes only bin 1 and 2 and candidates from the two main parties.

For Online Publication

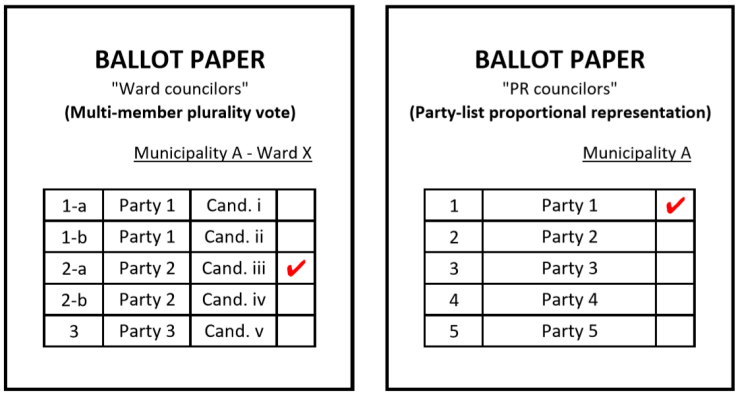
Appendix A. ADDITIONAL FIGURES

Figure A.1 - Female Share in National Parliaments and Attitudes Towards Women (1995-2004)



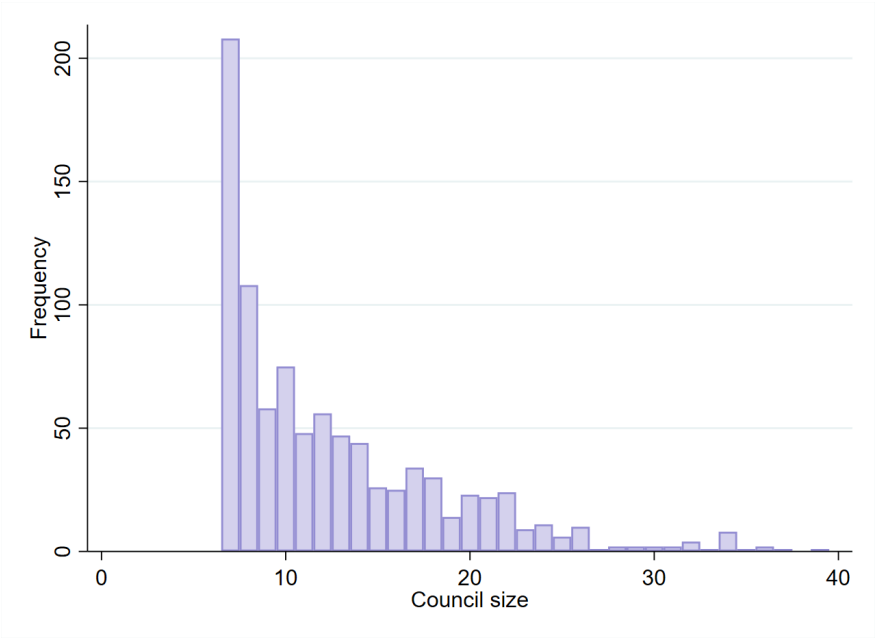
Notes: The graph depicts the correlation between attitudes towards women as political leaders and female representation in National Parliaments for multiple countries around the world in the period just before the introduction of the quota in South Korea (2005). On the y-axis, attitudes towards women are measured as the share of respondents that agree with the statement "Men make better political leaders than women do". Higher values indicate attitudes more favorable towards men. Blue dots indicate the share of men agreeing with the statement, while red dots indicate the share of women. The x-axis displays the share of seats held by women in National Parliaments (between 0 and 1). South Korean respondents are indicated with a triangle. Sources – Attitudes towards women: World Values Survey waves 3 (1995-1998) and 4 (1999-2004); Share of seats held by women in national parliaments: World Bank Gender Statistics, average years 1995-2004.

Figure A.2 - Ballot Papers in Municipal Council Elections



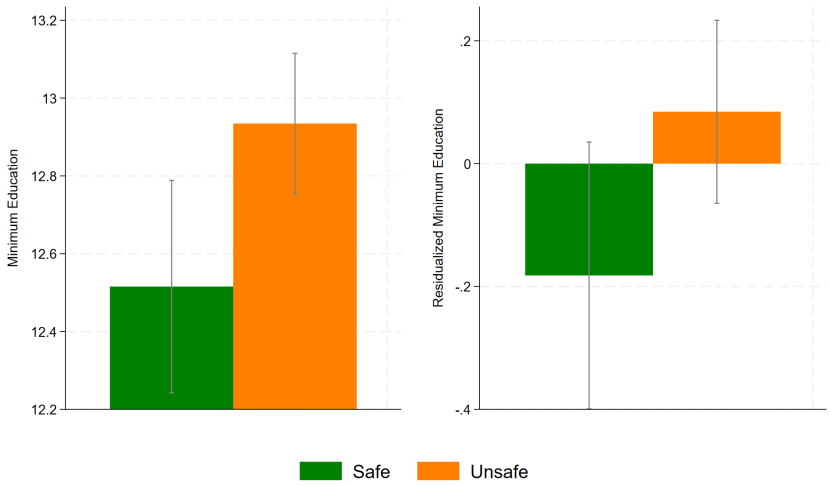
Notes: This figure illustrates the ballot papers for a voter residing in ward X of municipality A. The left one is used to vote for ward councilors and the right one for PR councilors. The red ticks indicate how the voter might vote.

Figure A.3 - Histogram of Council Size



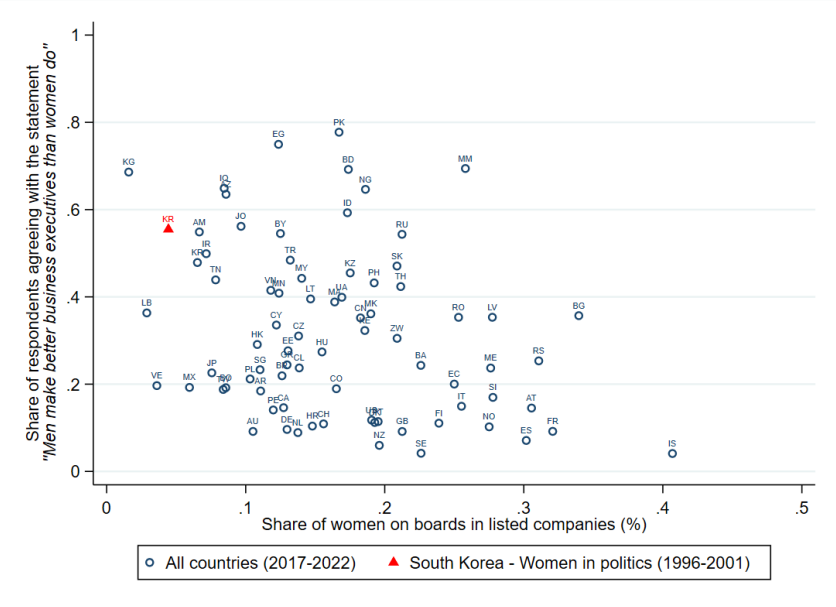
Notes: The figure displays the distribution of council size. The number of councils (vertical axis) for each size (horizontal axis) is displayed. The sample includes all municipal councils of election cycles 4, 5, 6, and 7.

Figure A.4 - Minimum Education of Male Candidates in Safe and Unsafe Wards



Notes: This figure illustrates the level of education of the male candidate with the lowest education level for the party in safe and unsafe wards in each election cycle. The bar indicates the average across all municipalities, parties, and election cycles, the vertical gray lines indicate standard deviations. The figure includes only bin 1 and 2 and candidates from the two main parties. The left panel displays the raw education levels, the right panel displays the residuals of a regression of education on age, municipality fixed effects, election cycle fixed effects, and party fixed effects.

Figure A.5 - Female Representation on Boards in Listed Companies and Attitudes Towards Women (2017-2022)



Notes: The graph depicts the correlation between attitudes towards women as leaders and female representation in listed companies' boards for multiple countries around the world in the second decade of years 2000s. On the y-axis, attitudes towards women are measured as the share of respondents that agree with the statement "Men make better business executives than women do". Higher values indicate attitudes more favorable towards men. The x-axis displays the share of seats held by women in listed companies' boards (between 0 and 1). The status quo regarding attitudes towards women as leaders and the representation of women in boards is compared to the situation of women in South Korea just before the introduction of the quota in municipal councils. The red triangle indicates attitudes towards women as political leaders and female representation in National Parliaments in South Korea just before the introduction of the quota in 2005. Attitudes towards women are measured as the share of respondents that agree with the statement "Men make better political leaders than women do". Higher values indicate attitudes more favorable towards men. Female representation in politics is measures as the share of seats held by women in the South Korean National Parliament (between 0 and 1). Sources: All countries – Attitudes: World Values Survey, wave 7 (2017-2022); Share of women on boards in listed companies: ORBIS, 2022. South Korea – Attitudes: World Values Survey, waves 3 (1996) and 4 (2001); Share of women in national parliaments: World Bank Gender Statistics, average years 1997-2001.

Appendix B. ADDITIONAL TABLES

Table B.1 - Amendments to Legislation on Municipal Council Elections

First applicable election year	Amendment
2006	[PR] Proportional representation introduced [W] Single-member plurality vote → Multi-member plurality vote [PR] Odd-number candidates in party lists must be female (not enforced) [W] Subsidies to parties for nominating female candidates
2010	[PR] Odd-number candidates in party lists must be female (enforced) [W] At least one female candidate per National Assembly Election district

Notes: The table summarizes the amendments to the legislation on South Korean municipal council elections. [PR] indicates rules relating to the PR arm and [W] to the ward arm. Adapted from Lim (2018).

Table B.2 - The Allocation of Proportional Representation Seats Across Parties

	Councils by the number of PR seats					
	1 PR seat		**2 PR seats**		**3 PR seats**	
	N.	Percent.	N.	Percent.	N.	Percent.
Election Cycle 4						
1 Party	117	100%	15	17.86%	0	0
2 Parties	0	0	69	82.14%	15	83.33%
3 Parties	0	0	0	0	3	16.67%
Election Cycle 5						
1 Party	117	100%	5	6.02%	0	0
2 Parties	0	0	78	93.98%	13	72.22%
3 Parties	0	0	0	0	7	27.78%
Election Cycle 6						
1 Party	110	100%	18	20.22%	0	0
2 Parties	0	0	71	79.78%	17	100%
3 Parties	0	0	0	0	0	0%
Election Cycle 7						
1 Party	105	100%	9	9.89%	1	4.35%
2 Parties	0	0	82	90.11%	18	94.74%
3 Parties	0	0	0	0	1	5.26%
Total	**449**		**347**		**72**	

Notes: This table illustrates the allocation of proportional representation seats across parties. For each election cycle and number of seats elected through proportional representation ("PR") within each council, it indicates the number (N.) and share (Percent.) of councils where councilors are affiliated with 1,2, or 3 parties. If one seat is elected through proportional representation in the council, only one councilor gets elected. Hence, mechanically all proportional representation seats are won by one party. When the council size increases, the councilors elected through proportional representation can be affiliated to more than one party. In the vast majority of such councils, two parties win one seat each. The sample is restricted to bins 1 and 2, i.e. to municipal councils with up to 25 councilors.

Table B.3 - Candidates and Councilors by Party Affiliation

		Candidates				Councilors			
		Ward		PR		Ward		PR	
	N	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Election Cycle 1									
Independent	226	1	0			1	0		
Election Cycle 2									
Independent	228	1	0			1	0		
Election Cycle 3									
Independent	228	1	0			1	0		
Election Cycle 4									
Independent	230	0.41	0.15	0	0	0.11	0.14	0	0
Progressive party	230	0.16	0.08	0.29	0.17	0.20	0.18	0.18	0.25
Conservative party	230	0.25	0.13	0.47	0.30	0.54	0.31	0.64	0.38
Election Cycle 5									
Independent	228	0.32	017	0	0	0.14	0.16	0	0
Progressive party	228	0.21	0.16	0.31	0.29	0.33	0.27	0.41	0.39
Conservative party	228	0.33	0.18	0.49	0.31	0.43	0.25	0.44	0.40
Election Cycle 6									
Independent	227	0.34	0.16	0	0	0.13	0.15	0	0
Progressive party	227	0.24	0.16	0.38	0.27	0.37	0.25	0.40	0.37
Conservative party	227	0.36	0.18	0.55	0.30	0.49	0.26	0.59	0.38
Election Cycle 7									
Independent	226	0.20	0.16	0	0	0.09	0.14	0	0
Progressive party	226	0.32	0.12	0.43	0.20	0.54	0.21	0.66	0.33
Conservative party	226	0.29	0.16	0.38	0.25	0.35	0.20	0.33	0.33

Notes: This table illustrates the party affiliation of candidates and councilors in each municipal council and election cycle. The statistics reported are mean and standard deviation of councils for each cycle. The affiliation is reported separately for candidates/councilors put forward in the two different arms - ward and PR. Three affiliations are reported: the two main parties - Progressive and Conservative party - and independent affiliation, i.e. candidates that run with no party affiliation. The residual category (omitted) includes all the other parties. The vast majority of councilors (>70%) is affiliated with either one of two main parties.

Table B.4 - Balance Tests on Pre-Determined Characteristics

***Panel A*: Population characteristics**

	Total population		Voting age population			Households	
	Total	Foreign	Total	Male	Female	Total	Foreign
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treat at cycle 4 x Cycle 4	-23.97	0.01	-17.22	-7.84	-9.38	-5.59	0.01
	(30.88)	(0.02)	(22.54)	(11.20)	(11.37)	(11.07)	(0.02)
Running variable form	council	council	council	council	council	council	council
N	219	219	219	219	219	219	219

***Panel B*: Time use and labor force participation**

	House work (hours)		Employed		Unemployed	
	Male	Female	Male	Female	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	1.30	-0.31	86940.60	42556.87	18867.18	54934.05
	(1.39)	(3.22)	(241854.26)	(141170.28)	(124931.31)	(246316.15)
Running variable form	council	council	council	council	council	council
N	219	219	219	219	219	219

***Panel C*: Education**

	Elementary School or less		Middle School		High School	
	Male	Female	Male	Female	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	8835.58	4324.18	5113.39	2762.45	35035.82	24315.10
	(10497.51)	(15200.97)	(15053.35)	(11853.95)	(92990.19)	(59395.49)
Running variable form	council	council	council	council	council	council
N	219	219	219	219	219	219

	Tech. University		University		Graduate Studies	
	Male	Female	Male	Female	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	10063.70	3714.14	21383.83	6028.32	6508.27	1412.68
	(30382.16)	(21548.29)	(82013.52)	(40201.11)	(20396.75)	(7645.36)
Running variable form	council	council	council	council	council	council
N	219	219	219	219	219	219

***Panel D*: Political leaning, economic, and ward division characteristics**

	Past vote share by party		Budget		Ward characteristics	
	Conservative	Progressive	Total	Council expenses	Num of wards	Seats per ward
	(1)	(2)	(3)	(4)	(5)	(6)
Treat at cycle 4 x Cycle 4	0.00	-0.00	54.16	0.02	-0.23	0.17
	(0.07)	(0.07)	(86.15)	(0.05)	(0.18)	(0.11)
Running variable form	council	council	council	council	ward	ward
N	219	219	219	219	219	219

Notes: This table presents the results of a test of absence of discontinuities in pre-determined characteristics at the threshold in cycle 4. The regression specification follows equation (1). The sample consists of bins 1 and 2 at election cycle 4. Panel A: residents, residents of voting age, and households by gender or citizenship status (source: National Election Commission). Panel B: province-level information on hours spent doing unpaid domestic or care-giving services by gender (2004 Statistics of Korea Time Use Survey), and employed/unemployed individuals (2005 Census). Panel C: province-level information on individuals by education and gender (2005 Census). Panel D: vote share of each main party in the PR arm of the National Assembly Election of 2004, municipal government expenditures (Local Finance Disclosure System of the Ministry of the Interior and Safety), and the number and size of wards in each municipality (National Election Commission). Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.5 - Robustness: Treatment Effect on the Number of Candidates and Councilors, for Various Bandwidths

	Candidates				Councilors					
	Ward		PR		Ward		PR		All	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)	Male (9)	Female (10)
***Panel A*: distance$^{\dagger} \leq 4$**										
Treat	0.37	0.31	0.58***	1.23***	-0.15	0.15	0.09**	0.91***	-0.06	1.06***
	(0.46)	(0.94)	(4.64)	(8.29)	(-0.74)	(0.74)	(1.97)	(19.58)	(-0.26)	(4.78)
N	868	868	868	868	868	868	868	868	868	868
***Panel B*: distance ≤ 3**										
Treat	0.14	0.33	0.51***	1.24***	-0.13	0.13	0.08	0.92***	-0.04	1.04***
	(0.16)	(0.99)	(3.77)	(7.95)	(-0.59)	(0.59)	(1.57)	(17.77)	(-0.19)	(4.48)
N	811	811	811	811	811	811	811	811	811	811
***Panel C*: distance ≤ 2**										
Treat	0.89	0.37	0.54***	1.29***	-0.13	0.13	0.08	0.92***	-0.06	1.06***
	(0.99)	(1.07)	(3.59)	(7.50)	(-0.59)	(0.59)	(1.33)	(16.07)	(-0.23)	(4.16)
N	514	514	514	514	514	514	514	514	514	514
***Panel D*: distance ≤ 1**										
Treat	0.34	0.44	0.61***	1.25***	-0.24	0.24	0.09	0.91***	-0.15	1.15***
	(0.34)	(1.17)	(3.55)	(6.66)	(-0.94)	(0.94)	(1.36)	(14.03)	(-0.53)	(4.02)
N	320	320	320	320	320	320	320	320	320	320
***Panel E*: distance $= 0$**										
Treat	0.38	0.42	0.58***	1.23***	-0.24	0.24	0.08	0.92***	-0.16	1.16***
	(0.37)	(1.10)	(3.26)	(6.53)	(-0.91)	(0.91)	(1.25)	(15.00)	(-0.55)	(3.99)
N	168	168	168	168	168	168	168	168	168	168

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) for different bandwidths used to define bins. Councils that belong to the same bin are compared to each other. Councils with size above the threshold are considered treated, councils with size below the threshold belong to the control group. Bandwidths refer to the distance to the threshold (Distance †). To illustrate, the council sizes for which distance equals 0 are 10, 11, 20, and 21, while the council sizes for which distance equals 1 are 9, 12, 19, and 22. In the main specification, each bin includes councils with distance smaller or equal to 5 seats from the threshold. The sample includes only bins 1 and 2 and includes all election cycles. t-statistics (in parenthesis) for standard errors clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.6 - Robustness: Treatment Effect (Balanced Panel)

	All political parties							
	Candidates				Councilors			
	Ward		PR		Ward		PR	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Treat at cycle 4 x Cycle 4	3.71***	-0.23	0.94***	0.96***	0.36	-0.36	0.09	0.76***
	(1.17)	(0.35)	(0.22)	(0.22)	(0.22)	(0.22)	(0.08)	(0.09)
Treat at cycle 4 x Cycle 5	0.42	0.51	0.65***	1.21***	-0.28	0.28	0.10	0.70***
	(0.91)	(0.37)	(0.17)	(0.23)	(0.23)	(0.23)	(0.07)	(0.08)
Treat at cycle 4 x Cycle 6	-1.45*	0.93**	0.26*	1.02***	-0.47*	0.47*	0.08	0.69***
	(0.85)	(0.42)	(0.15)	(0.22)	(0.27)	(0.27)	(0.06)	(0.08)
Treat at cycle 4 x Cycle 7	-2.26**	1.10**	0.21	1.27***	-0.73**	0.73**	0.04	0.69***
	(1.01)	(0.44)	(0.16)	(0.22)	(0.29)	(0.29)	(0.06)	(0.08)
Running variable form	ward	ward	council	council	ward	ward	council	council
N	863	863	863	863	863	863	863	863

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) to the sample definition. The sample in this table includes only municipalities for which we can observe all election cycles (balanced panel). This sample excludes 2 municipalities that merge in election cycle 6 and 1 municipality that becomes a district level council in election cycle 6. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.7 - Robustness: Treatment Effect (All Municipalities)

	All political parties							
	Candidates				Councilors			
	Ward		PR		Ward		PR	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Treat at cycle 4 x Cycle 4	3.71***	-0.27	0.92***	0.95***	0.37*	-0.37*	0.08	0.77***
	(1.15)	(0.35)	(0.22)	(0.22)	(0.21)	(0.21)	(0.08)	(0.08)
Treat at cycle 4 x Cycle 5	0.54	0.45	0.60***	1.08***	-0.27	0.27	0.10	0.65***
	(0.90)	(0.36)	(0.17)	(0.23)	(0.22)	(0.22)	(0.06)	(0.08)
Treat at cycle 4 x Cycle 6	-1.42*	0.91**	0.26*	1.00***	-0.47*	0.47*	0.08	0.69***
	(0.84)	(0.42)	(0.15)	(0.22)	(0.26)	(0.26)	(0.06)	(0.08)
Treat at cycle 4 x Cycle 7	-2.26**	1.11**	0.21	1.24***	-0.74**	0.74**	0.04	0.68***
	(1.00)	(0.44)	(0.16)	(0.22)	(0.29)	(0.29)	(0.06)	(0.08)
Running variable form	ward	ward	council	council	ward	ward	council	council
N	873	873	873	873	873	873	873	873

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) to the sample definition. The sample in this table includes all existing municipalities. The excluded municipalities were 2 municipalities that were annexed to a third one in election cycle 5, generating a discrepancy between ward and PR arms in cycle 5. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.8 - Robustness: Treatment Effect ($f(x)$: Linear Interaction)

	All political parties							
	Candidates				Councilors			
	Ward		PR		Ward		PR	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Treat at cycle 4 x Cycle 4	3.90***	-0.45	0.95***	0.93***	0.51**	-0.51**	0.09	0.77***
	(1.22)	(0.38)	(0.22)	(0.21)	(0.23)	(0.23)	(0.08)	(0.09)
Treat at cycle 4 x Cycle 5	0.75	0.29	0.65***	1.18***	-0.13	0.13	0.10	0.71***
	(1.00)	(0.39)	(0.17)	(0.22)	(0.24)	(0.24)	(0.07)	(0.08)
Treat at cycle 4 x Cycle 6	-1.20	0.70	0.27*	1.00***	-0.32	0.32	0.08	0.70***
	(0.96)	(0.43)	(0.15)	(0.22)	(0.27)	(0.27)	(0.06)	(0.08)
Treat at cycle 4 x Cycle 7	-2.04*	0.89*	0.23	1.25***	-0.58*	0.58*	0.04	0.70***
	(1.11)	(0.47)	(0.16)	(0.21)	(0.30)	(0.30)	(0.06)	(0.08)
Running variable form	ward	ward	council	council	ward	ward	council	council
N	868	868	868	868	868	868	868	868

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) to the choice of the functional form for controlling for the relationship between council size and the outcome. In this table $f(x) = \gamma_1 x + \gamma_2 x \cdot Treat$. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.9 - Robustness: Treatment Effect ($f(x)$: Quadratic)

	All political parties							
	Candidates				Councilors			
	Ward		PR		Ward		PR	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Treat at cycle 4 x Cycle 4	3.90***	-0.39	0.98***	0.88***	0.46**	-0.46**	0.10	0.77***
	(1.20)	(0.37)	(0.23)	(0.21)	(0.22)	(0.22)	(0.08)	(0.09)
Treat at cycle 4 x Cycle 5	0.75	0.35	0.67***	1.12***	-0.18	0.18	0.10	0.71***
	(0.97)	(0.38)	(0.18)	(0.23)	(0.23)	(0.23)	(0.07)	(0.08)
Treat at cycle 4 x Cycle 6	-1.20	0.76*	0.29*	0.95***	-0.37	0.37	0.09	0.70***
	(0.93)	(0.43)	(0.16)	(0.22)	(0.27)	(0.27)	(0.07)	(0.08)
Treat at cycle 4 x Cycle 7	-2.03*	0.95**	0.25	1.19***	-0.63**	0.63**	0.04	0.70***
	(1.08)	(0.46)	(0.17)	(0.21)	(0.30)	(0.30)	(0.06)	(0.08)
Running variable form	ward	ward	council	council	ward	ward	council	council
N	868	868	868	868	868	868	868	868

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) to the choice of the functional form for controlling for the relationship between council size and the outcome. In this table $f(x) = \gamma_1 x + \gamma_2 x^2$. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.10 - Robustness: Treatment Effect ($f(x)$: Quadratic Interaction)

	All political parties							
	Candidates				Councilors			
	Ward		PR		Ward		PR	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Treat at cycle 4 x Cycle 4	3.77***	-0.15	0.74**	0.85**	0.47	-0.47	-0.00	0.71***
	(1.39)	(0.42)	(0.30)	(0.33)	(0.29)	(0.29)	(0.11)	(0.13)
Treat at cycle 4 x Cycle 5	0.63	0.59	0.44*	1.10***	-0.17	0.17	0.00	0.66***
	(1.18)	(0.44)	(0.26)	(0.33)	(0.29)	(0.29)	(0.10)	(0.13)
Treat at cycle 4 x Cycle 6	-1.32	1.01**	0.06	0.92***	-0.36	0.36	-0.01	0.65***
	(1.11)	(0.47)	(0.24)	(0.33)	(0.31)	(0.31)	(0.10)	(0.13)
Treat at cycle 4 x Cycle 7	-2.16*	1.20**	0.02	1.17***	-0.62*	0.62*	-0.06	0.64***
	(1.27)	(0.51)	(0.26)	(0.32)	(0.34)	(0.34)	(0.10)	(0.13)
Running variable form	ward	ward	council	council	ward	ward	council	council
N	868	868	868	868	868	868	868	868

Notes: This table tests the robustness of the estimated treatment effect using regression equation (1) to the choice of the functional form for controlling for the relationship between council size and the outcome. In this table $f(x) = \gamma_1 x + \gamma_2 x^2 + (\gamma_3 x + \gamma_4 x^2) \cdot Treat$. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.11 - Placebo Test – The Effect of Being Past The Threshold Before The Reform

	Number of ward candidates			
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Treat at cycle 4 x Cycle 1	1.07	0.05	0.03	0.10
	(1.29)	(0.26)	(1.31)	(0.30)
Treat at cycle 4 x Cycle 2	0.57	-0.04	-0.51	0.04
	(1.12)	(0.23)	(1.01)	(0.30)
Treat at cycle 4 x Cycle 3	1.29	0.08	0.16	0.16
	(1.03)	(0.27)	(0.91)	(0.31)
Treat at cycle 4 x Cycle 4	3.31***	0.73**	2.96**	0.60**
	(1.20)	(0.28)	(1.14)	(0.27)
Treat at cycle 4 x Cycle 5			-0.68	1.30***
			(0.83)	(0.31)
Treat at cycle 4 x Cycle 6			-2.24***	1.59***
			(0.80)	(0.42)
Treat at cycle 4 x Cycle 7			-2.74***	1.58***
			(0.99)	(0.44)
Running variable form	ward	ward	ward	ward
N	914	914	1592	1592

Notes: This table reports the result of a placebo check where we estimate the effect of being above the threshold (defined based on cycle 4 council size) on the gender composition of candidates before the introduction of the quota in cycle 4. The outcome variable is the number of candidates elected through plurality voting in each municipality in each election cycle by gender. This include all candidates before election cycle 4, as up to the third election in 2002, all councilors were directly elected through plurality voting in single-member constituent wards. From cycle 4 onward, the outcome variable includes only candidates put forward by parties in the ward arm. The regression specification is given by equation (1). The sample includes all bins. As council size is larger in election cycles 1,2, and 3 compared to the following election cycles, restricting the sample only to bin 1 and 2 would imply selecting different municipalities before and after the reform. The running variable and treatment status are defined contemporaneously. While municipality size and divisions remained almost unchanged from cycle 4 onward, they changed dramatically during the first three election cycles. Thus, it would be inaccurate to define treatment for the first three cycles using cycle 4 municipality characteristics. The sample include all parties to be able to compare election cycles before and after the introduction of the quota. It was extremely rare to find candidates affiliated with a political party before election cycle 4. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.12 - Treatment Effect on The Gender Gap in Education and Political Experience

	Main political parties				
	Education level	Years of schooling	Bachelor or more	Attended top 20 uni	Political experience
	(1)	(2)	(3)	(4)	(5)
Female	-0.119	-0.224	0.002	-0.006	0.108***
	(0.110)	(0.183)	(0.027)	(0.015)	(0.027)
Female × Cycle 5	0.089	0.141	-0.020	0.021	-0.070**
	(0.119)	(0.194)	(0.032)	(0.017)	(0.032)
Female × Cycle 6	-0.015	0.010	-0.003	-0.016	-0.035
	(0.141)	(0.230)	(0.038)	(0.019)	(0.036)
Female × Cycle 7	0.372***	0.566***	0.002	-0.006	-0.029
	(0.127)	(0.209)	(0.034)	(0.020)	(0.034)
Treat at cycle 4	-0.150	-0.262	-0.017	0.059**	0.018
	(0.152)	(0.247)	(0.034)	(0.026)	(0.028)
Treat at cycle 4 × Cycle 5	-0.054	-0.085	-0.036	-0.006	-0.052**
	(0.086)	(0.140)	(0.022)	(0.012)	(0.022)
Treat at cycle 4 × Cycle 6	-0.108	-0.165	-0.018	-0.029**	-0.005
	(0.094)	(0.154)	(0.025)	(0.014)	(0.026)
Treat at cycle 4 × Cycle 7	-0.063	-0.117	-0.028	-0.022	0.010
	(0.099)	(0.160)	(0.027)	(0.017)	(0.027)
Treat at cycle 4 × Female	0.127	0.235	-0.020	-0.033	0.061
	(0.171)	(0.282)	(0.043)	(0.025)	(0.042)
Treat at cycle 4 × Female × Cycle 5	0.073	0.064	0.065	-0.019	-0.013
	(0.171)	(0.283)	(0.052)	(0.026)	(0.052)
Treat at cycle 4 × Female × Cycle 6	0.102	0.099	0.017	0.032	-0.048
	(0.202)	(0.324)	(0.055)	(0.029)	(0.055)
Treat at cycle 4 × Female × Cycle 7	-0.150	-0.283	0.011	0.035	-0.015
	(0.201)	(0.327)	(0.055)	(0.031)	(0.049)
Cycle 5	0.595***	0.992***	0.167***	-0.005	0.113***
	(0.052)	(0.083)	(0.015)	(0.008)	(0.014)
Cycle 6	1.080***	1.763***	0.272***	0.026***	0.125***
	(0.058)	(0.093)	(0.016)	(0.010)	(0.017)
Cycle 7	1.244***	2.075***	0.348***	0.019*	0.109***
	(0.058)	(0.093)	(0.016)	(0.011)	(0.017)
N	13235	13235	13235	13235	13235
Running variable form	council	council	council	council	council
Age polynomials	Yes	Yes	Yes	Yes	Yes
Party affiliation	Yes	Yes	Yes	Yes	Yes
Rookie vs Incumbent	Yes	Yes	Yes	Yes	Yes
Political Experience	Yes	Yes	Yes	Yes	No
Years of Schooling	No	No	No	No	Yes

Notes: This table reports the effect of being above the threshold (defined based on cycle 4 council size) on the gender gap in education and political experience of candidates across election cycles. The outcome variables are the candidates' level of education (0-12), years of schooling (0-22), a dummy equal to one if the candidate has a bachelor degree or more, a dummy equal to one if the candidate has received tertiary education from a top 20 university in Korea, and a dummy equal to one if the candidate had an occupation related to politics. The regression specification is given by equation (4). The analysis is performed at the individual level. The sample includes only bins 1 and 2, and only candidates from the two main parties for which we have education information. "Age polynomials" refers to age and age squared. "Party affiliation" is a dummy equal to one if the candidate is affiliated with the Democratic party. "Rookie or incumbent" refers to a dummy equal to one if the candidate is an incumbent - they have been elected in at least one of the previous election cycles. "Political experience" is a dummy equal to one if the candidate has has political experience outside the municipal council. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.13 - Treatment Effect on The Gender Gap in Voter Preferences

	Main political parties				
	Candidate's vote share in the ward election arm (%)				
	No controls (1)	Ballot position (2)	Individual characteristics (3)	N. ward candidates (4)	List fixed effects (5)
Female	0.478	-0.708	-0.045	0.454	-2.000**
	(1.061)	(0.972)	(1.015)	(1.020)	(0.867)
Cycle 5 x Female	-0.677	-1.593	-2.650**	-3.089***	-0.996
	(1.317)	(1.130)	(1.194)	(1.171)	(0.993)
Cycle 6 x Female	-1.457	-1.743*	-2.934***	-3.469***	-1.452*
	(1.169)	(0.996)	(1.031)	(1.036)	(0.873)
Cycle 7 x Female	1.688	1.612	0.145	-0.675	-0.100
	(1.222)	(1.154)	(1.191)	(1.164)	(0.972)
Treat at cycle 4	-2.124**	-1.982**	-2.190***	-0.846	
	(1.014)	(0.796)	(0.804)	(0.672)	
Treat at cycle 4 x Cycle 5	0.063	0.187	0.231	-0.467	
	(0.610)	(0.545)	(0.543)	(0.557)	
Treat at cycle 4 x Cycle 6	0.828	0.883	0.904	-0.450	
	(0.722)	(0.623)	(0.628)	(0.667)	
Treat at cycle 4 x Cycle 7	1.256	1.147*	1.190*	-0.349	
	(0.782)	(0.632)	(0.631)	(0.624)	
Treat at cycle 4 x Female	-1.213	0.428	-0.168	-0.448	0.434
	(1.867)	(1.540)	(1.614)	(1.524)	(1.149)
Treat at cycle 4 x Cycle 5 x Female	2.100	-0.595	-0.334	-0.216	-1.154
	(2.086)	(1.649)	(1.737)	(1.665)	(1.370)
Treat at cycle 4 x Cycle 6 x Female	1.579	-0.435	0.192	0.561	-0.110
	(1.880)	(1.527)	(1.597)	(1.531)	(1.297)
Treat at cycle 4 x Cycle 7 x Female	0.599	-0.941	-0.165	0.098	0.161
	(2.088)	(1.722)	(1.749)	(1.684)	(1.422)
N	11246	11246	10791	10791	10719
Running variable form	ward	ward	ward	ward	ward
Ballot Position	No	Yes	Yes	Yes	Yes
Schooling (0-22)	No	No	Yes	Yes	Yes
Rookie vs Incumbent	No	No	Yes	Yes	Yes
Political Experience	No	No	Yes	Yes	Yes
Age polynomials	No	No	Yes	Yes	Yes
N. ward candidates	No	No	No	Yes	Yes
List Fixed Effects	No	No	No	No	Yes

* p<.10, ** p<.05, *** p<.01

Notes: This table reports the effect of being above the threshold (defined based on cycle 4 council size) on the gender gap in the vote share obtained by candidates across election cycles (0-100). The regression specification is given by equation (4). The analysis is performed at the individual level. The sample includes all candidates put forward in municipalities included in bins 1 and 2 by the two main parties. "Ballot position" refers to a dummy equal to one for each position in the ballot list. "Schooling" refers to the years of schooling obtained by the candidate. "Age polynomials" refers to age and age squared. "Party affiliation" is a dummy equal to one if the candidate is affiliated with the Democratic party. "Rookie vs incumbent" refers to a dummy equal to one if the candidate is an incumbent - they have been elected in at least one of the previous election cycles. "Political experience" is a dummy equal to one if the candidate has political experience outside the municipal council. "N. ward candidates" refers to the total number of candidates competing in the municipality, independently on their party affiliation. "List fixed effects" refers to party by municipality by election cycle fixed effects - a fixed effect for the party list in the municipality in the election cycle. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.14 - Probability of Being Constrained in The Number of Female Candidates

	Main political parties (party x municipality)	
	Pr(unconstrained)	
	All main parties	Participates in ward arm
	(1)	(2)
Treat at cycle 4 x Cycle 4	-0.088	-0.093
	(0.075)	(0.074)
Treat at cycle 4 x Cycle 5	0.089	0.119*
	(0.073)	(0.071)
Treat at cycle 4 x Cycle 6	0.020	0.041
	(0.065)	(0.064)
Treat at cycle 4 x Cycle 7	0.072	0.086
	(0.068)	(0.069)
Running variable from	council	council
N	1557	1520

Notes: This table reports the effect of being above the threshold (defined based on cycle 4 council size) on the probability that the party is not constrained in the selection of candidates. The outcome variable is a dummy equal to 1 if a party is not constrained in the selection of candidates in a given election cycle. A party is defined as not constrained if the number of female candidates in the party's list is strictly greater than the number of women the party must place in its list due to quotas (1 woman if 1 or 2 seats are elected through the PR arm, and 2 women if 3 seats are elected through the PR arm - all odd-number candidates in the party list for the PR arm need to be female due to the quota). The regression specification is given by equation (1). The unit of analysis is party by municipality. The sample includes only bins 1 and 2, and only the two main parties. In column (2), the sample is restricted to only the main parties in municipalities where each party has at least one ward candidate. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix C. INSTITUTIONAL SETTING

C.1. Other reforms introduced simultaneously

Besides the double-arm voting system and the gender quota, an additional change was introduced in 2006. Subsidies were offered to parties based on the female ratio among the parties' candidates nationwide. It is unlikely that the subsidies affected much of the political parties' strategies, particularly at the municipality level. The scale of the subsidies has been criticized for being too low to effectively expand female nomination (Lee, 2003; Kim et al., 2003; Jin, 2018). Indeed, they account for only around 5 to 6% of the total value of election subsidies (National Election Commission, 2018). Therefore, the presence of the subsidies is unlikely to have impacted political parties' selection of candidates.

Amendments to electoral rules continued between the 2006 and 2010 elections. It was stipulated that in either the municipal council elections or the higher-up provincial council elections,

there must be at least one female candidate in each National Assembly Election district. As there are around 250 such districts, compared to 226 municipalities, a National Assembly Election district approximately compares to a municipality.[53] Legislative Impact Analysis Reports indicate that most parties chose to satisfy this rule in the municipal council elections, due to the larger number of candidates (Lee, 2019). Selecting which ward to place the female candidate in would have been a strategic concern for the political parties.

It is important to note that none of the other reforms conflicts with our identification strategy of regression discontinuity based on council size.

C.2. Background behind the adoption of gender quotas

Before gender quotas were adopted in the municipal council elections, they were adopted first in the National Assembly Election in 2004. The adoption was influenced by increasing demands by women's organizations to raise female representation in politics, which at the time was dramatically behind the international average.[54] As females constitute half the voters, it was in the interest of political parties to put gender quotas forward among their election pledges. Moreover, Jeon (2013) argues that the adoption of the quota was also a political tactic. Political parties wanted to increase the size of the National Assembly back to what it was before the size cut during the Asian Financial Crisis, and the fact that the majority of the added seats will go to females, with the quota, made for a good excuse to expand the Assembly.

Once the quota was adopted in the National Assembly Election, it became the natural next step to introduce it in the regional elections. The gender quota in the municipal council election was passed in the National Assembly, led by both major parties. Some argue that there was political motivation behind it, too (Kim, 2005). One new element in the reform was the party nomination system – a ward candidate must be nominated by their party in order to run with the party affiliation – and it has been disputed as a ploy to deepen party influence. Political parties used the quota to justify the party nomination system since the gender quota was embedded in the PR arm where party nomination was essential.

To sum up, it is unlikely there was a major division among political parties in their support of the gender quota when it was passed.

[53] National Assembly Election districts are divided depending on population size and local representativeness. A large municipality may contain five National Assembly Election districts, and up to five small municipalities may comprise one National Assembly Election district.

[54] See Cho and Kim (2010) for a summary of the major activities of women's organizations.

Appendix D. EMPIRICAL STRATEGY

D.1. Factors that bind a candidate to a certain municipality

A candidate is legally required to have been a resident of the municipality they are running in for at least 60 days prior to the election. In addition, as municipal councilors deal with local grass-roots matters, a candidate familiar with the municipality will win more votes *ceteris paribus*. Hence, a candidate usually runs in the municipality they have a connection with, such as their birthplace, long-term residence, or place of education. Moreover, the final say of a party's nomination lies on the head of the municipal branch of the party, so a candidate typically serves the local activities of the party in the municipality they desire to run in for a long time before getting nominated. Finally, once a candidate is nominated in a municipality, they put on a campaign and become known to the residents. So if they were to run again, they would not start over at a new location. For all these factors, rarely do parties move around candidates across municipalities for strategic reasons.

D.2. Confirming that the number of female PR councilors changes only at the thresholds

In order to buttress the regression discontinuity design, we test whether there is a change in the number of female PR councilors as council size increases, at points *other* than the thresholds. We estimate the following equation:

$$(\text{N. of female PR councilors})_{cbt} = \beta \times (\textit{Larger by one})_{cbt} + \delta_b + \gamma_t + \epsilon_{cbt} \tag{3}$$

$$\text{where } (\textit{Larger by one})_{cbt} = \begin{cases} 1, & \text{if (council size)}_{cbt} - \text{threshold}_{bt} = x \\ 0, & \text{if (council size)}_{cbt} - \text{threshold}_{bt} = x - 1 \end{cases}$$

for each value of $x \in \{-4, -3, ..., 3, 4\}$, i.e. distance from the threshold. The threshold is council $\times$ election cycle specific, as it depends on the bin the council belongs to.

Equation (3), therefore, estimates the change in the number of female PR councilors when the council size increases by 1, for all points around the threshold. Table D.1 reports the results. It confirms that there is a positive effect only at the threshold.

Table D.1 - The Effect of an Increase in Council Size on the Number of Female PR Councilors

	x value (distance from the threshold)								
	-4	-3	-2	-1	0	1	2	3	4
Coefficient ($\hat{\beta}$)	-0.03	0.03	-0.03	-0.01	0.92***	-0.01	-0.03	-0.03	0.09
Standard error	(0.09)	(0.02)	(0.03)	(0.04)	(0.06)	(0.08)	(0.07)	(0.08)	(0.09)
N	267	380	210	170	168	150	136	111	87

Notes: This table reports the results of the coefficient of $(\textit{Larger by one})_{cbt}$ in regression equation (3), for different values of x. For each x, the sample is councils that are x and $x-1$ away from the threshold (*Larger by one* $= 1$ and $= 0$, respectively.) When $x = 0$, $(\textit{Larger by one})_{cbt}$ corresponds to the treatment definition used in the main identification strategy (with the exception that the sample is restricted to councils just one seat above and below the threshold). The table shows that the number of female PR councilors increases discontinuously only at the treatment thresholds. The sample includes only bins 1 and 2. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D.3. Change of running variable for outcome variables relating to ward elections

When the outcome variable relates to ward elections, we change the running variable to $\tilde{x}_{cb} \equiv (\text{N. of ward councilors})_{cb} - (\text{N. of ward councilors at the threshold})_b$ at cycle 4.

To illustrate why this is important, let us consider councils just above and below the threshold of 11, i.e. councils with 11 and 10 councilors. Both sets of councils have 9 ward councilors, but this is not taken into account if our running variable is based on council size. As council size differs by one unit above and below the threshold, controlling for council size would effectively induce us to compare a treated council with *one fewer* ward councilor than the control council, therefore making it difficult to interpret the sign of the coefficient on $(\textit{Treat at cycle 4})$. Redefining the running variable solves this problem.[55]

Appendix E. ALTERNATIVE MECHANISMS

Change in the supply of women We estimate an individual-level version of equation (1):

$$Y_{icbt} = \alpha_b + \alpha_t + \sum_{s=4}^{7} \beta_s \cdot (\textit{Treat at cycle 4})_{cb} + \sum_{s=4}^{7} \pi_s \cdot (\textit{Treat at cycle 4})_{cb} \times \textit{Female}_{icbt} + \sum_{s=4}^{7} \kappa_s \cdot \textit{Female}_{icbt} + f(x_{cb}) + X'_{cbt}\gamma + X'_{icbt}\delta + \epsilon_{cbt} \quad (4)$$

[55] Changing the running variable this way does not change much else. In fact, the coefficients $\hat{\psi}_0$ and $\hat{\psi}_1$ stay the same, as well as the R-squared value.

where $(\textit{Treat at cycle } 4)_{cb}$ is treatment status at election cycle 4, X_{cbt} denotes municipality-level control variables such as the contemporaneous number of seats, α_b and α_t are bin and cycles fixed effects, while X_{icbt} indicates individual-level controls, including the party of affiliation, whether one's occupation is related to politics (substituted by education when the outcomes concern candidates' occupation), whether one was previously elected, and age and age squared. The outcomes we consider are candidates' education and political experience, defined as i) a categorical variable for the level of education,[56] ii) years of schooling, iii) whether the candidate holds a bachelor degree or more, iv) whether the candidate has received tertiary education in the top 20 universities in Korea[57], (v) the probability that the candidate had ex-ante political experience. The results are displayed in Table B.12.

Change in voter preferences for women We estimate equation (4) with the vote share a candidate obtained in the ward election as the outcome variable. Columns (1)-(5) of Table B.13 display the estimates of the specification as we gradually add controls. Column (1) includes only the number of ward seats for the *contemporaneous* election. Column (2) includes also the position on the ballot list and the party of affiliation, while in column (3) we additionally control for individual characteristics. Lastly, column (4) includes a control for the number of ward candidates in the municipality, and column (5) includes list fixed effects. A list is defined over a given election cycle, for a given municipality, and for a given political party.

Appendix F. MODEL OF PARTY LEARNING

F.1. Derivation: maximum likelihood estimator of μ_g

Conditional on s_i, the distribution of a_i is:

$$a_i|s_i \sim N\left(\mu_g + \frac{\sigma^2}{\sigma_s^2+\sigma^2}s_i, \frac{\sigma^2\sigma_s^2}{\sigma_s^2+\sigma^2}\right) \tag{5}$$

Let's define $c = \frac{\sigma^2}{\sigma_s^2+\sigma^2}$, $m(s_i) = \mu_g + \frac{\sigma^2}{\sigma_s^2+\sigma^2}s_i = \mu_g + cs_i$, $\bar{\sigma}^2 = \frac{\sigma^2\sigma_s^2}{\sigma_s^2+\sigma^2}$.

[56] Ranging from 0 to 12 based on final education degree enrolled in and degree completion status.

[57] A university belongs to the top 20 if it was in the top 20 in the University Rankings in any year between 1995 and 2019 according to JoongAng Ilbo, one of the three biggest newspapers in Korea.

Then the likelihood function is

$$\begin{aligned}\mathcal{L}(\mu_g) &= P(\mathbf{a}|\mathbf{s};\mu_g) \\ &= \Pi_{i=1}^{n}\phi(a_i|s_i;\mu_g) \quad \text{where } \phi : \text{Gaussian probability density function} \\ &= \frac{1}{(\sqrt{2\pi}\bar{\sigma})^n}\exp\left(-\frac{1}{2\bar{\sigma}^2}\sum_{i=1}^{n}\left(a_i - m(s_i)\right)^2\right)\end{aligned}$$

Thus, the maximum likelihood estimator is

$$\hat{\mu}_g = \frac{1}{n}\sum_{i=1}^{n}\left(a_i - cs_i\right) \sim N\left(\mu_g, \frac{1}{n}\bar{\sigma}^2\right) \tag{6}$$

F.2. Conditions for Nash equilibrium allocation of candidates

Because each party does not know about the potential candidates available to the other party, they can only form expectations about the competence of the opponent in each ward. Call the expected competence of the opposing party's best candidate $A^{(1)}$, that of the second best candidate $A^{(2)}$, etc.[58] Also rank wards by contestability. Call $|R|^{(1)}$ the absolute value of party R's popularity in the ward with the highest contestability, i.e. with the smallest absolute value of $-|I^w - I_R| + |I^w - I_L|$. For simplicity of exposition, we assume that there are sufficiently many potential candidates available to each party such that the expected gap in competence between any candidate and the next-best one is small relative to the gap in contestability: $\max_k\{A^{(k)} - A^{(k+1)}\} < \min_k\{|R|^{(k+1)} - |R|^{(k)}\}$. Under this assumption, the Nash equilibrium allocation of candidates is for each party to place the most competent candidate in the ward with the greatest contestability.[59]

F.3. Validity of the assumptions on the party's choice of candidates

In this section, we provide evidence of the validity of the model assumptions by studying election probabilities for the candidates elected before the introduction of the quota. Municipal elections were introduced in 1995, so we can exploit three rounds of elections and information for a total of 26,924 male candidates[60]. Before the introduction of the quota, all councilors were directly elected through plurality vote in single-member constituent wards with no party affiliation. Hence, we can

[58]For example, say $\tilde{\mu}_{f,t} < \tilde{\mu}_{m,t}$ so that the top candidate is expected to be male, drawn from $N(\tilde{\mu}_{m,t}, \sigma^2)$. Then $A^{(1)} = \tilde{\mu}_{m,t} + \sigma\int_{-\infty}^{\infty} x\frac{d}{dx}\Phi(x)^n dx$, where Φ is the cdf of the standard normal distribution, and n is the total number of male potential candidates.

[59]The assumption of $\max_k\{A^{(k)} - A^{(k+1)}\} < \min_k\{|R|^{(k+1)} - |R|^{(k)}\}$ ensures that the expected competence of the opponent does not overturn the contestability ranking of wards in equilibrium.

[60]We restrict the analysis to male candidates as women were rare and very selected.

study how much voters value different characteristics without the potential confounding factors such as unobserved preferences for parties, differences in parties strategic behaviors across wards, or the influence of ballot list position.

Table F.1 displays the results of this analysis. The probability of being elected and the candidates' vote share are regressed on municipality $\times$ election cycle fixed effects, and candidates' characteristics – age, education, a dummy for whether the candidate works in politics, and a dummy for whether the candidate was ever elected before. The table shows that an incumbency premium exists, older candidates have a higher probability of being elected (probably capturing social networks and the influence of the candidate in the community), and candidates with political experience get more votes. More relevantly for our modeling assumption, voters value the education of candidates. We can see that having a high school degree is associated with a 2.3 percentage points higher probability of being elected and 1 percentage point higher vote share compared to an elementary school certificate (omitted category), all else constant. In fact, the coefficients on the education degrees show that election outcomes improve monotonically with higher levels of education.

Table F.1 - What Do Voters Care About?

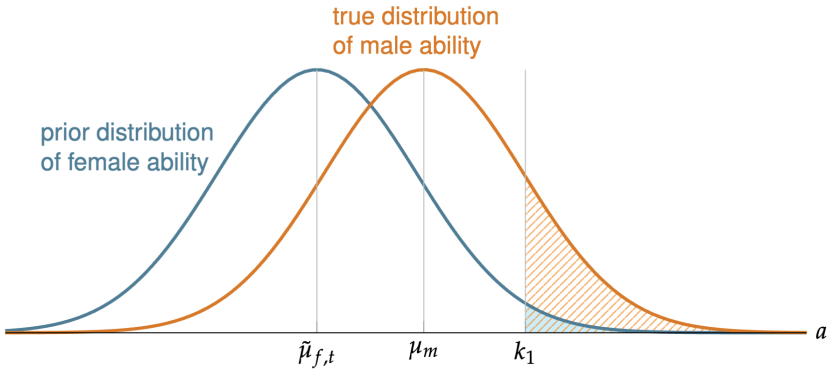
	Pr(Elected)	Vote Share
	(1)	(2)
Middle School	0.015	0.518
	(0.014)	(0.402)
High School	0.023**	0.884***
	(0.012)	(0.338)
Undergraduate Degree	0.053***	1.566***
	(0.012)	(0.353)
Graduate Degree	0.103***	2.817***
	(0.016)	(0.457)
Incumbent	0.165***	6.082***
	(0.010)	(0.284)
Age	0.043***	1.648***
	(0.004)	(0.109)
Age squared	-0.000***	-0.016***
	(0.000)	(0.001)
Political experience	0.040***	1.582***
	(0.011)	(0.328)
N	25507	24204
Municipality $\times$ Cycle FEs	Yes	Yes

Notes: The probability of being elected (column (1)) and the candidate's vote share (column (2)) are regressed on municipality $\times$ election cycle fixed effects, and candidates' characteristics – age, education (a dummy for different levels of education achieved by the candidate), a dummy for whether the candidate works in politics, and a dummy for whether the candidate was ever elected before. The sample consists of the universe of male candidates for the three municipal elections before the introduction of the quota in 1995, 1998, and 2002 (26,924 male candidates), for which we could retrieve occupation, education (95%), and vote share information (90%). Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

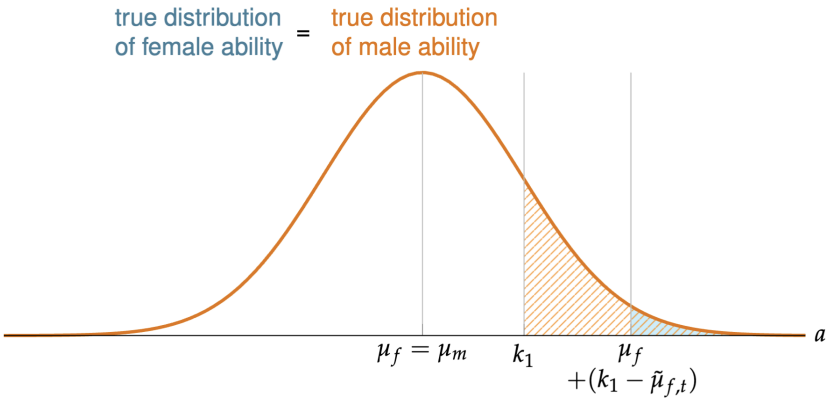
F.4. A diagrammatic illustration of candidates' selection

Figure F.1 illustrates the model for the $b = 0$ case. To simplify matters, suppose the true distribution of male ability is known. If the prior distribution of female ability at election t lies to the left of the male ability distribution, as in diagram (a), then the party will select candidates with perceived ability above a certain cutoff k_1, determined by the total number of candidates. The lowest signal among females is $(k_1 - \tilde{\mu}_{f,t})$, much higher than the lowest among males, $(k_1 - \mu_m)$. The female share of candidates will be given by the relative size of the shaded areas in (a). Now if the true ability distribution of females was identical to that of males, as plotted in diagram (b), then the true abilities of women, revealed post-election, will turn out to be much higher than expected. The party thus reconsiders the value of μ_f using maximum likelihood. The posterior distribution of female ability then is a weighted average of the prior and the MLE, and will lie closer to the true female ability distribution, as shown in diagram (c). At election $t + 1$, the new cutoff will be k_2, and the female share of candidates will be higher than at t.

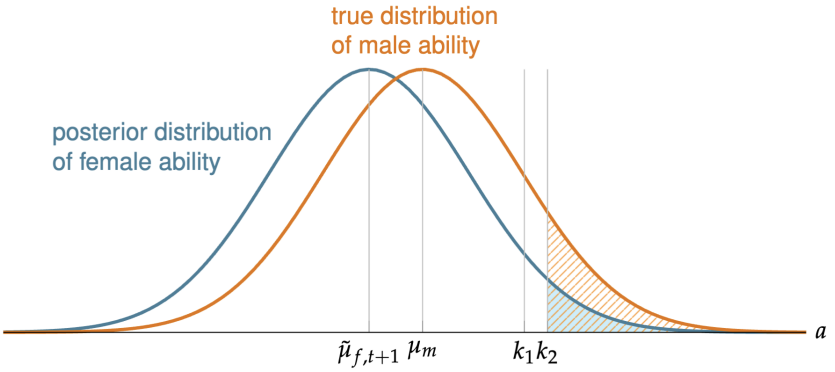
Figure F.1 - Illustration of Model of Belief Updating



(a) Candidate selection at t



(b) Maximum likelihood during the council term of t



(c) Candidate selection at $t + 1$

Notes: This figure provides a simplified illustration of the model in section V.B.. To simplify matters, a few assumptions are made. First, parties only care about maximizing the average ability of councilors, and not about meeting a particular female ratio. Moreover, suppose that the true distribution of male ability is known, while that of female ability is not. Panel (a) describes the selection of candidates at time t if the prior distribution of female ability at election t lies to the left of the true male ability distribution. Panel (b) illustrates that the true abilities of women revealed post-election, would turn out to be much higher than expected, if the true ability distribution of females were identical to that of males and. Panel (c) describes candidates selection at time $t + 1$, when the posterior distribution of female ability lies closer to the true female ability distribution.

F.5. Extension: if the exact ability of councilors is not revealed

What if the exact ability of councilors is not revealed while they serve their term? Rather, for councilor i, a party receives a second signal of ability that is highly informative about the *absolute* ability of i:

$$v_i \sim N(a_i, \sigma_v^2)$$

where σ_v^2 is a small number. Moreover, say the precision of v_i is inversely related to the closeness of the interaction between councilor i and a party. For instance,

$$\sigma_v^2 = \begin{cases} \sigma_1^2 & \text{if } i \text{ belongs to own party} \\ \sigma_2^2 & \text{else} \end{cases}$$

with $\sigma_1^2 < \sigma_2^2$.

Once the values of the second signals of ability of councilors, $\mathbf{v} = \{v_i\}$, are revealed, the party makes an inference about the value of μ_g via maximum likelihood as before.

Conditional on s_i, the distribution of v_i is

$$v_i | s_i \sim N\left(\mu_g + \frac{\sigma^2}{\sigma_s^2 + \sigma^2} s_i, \sigma_v^2 + \frac{\sigma^2 \sigma_s^2}{\sigma_s^2 + \sigma^2}\right) \tag{7}$$

Let's call $\bar{\sigma}_1^2 = \sigma_1^2 + \frac{\sigma^2\sigma_s^2}{\sigma_s^2+\sigma^2}$ and $\bar{\sigma}_2^2 = \sigma_2^2 + \frac{\sigma^2\sigma_s^2}{\sigma_s^2+\sigma^2}$. N_1 denotes the set of own-party councilors of size n_1, and N_2 the set of other councilors of size n_2.

The likelihood function is

$$\begin{aligned}
\mathcal{L}(\mu_g) &= P(\mathbf{v}|\mathbf{s}; \mu_g) \\
&= \Pi_{i \in N_1} f(v_i | s_i; \mu_g, \sigma_1^2) \times \Pi_{i \in N_2} f(v_i | s_i; \mu_g, \sigma_2^2) \\
&= \frac{1}{(\sqrt{2\pi}\bar{\sigma}_1)^{n_1}} \exp\left(-\frac{1}{2\bar{\sigma}_1^2} \sum_{i \in N_1} \big(v_i - m(s_i)\big)^2\right) \times \frac{1}{(\sqrt{2\pi}\bar{\sigma}_2)^{n_2}} \exp\left(-\frac{1}{2\bar{\sigma}_2^2} \sum_{i \in N_2} \big(v_i - m(s_i)\big)^2\right)
\end{aligned}$$

Then the maximum likelihood estimator is

$$\hat{\mu}_g = \frac{\bar{\sigma}_2^2 \sum_{i \in N_1} \big(v_i - c s_i\big) + \bar{\sigma}_1^2 \sum_{i \in N_2} \big(v_i - c s_i\big)}{\bar{\sigma}_2^2 n_1 + \bar{\sigma}_1^2 n_2} \tag{8}$$

The distribution of $\hat{\mu}_g$ is

$$\hat{\mu}_g \sim N\left(\mu_g, \frac{\bar{\sigma}_1^2 \bar{\sigma}_2^2}{\bar{\sigma}_2^2 n_1 + \bar{\sigma}_1^2 n_2}\right) \tag{9}$$

The posterior distribution about the value of μ_g follows the same structure as before.

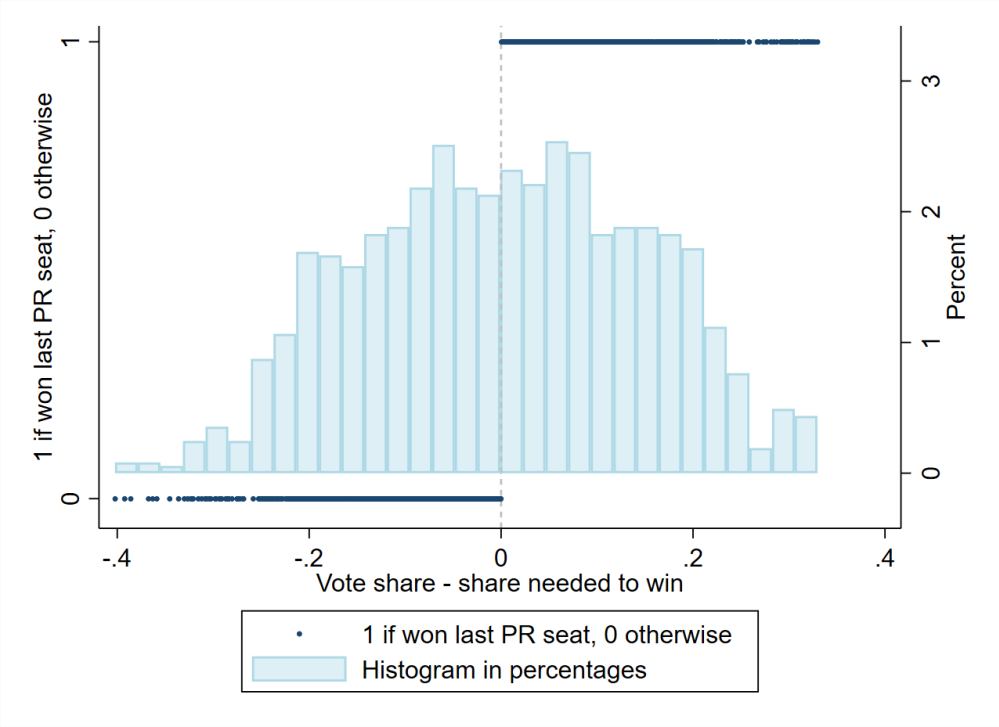
Appendix G. PARTY-LEVEL RD DESIGN

G.1. The empirical strategy

We conduct a *party*-level analysis, where we compare the strategies of parties that marginally won or lost the election of their first – and therefore female – PR candidate in the previous election cycle.

We take marginal parties to be the *two* parties that either marginally won or lost a PR seat for the municipality. To differentiate marginal winners from losers, we measure how far off the vote share received by a party was, from the share it needed to win that seat. For party p in municipal council c at election cycle t, this value is given by $v_{cpt} \equiv (\text{vote share})_{cpt} - \bar{v}_{cpt}$, where $\bar{v}$ denotes the verdict-determining vote share. As the simplest example of $\bar{v}$, when two parties are competing for one PR seat, $\bar{v} = 0.5$ for both parties. The precise way we compute $\bar{v}$ for all possible contest scenarios is detailed in Appendix Section G.2.. Figure G.1 shows the distribution of the vote shares received by the two marginal parties competing for the last PR seat in a municipality. The histogram shows that there are plenty of parties that received a vote share close to the share needed to win that seat.

Figure G.1 - Marginal Winners and Losers of The Last PR Seat



Notes: This figure shows the distribution of the vote shares received by the two marginal parties competing for a PR seat in a municipality. The vote share is computed to be the share of votes received among qualifying parties, i.e. parties that received more than 5% of the raw votes in the PR election arm. The sample includes all election cycles and municipalities. The x-axis displays the difference between the vote share obtained by the party and the vote share the party needed to win the seat, i.e. the party's margin of victory. When the margin of victory is positive, the party won the seat. When the margin of victory is negative, the party lost the seat. The light blue bars display the share (in percentage points) of parties that obtained each margin of victory - indicated on the y-axis on the right side of the graph. The blue dots display the election outcomes for the party. The outcome is equal to 1 if the party won the seat, and 0 otherwise, as indicated in the y-axis on the left side of the graph.

To focus on the effect of experiencing a *woman* from within the party, the marginal parties in our sample are restricted to those whose marginal candidate was the number-1 candidate in the party list.[61] Thus, we compare parties that marginally got their first (female) PR candidate elected in the previous election cycle with parties that marginally failed by random chance.

We employ a regression discontinuity design of the following form:

$$Y_{cpt} = \alpha_t + \beta \times Winner_{cp,t-1} + f(v_{cp,t-1}) + X'_{cpt}\gamma + \epsilon_{cpt} \tag{10}$$

where $Winner_{cp,t-1} \equiv \mathbb{1}(v_{cp,t-1} \geq 0)$. $f(v_{cp,t-1})$ is linear and allows for different slopes to the left and right of the cutoff $v_{cp,t-1} = 0$. X_{cpt} represents the control variables, including the number

[61] To clarify, these include parties in municipalities with more than 1 PR seat. For example, let's assume that there are 2 PR seats in the council and the contest is whether the most popular party wins both seats or the second-most popular party wins one, too. In this case, only the second-most popular party is in the sample. Its marginal candidate is the first PR candidate on the party list, while the marginal candidate for the most popular party is the second.

of ward seats and the total council size for the *contemporaneous* election, i.e. election cycle t. A further factor to note is that the sample includes only the two major parties in South Korea, in order to track the parties over time. X_{cpt} also includes a dummy that indicates which of the two major parties is party p.

G.2. Computing the running variable

The purpose of the regression discontinuity design of Section V.C. is to compare the strategies of parties that marginally won a PR councilor to those that marginally lost a PR councilor in the previous election. Thus, we are interested in the causal effect of having won a female PR councilor. We take marginal parties to be the *two* parties that either marginally won or lost the *last* PR seat. In order to differentiate marginal winners from losers, we measure how far off the vote share received by a party was, from the share it needed to win that seat. The running variable for party p in municipal council c at election cycle t equals $v_{cpt} = voteshare_{cp,t-1} - \bar{v}_{cp,t-1}$, where $\bar{v}$ denotes the verdict-determining vote share.

To compute $\bar{v}$, we first need to describe the rules by which PR seats get allocated:

Rules for allocating PR seats

1. Among parties running for prop rep in a municipality, only the parties getting >=5% of votes qualify.
2. Of the qualifying parties, first compute X =(number of prop MP seats in the municipality)×(vote share of each qualifying party).
3. Allocate to each qualifying party the number of seats equal to the integer part of X.
4. Allocate the remaining seats by the ranking of the decimal part of X.

E.g. Municipal council A has 3 PR seats. There are 3 parties (1, 2, and 3) running for proportional representation. The vote shares of the parties are: party 1: 60%, 2: 38%, and 3: 2%. Party 3 got less than 5%, so it does not qualify. Among the qualifying parties, the vote shares are then party 1: $60/(60+38) \approx 61.22\%$, and 2: $38/(60+38) \approx 38.77\%$. The values of X's are party 1: $3 \times 0.6122 \approx 1.83$, and 2: $3 \times 0.3877 \approx 1.16$. Parties 1 and 2 both have 1 in the integer part of X, so they first get one PR councilor each. The last PR seat goes to party 1, because $0.83 > 0.16$.

Below, we compute $\bar{v}$ for all possible contest scenarios.[62] While doing so, we distinguish

[62] An example is when there are three PR seats in a municipality, and the rank-1 and rank-2 parties contest over

whether the marginal candidate that won – or nearly won – the last PR seat corresponds to the first, second, or third PR candidate in a party's list. For notational convenience, we call s the position in the party list of the marginal candidate of a party, and V the sum of the vote shares (among qualifying parties) received by the two marginal parties.

1 When there is one PR seat in the municipality

i) The two most popular parties contest over the only PR seat. Marginal parties: ranks 1 and 2

- Rank 1: $\bar{v} = \frac{V}{2}$, $s = 1$
- Rank 2: $\bar{v} = \frac{V}{2}$, $s = 1$

2 When there are two PR seats in the municipality

i) The contest is over whether the rank-2 party wins the second PR seat. Marginal parties: ranks 1 and 2

- Rank 1: $\bar{v} = \frac{2V+1}{4}$, $s = 2$
- Rank 2: $\bar{v} = \frac{2V-1}{4}$, $s = 1$

3 When there are three PR seats in the municipality

i) The contest is over whether the third PR seat goes to the rank-1 party or the rank-2 party. Marginal parties: ranks 1 and 2

- Rank 1: $\bar{v} = \frac{3V+2}{6}$, $s = 3$
- Rank 2: $\bar{v} = \frac{3V-2}{6}$, $s = 1$

ii) Where the rank-2 party wins a seat for sure, the contest is over whether the third PR seat goes to the rank-1 party or the rank-3 party. Marginal parties: ranks 1 and 3

- Rank 1: $\bar{v} = \frac{3V+1}{6}$, $s = 2$
- Rank 3: $\bar{v} = \frac{3V-1}{6}$, $s = 1$

4 When there are four PR seats in the municipality

i) The contest is over whether the fourth PR seat goes to the rank-1 party or the rank-2 party. Marginal parties: ranks 1 and 2

- Rank 1: $\bar{v} = \frac{4V+3}{8}$, $s = 4$

the last seat. Let v_n denote the vote share (among qualifying parties) received by the rank-n party. Rank 1 wins if $3v_1 - 2 > 3v_2 \iff v_1 > v_2 + \frac{2}{3}$. Therefore, $\bar{v}$ for the rank-1 party equals $v_2 + \frac{2}{3}$. On the other hand, $\bar{v}$ for the rank-2 party equals $v_1 - \frac{2}{3}$.

- Rank 2: $\bar{v} = \frac{4V-3}{8}$, $s = 1$

ii) Where the rank-1 party wins two seats for sure and the rank-2 party wins a seat for sure, the contest is over whether the fourth PR seat goes to the rank-1 party or the rank-2 party. Marginal parties: ranks 1 and 2

- Rank 1: $\bar{v} = \frac{4V+1}{8}$, $s = 3$
- Rank 3: $\bar{v} = \frac{4V-1}{8}$, $s = 2$

iii) Where the rank-1 party wins two seats for sure and the rank-2 party wins a seat for sure, the contest is over whether the fourth PR seat goes to the rank-2 party or the rank-3 party. Marginal parties: ranks 2 and 3

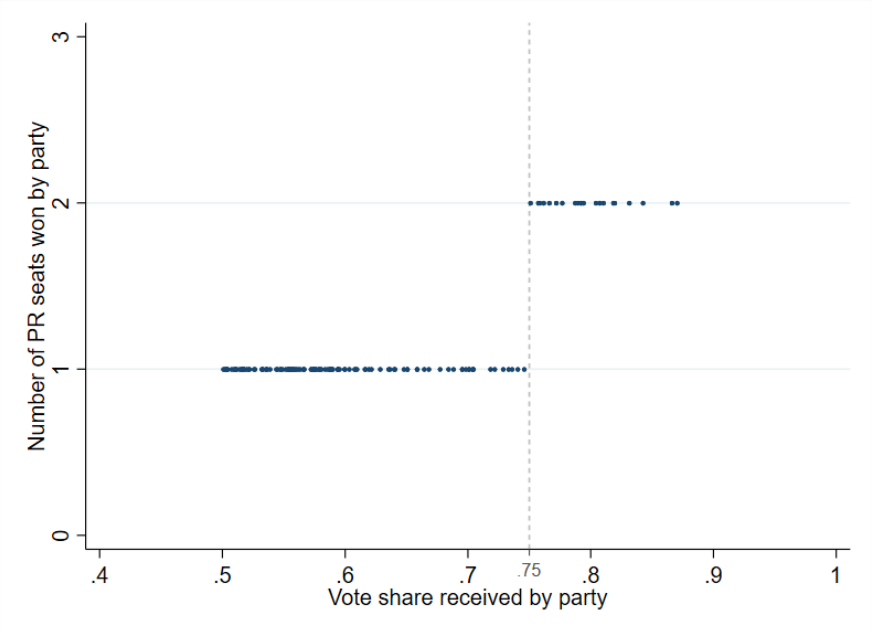
- Rank 2: $\bar{v} = \frac{4V+1}{8}$, $s = 2$
- Rank 3: $\bar{v} = \frac{4V-1}{8}$, $s = 1$

iv) Where the rank-2 and rank-3 parties win a seat each for sure, the contest is over whether the fourth PR seat goes to the rank-1 party or the rank-4 party. Marginal parties: ranks 1 and 4

- Rank 1: $\bar{v} = \frac{4V+1}{8}$, $s = 2$
- Rank 4: $\bar{v} = \frac{4V-1}{8}$, $s = 1$

As an example, take the case of the rank-1 party in a municipality with two PR seats and two qualifying parties. The party's $\bar{v} = 0.75$, according to the computation given above. Indeed, Figure G.2 shows that among such rank-1 parties, those receiving a vote share greater than 0.75 win two PR councilors whereas those receiving a vote share below 0.75 win one PR councilor.

Figure G.2 - Marginal Winners and Losers of The Last PR Seat, Among Rank-1 Parties in Municipalities With Two PR Seats and Two Qualifying Parties



Notes: This figure shows that in municipalities with two PR seats and two qualifying parties, the rank-1 parties must receive a vote share greater or equal to 0.75 in order to win both PR seats. The reason the vote share received is always greater than 0.5 is because these parties are the rank-1 parties. Note that the vote share is the share of votes among qualifying parties only.

G.3. Robustness to the choice of $f(x)$

Table G.1 - Robustness: The Effect Of Marginally Winning a PR Woman In The Previous Election

Main political parties				
$\mathbb{1}$(Number-1 PR candidate in $t-1$ is a ward candidate in t)				
Bandwidth ($\lvert v_{cpt} \rvert$)	0.20	0.15	0.10	0.05
	(1)	(2)	(3)	(4)
Panel A: All parties				
$f(x) = x$	0.44***	0.43***	0.35***	0.42***
	(0.08)	(0.08)	(0.10)	(0.13)
$f(x) = x + x^2$	0.40***	0.41***	0.36***	0.43***
	(0.07)	(0.08)	(0.09)	(0.13)
$f(x) = (x + x^2) \times Treat$	0.39***	0.39***	0.55***	0.75***
	(0.09)	(0.11)	(0.13)	(0.16)
N	414	313	216	114
Panel B: 2nd PR candidate = Man				
$f(x) = x$	0.47***	0.52***	0.40***	0.47***
	(0.08)	(0.09)	(0.11)	(0.16)
$f(x) = x + x^2$	0.44***	0.49***	0.41***	0.47***
	(0.08)	(0.08)	(0.10)	(0.14)
$f(x) = (x + x^2) \times Treat$	0.47***	0.46***	0.58***	0.72***
	(0.10)	(0.12)	(0.15)	(0.20)
N	308	241	165	90
Panel C: 2nd PR candidate = Woman				
$f(x) = x$	0.37*	0.20	0.11	0.03
	(0.20)	(0.20)	(0.24)	(0.35)
$f(x) = x + x^2$	0.23	0.22	0.12	-0.07
	(0.19)	(0.19)	(0.22)	(0.37)
$f(x) = (x + x^2) \times Treat$	0.02	0.12	-0.25	-0.46
	(0.24)	(0.32)	(0.39)	(0.61)
N	106	72	51	24

Notes: This table tests the robustness of the estimated treatment effect using regression equation (10) on the probability that the number-1 PR candidate for the party in cycle $t-1$ is among the party ward candidates in cycle t. Three different specifications are considered for the functional form of $f(v_{cp,t-1})$. The first row reports the coefficient of the $Winner_{t-1}$ dummy assuming $f(x) = x$. The second row assumes $f(x) = (x + x^2)$. The third row assumes $f(x) = (x+x^2) \times Treat$. The results are provided for all parties (Panel A), parties for which the second PR candidate in cycle $t-1$ was a man (Panel B), and parties where the second PR candidate was a woman (Panel C). Each column shows the coefficient of the $Winner_{t-1}$ dummy (equal to 1 if the party won the election of its PR candidate in cycle t 1) considering different margins of victory (bandwidths).The sample includes all election cycles after the introduction of the quota (4,5,6,7) and only the two main parties. The unit of analysis is a party in election cycle t. The standard errors are clustered at the municipality $\times$ party level. Standard errors (in parenthesis) are clustered at municipality level; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.