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ORIGINAL ARTICLE

Women on the ballot and women at the polls: how women's representation shapes voter turnout in local elections

Emanuel Coman[1] and Sarah Shair-Rosenfield[2]

[1]Department of Political Science, Trinity College Dublin, Dublin, Ireland and [2]Department of Politics and International Relations, University of York, York, UK
Corresponding author: Sarah Shair-Rosenfield; Email: sarah.shair-rosenfield@york.ac.uk

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Abstract
We argue that more female candidates on the ballot will decrease the gender participation gap at the polls. We test this hypothesis with data from Italian local elections between 2008 and 2020, taking advantage of a 2012 law requiring at least a third of local council candidates to be women in localities with 5000+ inhabitants. Exploiting the exogenous geographic variation and timing in the implementation of the electoral reform, we evaluate the effect of this exogenously driven variation in women's candidacy on the gendered voting gap. We find a significant and substantively strong causal relationship between the share of women on the ballot and the gendered gap, driven by an increase in women's, but not men's, participation at the polls.

Keyword: causal inference

How (much) does the diversity of the candidate pool influence citizen engagement and voter turnout in elections? Scholarly engagement with the topic has shown mixed support for the role that candidate diversity plays in encouraging political participation, with variation across time and space. For example, Barack Obama's successful presidential bid served as a clear indication of a positive racial affinity effect among Black voters, who turned out in record numbers in 2008 to vote him into office (McKee *et al.*, 2012). Amid a global rise in the success of parties and individuals espousing exclusionary political views and beliefs, it is important to understand potential channels through which greater inclusion of historically marginalized groups can help to reduce gaps in political participation and improve the democratic process.

Recent work examining contemporary and historical reductions in the gendered participation gap highlights the importance of institutions and institutional change. Central to these explanations about the power of institutions is the identification of specific mechanisms that lead individuals to become more politically engaged and motivated to vote. Electoral rules have the power to (re)shape incentives to mobilize women's participation when they lead to a political arena that is more inclusive (Kittilson and Schwindt-Bayer, 2010; Kim, 2019), more competitive (Corder and Wolbrecht, 2016; Skorge, 2023; Teele, 2023), or directly galvanizes participation (Córdova and Rangel, 2017). Yet, less is known about how institutions (re)shape symbolic motivations that can influence women's political participation. For example, the adoption of gender quotas often results in an increase in women's presence on ballots, which may subsequently lead to an immediate and direct effect when a woman possesses evidence of someone who "looks like her" involved in an integral political act such as running for office. Here we turn our attention to an important factor shaping women's political participation: *does the presence of more women on the ballot motivate women to participate more in the electoral process?*

This important question is difficult to address empirically because of the endogenous nature of the relationship between women's presence on and their decision to cast a ballot: electoral districts where women are politically active are likely to have high rates of women both on the ballot and turning up at the polls. To overcome this endogeneity issue, we employ a causal identification strategy centered on an institutional reform rolled out across Italian municipalities. In 2012, Italy adopted a gender quota law requiring one-third of party nominees to municipal council candidate lists to be women. However, the rule only applies to municipalities with a minimum of 5000 inhabitants, thus creating a discontinuity that we use to causally identify the potential effect of women's candidacy rates on the gendered participation gap.[1] We exploit the exogenous geographic variation in the implementation of the electoral reform (above 5000 population), as well as the timing of the reform (after 2012), to instrument the change in the proportion of women on the ballot. We then evaluate the effect of this exogenously driven variation in women's candidacy rates on the gendered participation gap at the polls by comparing municipalities just above and below the population threshold subject to the gender quota. To exploit both the geographic and time variation in the application of the reform, in the first stage of the analysis we implement a difference in discontinuities (DIDisc) design (Grembi *et al.*, 2011).

Our two-stage analysis reveals that the gender quota increases the share of female candidates by 6.5 percentage points, which in turn reduces the representation gap between men and women by 0.5 percentage points. This reduction represents the equivalent of approximately one-third of the average pre-reform gap. Furthermore, we find that this reduction in the voter turnout gap is driven by an increase in women's participation: having more women on the ballot improves women's turnout but has no significant effect on men's turnout. This provides a counterpoint to fears of "backlash" by men when women's candidacy and representation levels increase.

Our main finding supports our theoretical expectation that increasing women's candidacy rates can positively impact women's political engagement and participation, without a commensurate negative effect on men's engagement and participation. This is noteworthy, given recent work showing that women's voter turnout rates continue to lag behind men's in countries such as Germany, Italy, Japan, and South Korea (Stockemer and Sundstrom, 2023). While gender quotas are typically adopted with an eye toward improving women's representation rates, here we identify an additional way that quota adoption may lead to broader societal gender equality: increasing women's voter turnout. By diversifying the candidate pool, gender quotas can impact women's political participation as candidates and elected officials, producing positive spillover effects on the political engagement of women throughout society. This increase in women's participation may also subsequently influence vote results, increasing women's electoral success and further improving diversity and inclusiveness in the democratic process.

1. The voter turnout gender gap in comparative perspective

Because the very nature of the democratic process relies on equal opportunity for political participation of all groups within society, notable gaps in political participation and engagement can herald weaker avenues for representation of specific interests and subsequently contribute to formal descriptive representation gaps. As a result, the so-called "gender gap" in voter turnout across national boundaries and time has been the subject of much scholarly investigation. Earlier work found support for the existence of a gap favoring men's turnout, much of which was predicated on differences between the date of men's and women's suffrage, women's lower political knowledge and perceived inappropriateness to be engaged in politics, structural gender inequality within society, and a general lack of women's rights protections (Verba and Nie, 1972;

[1]Other papers have pursued similar lines of research given the nature of the quota's adoption and data structure at the local level (cf., De Paola *et al.*, 2014; Baltrunaite *et al.*, 2019).

Schlozman *et al.*, 1994; Norris, 2002). More recent studies highlight that the size and significance of the gap is dependent on a number of other factors, including: election type (Kittilson and Schwindt-Bayer, 2012; Beauregard, 2014), level of election (Dassonneville and Kostelka, 2021), geographic region (Carreras and Castañeda-Angarita, 2014; Espinal and Zhao, 2015), and how the gap is reported (Stockemer and Sundstrom, 2023). While the cumulative record tips toward limited support for male–female differences in contemporary turnout rates, the gendered nature of voter turnout remains context specific: a number of countries and regions within countries still display evidence of substantial gaps between men's and women's turnout rates, while in other countries and subnational regions the gap has reversed.

Within the scholarly literature seeking to explain the underlying causes of a potential gap, two sets of factors have emerged: those highlighting individual-level factors and those highlighting institutional factors. Where women are less integrated into the labor force, conservative or traditional norms determine gender roles inside and outside the home, and women's issues and issues of gender equality remain generally less salient compared to other issues such as crime or security, women's participation as voters is lower (Verba *et al.*, 1997; Inglehart and Norris, 2003; Alexander and Coffé, 2018; Bellettini *et al.*, 2023). Conversely, social policy expenditure can disproportionately affect an individual's quality of life—as is the case of single mothers—and countries that provide greater access to early childcare benefits have higher rates of women's voter turnout than countries with more limited expenditures (Shore, 2020). Still other studies showing equal or higher women's turnout have argued that women's motivation to participate in politics stems from distinct attributes, characteristics, or opportunity, such as a greater sense of civic duty (Carreras, 2018) or longer-term socialization effects of women's descriptive representation (Dassonneville and McAllister, 2018). Consequently, these individual traits and motives in voting gender gaps suggest mechanisms through which women's participation reaches or exceeds men's.

In the context of institutions, recent studies have highlighted the importance of district competitiveness in decreasing the gender gap: where shifts in electoral rules lead to higher levels of competition between political parties, women are more likely to be mobilized by those parties and subsequently more likely to turn out (Skorge, 2023; Teele, 2023). Yet, electoral reforms such as Norway's shift from a plurality-based to proportional representation (PR)-based system are rare in the modern world (see, Shair-Rosenfield, 2019). Furthermore, electoral rules and reforms that are not explicitly designed with gendered considerations in mind tend to have a limited relationship to reducing the gendered turnout gap (Kittilson and Schwindt-Bayer, 2012) except when they are applied in a universal and compulsory fashion (Córdova and Rangel, 2017). Even the introduction of affirmative action mechanisms explicitly designed to promote women's inclusion and participation in the political arena have mixed impact on empirical studies (Zetterberg, 2009; Clayton, 2015; Hinojosa *et al.*, 2017). While institutions have long been theorized to shape women's political participation in numerous ways, the empirical record suggests that institutions tend to exert the greatest influence when they can (re)shape incentives or perspectives that subsequently encourage women's participation.

These incentives are also (re)shaped in non-uniform and non-universal ways across the geographic landscape. Recent analyses of gender gaps in both voter turnout (Skorge, 2023; Teele, 2023) and partisan preferences (Corder and Wolbrecht, 2016; Teele, 2024) reveal substantial geographical variation in the degree to which women were motivated to vote and to vote for left-leaning parties. Accounting for how political geography drove historically differentiated effects of institutions, political competition, and electoral salience allowed scholars to more precisely identify the underpinning reasons why women's participation often lagged in rural areas. This in turn helped to explain the empirical finding of the modern political gender gap: women's seeming aggregate propensity to vote for more liberal and progressive parties than men did was fueled by the creation of a rural–urban female vote gap that did not occur amongst male voters.

Here, we turn to a distinct explanation for changes in women's voter turnout that combines aspects of institutional and geographic rationale: the influence of candidate diversity in

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motivating women to turnout to vote. Drawing on a wide literature on role model effects (cf., Atkeson, 2003; Schwindt-Bayer and Mischler, 2005; Campbell and Wolbrecht, 2006), we begin from the standpoint that *symbolic motivations* can influence women's participation by exerting an immediate, personalized, and motivating effect associated with a belief or expectation of belonging, and that it can happen as quickly as within the span of a single electoral cycle. If, as many scholars speculate, the presence of women representatives can serve as a symbolic influence, the same logic should extend to female candidates. Women's lower levels of political participation and engagement often stem from a perception, reinforced through the male-dominated composition of the candidate pool, that politics is men's work and men's domain (Lawless, 2004; Coffé and Bolzendahl, 2011). Ballots full of men's names, and absent women's names, can reinforce the notion that the political arena is one in which women's contributions are not valued or desired. Where ballots have traditionally contained far fewer identifiably female names, either across or in specific parts of the political spectrum, changes in whose names occupy ballot positions may thus exert a positive influence on women's engagement by signaling women's claims to join political spaces. As the ballot for a given locality shifts to greater balance between men's and women's names, women voters in that locality should feel increasingly able and motivated to participate compared to women voters in localities with ballots still dominated by men's names.

The influence of candidate diversity need not be exclusively symbolic: women's increased presence on the ballot may also invoke hopes that women's issues are more likely to be addressed by the broader political establishment. Women and men demonstrate distinct considerations on gender equality beliefs and substantive issues when faced with the opportunity to vote for a candidate of either gender (Dolan, 1998; Campbell and Heath, 2017). Scholarship has shown that increased women's representation is associated with *substantive* policy changes favoring women's issues, such as maternity and childcare leave (Kittilson, 2008) or child health policies (Swiss *et al.*, 2012). As a result, women may view female candidates as an immediate signal of greater potential attention to gender equality and women's issues in the current electoral cycle, either by the candidates themselves or the parties who chose to nominate them. While left-oriented political parties hoping to attract more voters may play into such perceptions by nominating more women candidates, the perception of attention to women's issues is also not exclusive to parties on the left. Centrist and right-oriented parties, fearful of losing ground with female voters and interested in reshaping narratives about what constitutes "women's issues" or preferences, then begin to nominate female candidates at higher rates as well (Matland and Studlar, 1996; Kittilson, 2006).

The sum of these theoretical perspectives leads us to anticipate that greater candidate diversity, specifically an increase in the rate of female candidates on ballots, should result in an increase in interest, efficacy, and turnout among would-be women voters. As a result, we expect that women's turnout will increase in localities where women's presence on the ballot increases. However, since we expect no similar effect on men's turnout as a result of a change in women's presence on the ballot, this leads to our primary hypothesis:

> Having more women on the ballot leads to a decrease in the male–female voter turnout gap, because women turnout to vote at higher rates while men's turnout remains unaffected.

While the relationship between the presence of women on the ballot and at the polls follows logically from both substantive and symbolic arguments, the empirical evidence to date has shown mixed results. In one of the early works in the American context, Atkeson (2003) finds that survey respondents from districts with competitive female candidates exhibit different attitudes toward political participation. However, this finding was not confirmed by Dolan (2006) or Stauffer and Fraga (2022). More recent works employing identification strategies to directly address the endogenous nature of the relationship also find no causal relationship between the gender of candidates and the gender gap in participation in the USA (Broockman, 2014) or Spanish municipalities (Casas-Arce and Saiz, 2011).

Beyond these mixed findings from survey and experimental approaches, recent works investigating historical changes in the gender voting gap have shown the importance of focusing on analysis of actual election outcomes. We follow the methodological examples set by Skorge (2023) and Teele (2023) in their analyses of the Norwegian electoral reform of 1918, where a change in the electoral rules serves as an exogenous treatment through which to understand the effects of the institutional structure on the change in women's voter turnout rates. We also take a similarly geographically disaggregated approach by considering how nation-wide institutional reform, but which disproportionately alters candidate diversity in non-urban areas, may lead to discernible differences in changes to women's motivations and preferences when comparing across municipalities. In particular, we focus on how a specific institutional reform—the adoption of a gender quota that applied only to municipalities with more than 5000 inhabitants—can lead to a diversification of the municipal councilor candidate pool and subsequently influence the municipal-level gender gap in voter turnout.

Here we tackle the causal relationship between the presence of female candidates and the gender gap in voter turnout using data from Italian municipal elections. Previous studies have relied on the Italian case due to the repeated introduction and retraction of gender quotas at the municipal level, also finding inconsistent effects of changes in women's representation on women's participation. De Paola *et al.* (2014) use a gender quota imposed for a brief period in Italian local elections (1993–1995) that only affected the localities that had elections within that brief period. Their difference-in-differences analysis finds that turnout in localities affected by the quota increased by roughly 3 percent for men and 3.7 percent for women. However, the pre- and post-reform observations for the control and treatment groups were taken years apart. Post-reform elections for the treatment group take place between 1993 and 1995; post-reform elections for the control group take place between 1995 and 1999. Thus, one cannot rule out the possibility that the lower turnout in the control group could be a function of participation trends in the population, driven by exogenous factors such as the economy, political scandals, and so on. Such concerns about failure to account for and rule out alternative explanations using these data are reflected in the fact that turnout dropped roughly 3.5 percent between the 1994 and the 1996 national elections, which is very close to the effect reported by De Paola *et al.* (2014) for local elections and attributed to the reform.

Subsequently, Baltrunaite *et al.* (2019) probed the effect of a new gender quota imposed in 2013 at the municipality level and find no effect on turnout in general or on women in particular. Yet, the analysis only uses one post-election year (2013) in which there were few elections (see Figure 1), meaning the analyses are likely underpowered. Applying the algorithm in Calonico *et al.* (2014) to determine the optimal bandwidth, a standard we also follow, the analyses in Baltrunaite *et al.* (2019) have fewer than 50 observations on each side of the threshold, which is far from optimal and difficult to draw statistical or substantive conclusions from in any case. Regardless of specific causal identification strategy employed, from a theoretical perspective it is dangerous to draw conclusions—especially for null findings—from a single year when few elections took place. Moreover, the quota was not the only electoral reform adopted in 2012, which means other political and electoral system factors may have further shaped the 2013 outcomes in ways that are difficult to account for with only a relatively small number of observations.

Bearing in mind both the merits and limitations of these latter works on Italy, we also look at the potential effect of the 2013 gender quota. To address some of the limitations of previous studies, our analysis relies on a significantly larger number of post-treatment observations in elections up until 2020, which should help us overcome any degrees of freedom issues and lend greater confidence to the generalizability of the findings. Additionally, we focus primarily on the direct effect of female candidacies on turnout rather than the effect of the reform, using implementation of the reform as a way to explain differences in female candidate rates in otherwise similar municipalities. As a result, while our work builds on that of De Paola *et al.* (2014)

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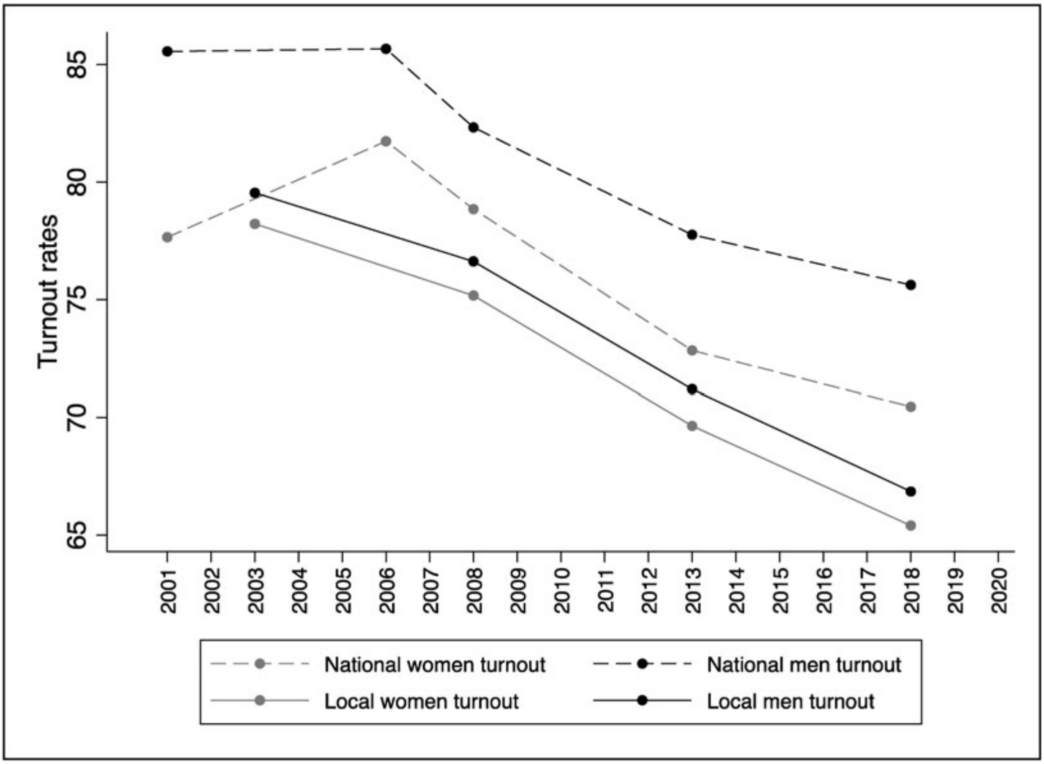

Figure 1. Italian men's and women's turnout rates at national and local levels.

and Baltrunaite *et al.* (2019), it extends beyond what they are able to claim regarding the effect of quota adoption in Italian municipalities.

2. The utility of the Italian case

As shown in Figure 1, the male–female voter turnout gap in Italian local elections is persistent but smaller than the gap at the national level. The solid lines show local election turnout rates and the dashed lines show national election turnout rates, with the gray lines indicating women's turnout and the black lines indicating men's turnout. Since local elections in Italy are scattered, reporting yearly participation values is not appropriate, as the number and geographical distribution of the localities with elections in each year varies significantly. We instead average participation rates across five-year periods, which is the time between elections. For instance, the value associated with year 2003 represents an average of participation in all local elections between 2001 and 2005. Thus, each locality is included in one of the four graphed points. At the national level, the gap is substantial and has actually grown since 2006, where the drop in women's turnout exceeds the drop in men's turnout. At the local level, the average gap aggregated across all municipalities has remained smaller and more consistent, with a similar overall drop when comparing men's and women's turnout over time. As this specific gap is not especially large but stubbornly persistent, the Italian municipalities present a "tougher" but no less important test of our theory, and thus we can be more certain of the effect if we still find a reduction in the gap.

The use of election data from Italian municipalities provides us with a strong identification strategy, as we exploit the gender-imposed quota that only affected localities above a certain population threshold. Additionally, the Italian municipalities provide two extra inferential benefits. First, existing comparative studies focusing on the gendered gap often rely on national election turnout with control variables that account for aspects such as level of economic development, population size, and electoral system attributes. Yet, this observational strategy less precisely pinpoints the influence of changes in women's candidacy rates because of a range of potential unobserved effects stemming from differences across countries' political systems. Studying variance at the subnational (e.g., provincial, municipal, or local) level permits a research design where such country-level aspects are largely controlled for, including where the same general electoral system structure applies, but where variation in a specific electoral rule (e.g., a quota) produces different rates of subnational women's representation. Second, it is important to examine this research question in a place where traditional gender roles are still commonly observed and thus shape the likelihood of women running for office and voting. Examining this particular line of questioning where gender norms are more flexible or malleable means there is less likely to be a gendered turnout gap, and thus less reason to expect changes or reductions due to some exogenously generated intervention.

Since 1993, Italian voters in localities with fewer than 15,000[2] people choose their mayor and local councilors through a unique ballot in which candidates for mayor lead individual lists of council candidates. The mayoral and council candidates are grouped under national or local party banners. The voter casts only one vote per electoral list, although voters may also rank candidates within the list for the local council. The number of candidates on each list cannot be larger than the total number of council seats nor smaller than three quarters of the total number. The list that gains a plurality of votes (the list votes) wins the mayorship as well as two-thirds of the seats in the local council. The rest of the seats are distributed among the remaining lists based on proportional representation. The ranking of candidates constitutes a secondary ballot, since the allocation of seats within each list is done based on votes cast for the candidates within the ranked list.

Due to the direct voter-to-candidate linkages possible in the Italian electoral system, there is greater opportunity for increased women's candidacy rates to influence changes in voter turnout than if voters simply cast ballots for fixed party lists. For example, previous research has shown that systems in which preferential voting determines which candidates win seats have a clear impact on women's electoral success (cf., Kunovich, 2012; Shair-Rosenfield, 2012; Valdini, 2013).[3] This is because electoral systems like the Italian one, in which voters can specifically cast ballots to express a preference for (or against) women candidates, provide the opportunity for symbolic and substantive representation interests to motivate voters. Because voters can choose specific candidates who they perceive to represent particular interests of theirs, the diversity of the candidate pool can motivate voters to participate in order to express their candidate-specific preferences. In systems with closed lists where voter choice does not matter in determining which candidates win seats, there should be less reason for women to participate at higher rates if all parties are required to put more women's names on the ballot. This is because if individual voter preferences do not directly influence candidate selection, then there should be limited effect of a more diverse candidate pool on women's turnout because their votes will not affect whether more female candidates are elected.

In addition to the preferential voting system that allows for symbolic and substantive representation interests to motivate voters from a theoretical standpoint, the use of Italian election results also helps us circumvent the endogeneity issues pertaining to the relationship between women on ballot and women at the polls. In 2012, the Italian government adopted a law (Law 215/2012) meant to increase the representation of women in local politics. The law requires that neither gender can represent more than two-thirds of the names on an electoral list, thus ensuring that at

[2]The rules for localities over 15,000 are slightly different. However, given our focus on localities around 5000 inhabitants, all the localities under analysis here (within the bandwidth) are under 15,000 and so we focus on these rules only.

[3]These studies show mixed outcomes in how preferential voting systems impact women's electoral success, since voters can either express greater support for women OR greater gender bias than the parties that nominate them.

least one-third of the names are women. Lists that do not comply with this requirement are automatically purged of all their male candidates (Baltrunaite *et al.*, 2019).[4] Additionally, under the new law voters can choose up to two candidates on the open list secondary ballot, as long as the two candidates are of different gender. Both of these requirements should result in more women on the ballot. The law however, does not apply to four regions with special autonomy status: Sicily, Valle d'Aosta, Friuli-Venezia Giulia, and Trentino-Alto Adige. Our analyses do not include localities from these regions. Furthermore, the open list element of the secondary ballot reduces the risk of having more women on the ballot placed at the bottom of the list, only to meet the requirements of the new law. Baltrunaite *et al.* (2019) do not find evidence of strategic placement of women in the open list in the aftermath of reform.[5]

Important for our purposes, the law only applies to municipalities of 5000 inhabitants and above, and thus creates a discontinuity that we can exploit to causally assess our main hypothesis. To do this, we compare municipalities just above and below this legal threshold, but which are otherwise highly similar with respect to other socio-economic considerations. The localities above the threshold are subject to the law, and therefore should show higher numbers of female candidacies in the post-reform era; this in turn should lead to a reduction in the gendered participation gap in elections. Limiting our analysis to these localities around the threshold allows us to overcome the endogeneity issues present in a simple observational design and to estimate the causal impact of the increase in women's candidacy rates. This is because any cross-sectional association between high women's candidacy rates and a low gendered participation gap, regardless of the territorial units (localities, regions, countries), might be attributed to characteristics of those units (women's higher education rates, women's labor force participation rates, religiosity of the population, extent of gender-neutral welfare provision) that influence both women's candidacy rates and the gendered participation gap. A causal relationship between the two is therefore difficult to establish and requires a great deal of assumptions that are difficult if not impossible to justify. By looking at localities around the threshold that are similar in most respects, we can assume that they are similar in all those characteristics while their difference in women's candidacy rates is determined almost randomly by their barely passing or barely missing the population threshold. A causal relationship can be established under more feasible assumptions.[6]

We collected municipal election results from all Italian municipalities between 1993 and 2020. The results contain information about vote participation by gender and locality, information needed to construct our dependent variable. Data on the sex distribution of candidates however, have only been collected more recently. For instance, Baltrunaite *et al.* (2019) had to collect their own data on the gender of candidates in a handful of localities only. We were able to obtain information about the sex of the candidates in all localities from the Italian Ministry of Interior and thus created an original dataset on the sex distribution of candidates for the time period 2008–2020.[7] This is the time frame of our analysis.

Municipal elections in Italy are not aligned nationally, with elections in every year covering different numbers of localities as reported in Figure 2. Elections take place every five years, so each locality should be observed at least once before and after the electoral reform. Thus, localities that had elections in 2008 under the old system had their first elections under the new system in 2013; those localities that had elections in 2009 had their first post-reform elections in 2014; and

[4]In Appendix D we assess the degree of compliance to the gender quota, and find that only 0.39 percent of party lists in the post-reform era do not follow the new rules. Furthermore, we find that compliance is higher in later post-reform elections, and that by the third election all party lists comply.

[5]Baltrunaite *et al.* (2019) find that in the first year after reform (2013) the norm was to list candidates in the alphabetical order.

[6]In Section 4.1 we provide a series of tests that justify our approach.

[7]We would like to give special thanks to Simona Mazzara at the Italian Ministry of Interior who kindly provided us the data on candidate gender.

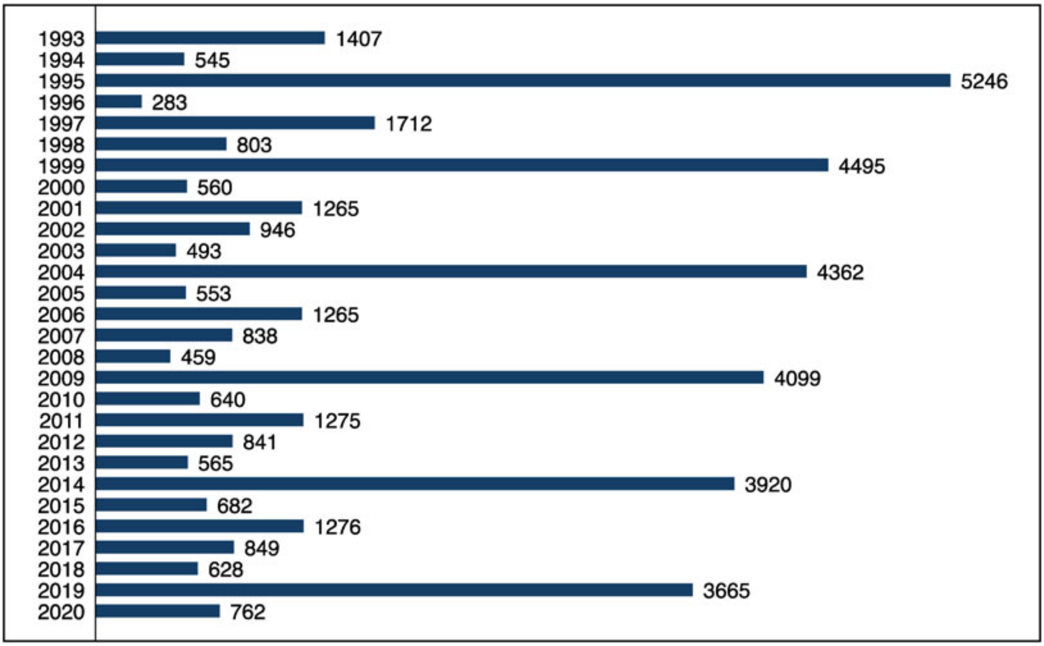

Figure 2. Number of Italian local elections per year (1993–2020).

so on. Between 2008 and 2012 (including) almost all localities had elections under the old pre-quota system.[8]

3. Data and methods

We take an instrumental variable approach to estimation in which we exploit the exogenous geographic variation in the implementation of the electoral reform (above 5000 population), as well as the timing of the reform (after 2012) as an instrument for change in the proportion of women on the ballot; we then evaluate the effect of this exogenous change in the proportion of women on the ballot on the proportion of women at the polls.

Our main analysis takes the form of a two-stage analysis: (1) in the first stage we estimate the effect of the gender quota on women's presence on the ballot; and (2) in the second stage we estimate the effect of women's presence on the ballot on the gendered participation gap. To take advantage of both the geographic (above 5000) and time (after 2012) variation in the application of the new law in the first stage of the analysis we implement a DIDisc design (Grembi *et al.*, 2011). In substantive terms, in the first stage of estimation we look at the difference in women's presence on ballot between localities just above and just below the threshold before the reform and subtract it from the equivalent difference after the reform. In the second stage we use the values estimated in the first stage (women's presence on ballot) to predict the participation gap (Figure 3).

The use of a DIDisc with before and after reform results, as opposed to a simple regresion discontinuity design (RDD) with post-reform data, helps us circumvent some of the threats to

[8]There are some localities in our dataset that have only pre-reform or post-reform observations, as evidenced in Table A4 of the Appendix. These rare occurrences are consequences of old localities disappearing and new ones being born over the long time period under analysis. Also, there are localities that have elections before the end of the 5 year term. These early elections are determined by multiple resignations of councilors.

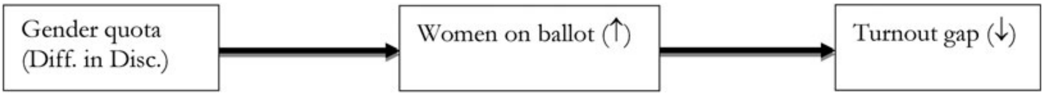

Figure 3. Schematic representation of the two-stage analysis.

the exclusion restriction, a necessary condition for a valid instrumental variable design. These threats come from additional policies implemented above the 5000-population threshold. Based on the existing literature (Andreoli *et al.*, 2021) there are two such policies with various lengths of implementation between 2008 and 2020 (our time frame). First, the salaries of mayors jump in localities over 5000 for the entire period between 2008 and 2020. Second, between 1999 and 2013, the Italian "Domestic Stability Pact" (DSP) imposed fiscal discipline in all localities above 5000 inhabitants. Starting with 2013 the implementation threshold was lowered to 1000 inhabitants.

While we have no theoretical reasons to believe that these confounding factors should directly influence women's turnout, their presence could in theory bias the results of a simple post-reform RDD if the treatment status (above 5000) influences the dependent variable (gendered turnout gap) directly rather than through the intervening variable (women on the ballot). Because of these multiple rules created around the 5000 threshold, the exclusion restriction may not hold.

Our DIDisc approach can resolve this issue under the assumption that the combined effect of the confounding policies (mayoral salary and DSP), holding fixed the electoral reform, is time invariant (Marattin *et al.*, 2021: 13). In difference-in-differences language, the localities just above and below the threshold would have been on parallel trends (regarding women's presence at the polls) between 2008 and 2020 if the electoral reform had not been implemented. Thus, the necessary condition for unbiased estimates in the first stage is that the other policy rules associated with the 5000-population threshold remain constant across the period under investigation. As seen in Figure 4, this is the case for mayoral salary, meaning the DIDisc can insulate the effect of the electoral reform on ballot configuration from that of mayoral salary. If the estimated values for women on the ballot used in the second stage are not influenced by this confounding factor (mayoral salary), the exclusion restriction is not violated. Unfortunately, the same does not hold for the DSP, as the change in the rules of applicability roughly coincides with the implementation of the new electoral law.

One solution to this problem would be to restrict our sample to a period of time (including both before and after the reform years) where all confounding policies associated with the 5000-population threshold remain constant (see Marattin *et al.*, 2021). Unfortunately, as seen in Figure 4, such a period does not exist. Therefore, to address the potential confounding nature

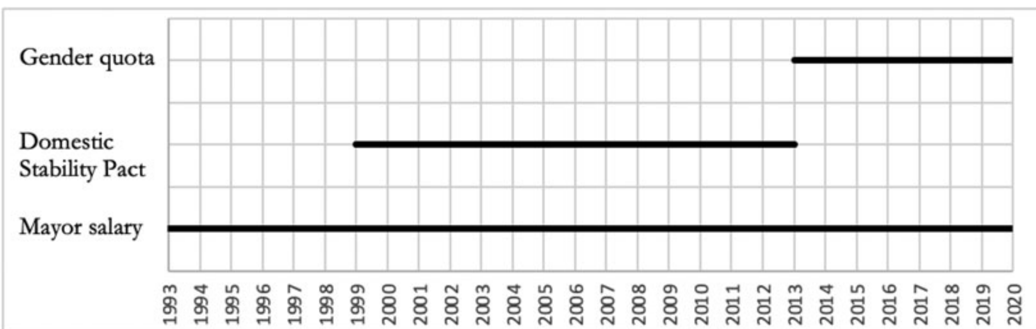

Figure 4. Application of policy rules around the 5000-population threshold (1993–2020).
Note: The three lines represent the period of uninterrupted application of the three policies with application in localities above 5000.

Table 1. Regression discontinuity (RD) estimates of the effect of domestic stability pact implementation on the gendered turnout gap—population threshold 1000

Bandwidth	Beta	SE	p-value	Effective *N* Left of threshold	Effective *N* Right of threshold
100	−0.149	0.682	0.827	264	312
200	−0.147	0.445	0.741	601	597
300	−0.093	0.349	0.789	909	905
400	−0.104	0.298	0.727	1248	1146
500	−0.170	0.263	0.518	1657	1421

Note: Continuity-based analyses around the 1000-population threshold with triangular kernel functions (Cattaneo *et al*., 2019); results obtained with the rdrobust command in Stata (Calonico *et al*., 2017).

of the DSP, we take advantage of the fact that the DSP continues after 2013, only the population threshold for its application shifts from 5000 to 1000 inhabitants. As such, if there is a confounding direct effect of DSP on the gendered turnout gap, this effect should be captured in the post-2013 era in an RDD analysis with 1000 as population threshold. In Table 1 we report the results of such RDD analyses with various bandwidths; we find no evidence of a discontinuity in women's turnout at the 1000-population threshold in the 2013–2020 period.

4. Analyses and results

4.1 Design validation: the density of the running variable and balance

We first report the results of two important tests for design validation: density of running variable and balance. An important issue facing RDD analyses in which researchers use population thresholds is sorting around the threshold (Eggers *et al*., 2018). Simply put, when the population of a locality changes between censuses enough to move the locality either below or above the threshold, authorities may be inclined to misreport these changes so that the rules at stake not change. Such manipulation would pose a serious threat to the as-random assumption, and implicitly to the validity of our estimates. To assess whether this is the case, we implement a test of the null hypothesis that the density of the running variable is continuous at the threshold (Cattaneo *et al*., 2018; 2020). Intuitively, if authorities intentionally misreport the true size of the population to keep them just above or just below the threshold, one should see a surprising change in the distribution of population around the threshold. Our data on the municipal populations comes from the 2001 and 2011 population censuses, published by the Italian Ministry of Interior; these are the two censuses used to determine the official population of all localities in all elections between 2008 and 2020. Based on the tests reported in Table 2, we find no evidence

Table 2. Nonparametric density estimates on either side of population threshold

	Sample		
	2001	2011	2001 and 2011
t-Statistic	−0.207	−1.127	−1.197
p > *t*	0.836	0.260	0.232
N			
Left of threshold	5836	5702	11,538
Right of threshold	2265	2390	4655
Effective *N*[a]			
Left of threshold	623	686	1063
Right of threshold	424	436	738

[a]The number of observations is given by a data-driven optimal bandwidth that minimizes the mean square error (Calonico *et al*., 2014); results obtained using the rddensity command in Stata (Cattaneo *et al*., 2018; 2020).

Table 3. Balance tests for localities just above and below the 5000 threshold

	Men and women	Women
Population gender distribution (ratio of men-to-women)	0.028 (0.308)	
Population distribution		
Under 25	0.333 (0.931)	0.393 (1.109)
25 to 44	−0.106 (−0.412)	−0.058 (−0.215)
45 to 64	−0.232 (−1.124)	−0.124 (−0.634)
Over 64	−0.047 (−0.118)	−0.288 (−0.655)
University degree	0.112 (0.569)	0.097 (0.441)
Unemployment rate	0.704 (1.600)	0.800 (1.473)
Percent of women on lists before the reform (2008–2012)		−1.381 (−1.258)

Note: The analyses test whether localities that barely pass the 5000-population threshold and localities that barely fail to pass it are significantly different with regards to a series of characteristics; *z*-statistics in parentheses; continuity-based results with data-driven bandwidth using the algorithm proposed in Calonico *et al.* (2014).

of manipulation at the threshold for either of the two censuses used in the analyses. We can thus conclude that the internal validity of our design is not threatened by population manipulation around the threshold.

A key assumption of an RD design is that observations narrowly below and above the treatment threshold are similar on relevant pre-treatment characteristics. To test this assumption we look at four locality-level variables as reported in the official 2001 and 2011 censuses: gender distribution, age distribution, unemployment levels, and tertiary education. For the last three variables we report results for the entire population (men and women) as well as for the female population. This information comes from the official census data. Additionally, we look at women's candidacy rates in the pre-reform period (2008–2012) and whether they are significantly different for localities that are right above and right below the 5000-population threshold. The estimates in Table 3 are intent-to-treat analyses using a continuity-based RD specification. Each covariate is plugged in separately as the dependent variable. These continuity-based results show no evidence of a jump at the treatment threshold for any of these locality-level variables.

4.2 The two-stage instrumental variable model

To estimate the causal effect of having female candidates on women's turnout we implement a two-stage ordinary least-squares (OLS) model. In the first stage of our analysis we take a DIDisc approach for estimation. Following Marattin *et al.* (2021), we implement the DIDisc estimator (Grembi *et al.*, 2011) used in our first-stage analysis in three steps. Following the advice in Marattin *et al.* (2021) we first create a more homogenous sample of localities by keeping only localities between 1000 and 10,000 inhabitants. Second, we select a data-driven optimal bandwidth as prescribed in Calonico *et al.* (2014). Third, we restrict our sample to the localities in the bandwidth and run a local linear regression of the following form:

$$\widehat{FC_{it}} = \beta_0 + \beta_1 P_{it} + T_{it}(\beta_3 + \beta_4 P_{it}) + R_t[\beta_5 + \beta_6 P_{it} + T_{it}(\beta_7 + \beta_8 P_{it})] + \varepsilon_{it} \qquad (.)$$

where, i indexes localities and t indexes election years; T_i is the treatment status (over 5000); R_t is a dummy that takes values of "1" after the 2012 reform; and P_{it} is the normalized population.[9] The standard errors are clustered by locality. The parameter β_7 identifies the after-treatment effect of electoral reform on female candidacies. The dependent variable FC_{it} captures the percent of female candidates out of all candidates for local council in locality i at time t.

[9]The precise population data used before each election in each locality come from the official election site of the Italian Ministry of Interior (elezioni.interno.gov.it).

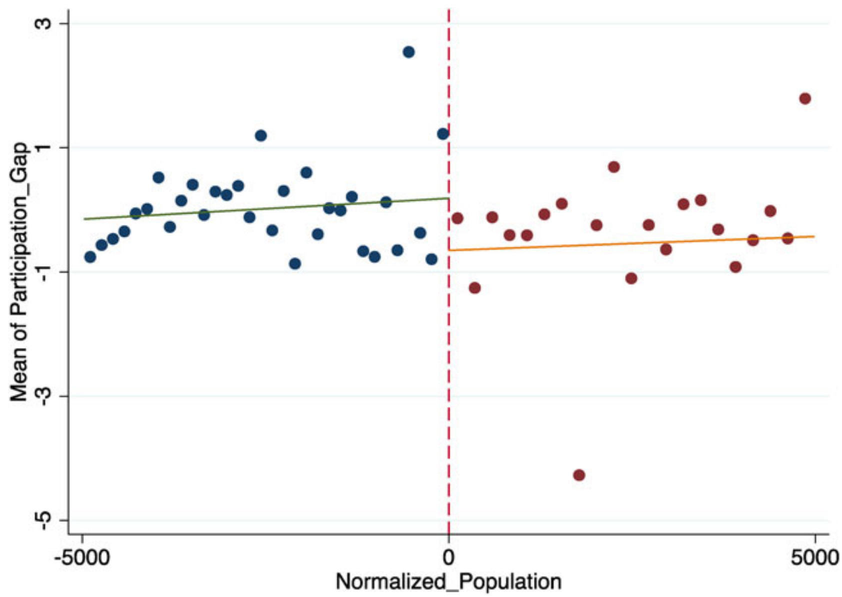

Figure 5. Relationship of population, treatment status, and gender gap in turnout (differences post- and pre-reform). *Note*: The lines are OLS estimates; scatter plots are averaged over intervals of four inhabitants.

In the second stage we estimate the effect of the percent of female candidates (from first stage) on the difference in turnout rates between men and women:

$$Gender\_gap_{it} = \beta_0 + \beta_1 \times \widehat{FC}_{it} + u_{it} \qquad (.)$$

Before reporting the results of our two-stage OLS analyses, in Figure 5 we graph the differences between pre- and post-reform levels of the gendered participation gap (male-female) against normalized population size. The pre- and post-reform differences have been averaged across population bins of 4 individuals. The graph in figure 5 suggests prima facie that the reform is associated with a decrease in the gendered participation gap, as predicted by our theory. In Table 4 we report the results of two-stage IV tests for the relationships between the reform and the percent of women candidates (first stage), and between the percent of women candidates and the male-female turnout gap (second stage). The first stage analysis estimates that the electoral reform increases the share of women on the ballot by roughly 6.5 percentage points. The second stage analysis estimates the effect of the exogenously-induced variance in the proportion of women on the ballot on the gendered turnout gap. We find a statistically significant positive relationship between the two. In substantive terms the local effect seems small, but it is important to note that this represents the effect of a one percent change in female candidates on the gendered turnout gap, while the average turnout gap before the electoral reform was 1.47 in the localities included in the sample. As such, a hypothetical 20% change in women's candidacy rates reduces the turnout gap by 0.5, roughly a third of the average pre-reform gap. For a country in which persistent local gender turnout gaps were not large to begin with, this represents a clear and significant reduction.

4.3 Is the effect on women's turnout, men's turnout, or both?

Our main analysis confirms the hypothesized effect of women's candidacies on the gendered turnout gap, but it does not tell us whether this effect is driven by changes in women's turnout,

Table 4. Effect of women's candidacy rates on the gendered turnout gap

	First-stage analysis			
The effect of electoral reform on the percent of female candidates	Beta 6.469	SE 1.312	p-value 0.000	*N*[a] 2619
	Second-stage analysis			
The effect of instrumented percent of female candidates on turnout gap	Beta −0.025	SE 0.005	p-value 0.000	*N*[a] 2619

[a]The number of observations reflects the sample within the 1290 bandwidth that has been selected using the algorithm proposed in Calonico *et al.* (2014).

Table 5. Effect of women's candidacy rates on women's men's turnout rates (second-stage analysis results)

	Women's turnout			
The effect of instrumented percent of female candidates on turnout	Beta 0.046	SE 0.018	p-value 0.010	*N*[a] 2618
	Men's turnout			
The effect of instrumented percent of female candidates on turnout	Beta 0.001	SE 0.018	p-value 0.936	*N*[a] 2618

[a]The number of observations reflects the sample within the 1290 bandwidth that has been selected using the algorithm proposed in Calonico *et al.* (2014).

men's turnout, or both. To further tease out the effect, in this section we re-run the main analysis in Section 3, with two different dependent variables: (1) the difference between the women's turnout rate in each locality/election and the average yearly women's turnout rates; and (2) the difference between men's turnout rate in each locality/election and the average yearly men's turnout rates. We look at deviations from average yearly turnout rates to account for time trends in turnout, which have been shown to be very important (Franklin, 2004).[10]

The results from the second-stage analyses reported in Table 5 confirm the positive effect of increased women's candidacies on women's turnout.[11] A one point increase in the percentage of women candidates on the ballot increases the deviation from average turnout rates by roughly 0.05. The similar effect on turnout by men is very small, and indistinguishable from 0 based on widely accepted criteria of statistical significance. We can thus say that the effect on turnout gap is driven primarily by increased turnout rates by women.

5. Ancillary analyses and robustness tests

We further tease out the mechanisms connecting women candidacies to gender gap in turnout with two additional tests, as reported in Appendix F. First, we test whether the effect on the gendered turnout gap is higher in localities where the increase in women's candidacy rates comes primarily from party lists perceived as more capable of influencing the post-election policy agenda. This expectation follows from the instrumental motivations for higher female turnout rates, as party lists expected to win a plurality of votes are also expected to influence policy (see Appendix F). The results of the analysis are, however, inconclusive. Second, we test whether the main effect grows stronger with the passage of time and we compare the effect in the first post-reform election with the effect in the second (or third) election. The results suggest a

[10]Accounting for turnout trends is important especially for our time period that includes the economic turmoil caused by the financial crisis of the late 2000s. Trends should not be problematic in our gap analysis, as both men and women should be affected to the same extents.

[11]The results of the first-stage analysis are identical to those reported in Table 4.

growing effect in later elections, but the results should be taken with a grain of salt, as the difference is not substantially large and the confidence intervals of the two effects overlap considerably (see Appendix F). Future tests with more post-reform elections could deliver more definitive results.

We also conduct a series of robustness tests that overall confirm and strengthen our main findings. The results of these tests are reported in the Appendix. First, we run a series of placebo tests to see whether the effect in the first stage of our analysis is indeed due to the electoral reform or a statistical fluke (Appendix A). In these tests we artificially change the population threshold using population values between 4000 and 6000 in increments of 100, and thus run placebo tests with thresholds of 5100, 4900, 5200, 4800, and so on. None of these tests is statistically significant. Second, we re-run the main analyses with various bandwidths between 1000 and 3000 in increments of 200 (our data-driven bandwidth is 2280.490). Third, we conduct a so-called "donut hole" robustness check, in which we narrow the bandwidth by removing observations close to the threshold. The results of these two sets of tests are statistically significant and not too different in magnitude from the results with the data-driven bandwidth (see Appendices B and C). Fourth, we re-run the main analysis with a reduced sample of localities between 3000 and 7000. The test is meant to account for the fact that a law from 2014 requires that the executive arm of the local council be composed of 40 percent women. The results with the reduced sample are very similar to our main results (see Appendix H).

6. Discussion

While previous work on gender affinity voting has addressed the theoretical premise under which a candidate's gender influences the vote preferences of individuals who share that gender identity, we instead address the question of whether a candidate's gender influences the political participation of individuals who share that gender identity. Making use of a 2012 gender quota adoption in Italian municipalities larger than 5000 inhabitants, our analysis aims to offer a better explanation of the relationship between women's presence on ballots and women's participation at the polls. We find that higher female presence on the ballot decreases gendered turnout bias by a substantively modest but still significant amount, even in a case where the gendered gap in voter turnout was not extremely large prior to the reform's effect on women's candidacy rates. Furthermore, our ancillary analyses suggest that this result is driven by an increase in women's turnout, while higher female presence on the ballot seems to have no effect on men's turnout rates.

This suggests a further positive influence of quotas and other affirmative action mechanisms that are designed to promote women's inclusion in electoral politics. While such affirmative action policies are intended to reshape the descriptive representation of political actors who stand for elected office, our finding points to another downstream consequence of the increase in women's presence on ballots: promoting women's political participation more generally. This is important because it complements and extends the already-theorized advantage of affirmative action mechanisms in expanding the diversity of the candidate pool to also expand the diversity of the voter pool. If quotas improve the rate at which women run, an extension of that argument is that our findings suggest quotas will also improve the rate at which women vote.

Our analyses unfortunately cannot distinguish among the potential mechanisms driving our finding. While our ancillary analyses suggest that the gendered gap decreases because of higher women's turnout and not men's, this finding in itself is not enough to adjudicate between mechanisms, as both symbolic and substantive considerations could lead to this result, as discussed in our theory section. Future work employing experimental methods could help to ascertain whether and to what extent symbolic and instrumental motivations prompt women to decide to vote when the rate of female candidacy increases. Furthermore, such an approach could enable closer attention to the contexts when and how these motivations interact, by allowing subjects to express both symbolic and instrumental motives for a gendered voter turnout effect.

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