Women at work:
Gender quotas, municipal elections and local spending*

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September 2021

Abstract

Gender quotas should foster women's presence in politics, which in turn may affect local policymaking. This paper investigates this mechanism, considering indicators of municipality spending in Italy as relevant policy outcomes. For identification, we rely on the time and geographic variation in the introduction of a gender quota reform by Law 215/2012. The reform affected gender composition of candidates in Italian municipal council elections, resulting in an increase of the share of female councilors of about 13.9 percentage points. Using the reform as an instrument, we estimate that a one percentage point increase in female participation in councils rises expenditure for local security by about 1% and reduces administration costs by a comparable amount, whereas evidence on the impact on other local expenditure items is mixed and not significant. Estimated effects are associated with compositional changes in terms of employment status of female councilors and are robust to endogeneity issues, to relevant sample selections and to the implications of confounding policies.

JEL classification: D72, J16.
Keywords: Gender bias, municipal budget, local policy, municipal council, Italy, Law 215/2012.

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* We are grateful to Vardan Baghdasaryan, Alessandra Casarico, Michela Cella, Francesco Scervini and two anonymous reviewers for useful comments and to Andrea Bonfatti and Nicola Tommasi for helping with data management. The usual disclaimer applies. This work was supported by the Luxembourg Fonds National de la Recherche [IMCHILD grant INTER/NORFACE/16/11333934 and PREFER-ME CORE grant C17/SC/11715898], the University of Verona [Ricerca di Base grants MOBILIFE-2017-RBVR17KFHX and PREOPP-2019-RBVR19FSFA], and by MIUR [PRIN 2017K8ANN4: "New approaches to Political Economy: from methods to data"]. Replication code and data are made available as a web appendix on the authors webpages.

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1. Introduction

Gender inequality in politics is a well-documented phenomenon around the globe. The average share of women across parliaments worldwide is approximately 24.5%, and it is far below 50% in the majority of parliaments (Inter-Parliamentary Union Data 2019). Similar figures are observed across Europe (28.5% on average), where gender balance is virtually reached only on a limited group of countries (e.g., France 49%, Sweden 48.2%, Spain 45.4%) (CEPR Report Women in Politics 2019).

Female under-representation in political bodies is a relevant issue for at least two reasons. First, it portrays a clear violation of *descriptive representation* of relevant population types (i.e., female citizens) in public institutions involved in policymaking. Second, an issue of *substantive representation* also arises if gender composition of political bodies influences policy implementation and public spending. There is, in fact, evidence that female politicians implement, more often than their male counterparts, policies in those areas of intervention that are traditionally seen as being women' issues, such as childcare, health, environment and social services and, when they do it, they resort to larger budgets (Clots-Figueras 2011; Funk and Gathmann 2015). Moreover, the presence of more female politicians may prove beneficial to women's issues such as childcare investments even when women are not pivotal in the decisions, as they may acknowledge those issues more often in the pre-policy debate (Hessami and Baskaran 2019).

Women's presence affects policies and economic outcomes at every level of government. Chattopadhyay and Duflo (2004) show that Indian villages where the head of council is a woman invest more in those public goods which are more relevant for local females. Clots-Figueras (2011, 2012) shows that the presence of female legislators in India has a positive effect on expenditure on health and early education, as well as on the adoption of redistributive policies. Brollo and Troiano (2016) analyze the case of Brazilian municipalities and show that female mayors engage less in corruption. Svaleryd (2009) shows that the gender composition of municipal councils in Sweden influences the patterns of local spending, whereas Ferreira and Gyourko (2014) do not find any effect of female mayors on policy in U.S. cities. Contributions close to our work investigate the effect of increasing the share of female mayors and female councilors in Spanish municipalities, with ambiguous results. Some papers find that the gender of the mayor and the gender composition of the council influence municipal expenditure (Cabaleiro and Buch 2018, 2020; Hernández-Nicolás et al. 2018), while others do not find evidence that an increase in female representation affects the composition of municipal spending (Campa and Bagues 2021), nor that female mayors are more likely to implement gender sensitive policies (Gago and Carozzi 2021).

In this paper, we investigate and quantify the extent to which municipality-level policies are affected by the gender composition of elected municipal bodies in Italy. We use official municipality spending records, aggregated into spending indicators, to measure the budgetary size of relevant policies. Focusing on municipal governments is interesting for at least two reasons. First, at the municipal level there is a closer relation between citizens and elected politicians, which implies that prejudices should have a lower bite on elections and that elected women should help the electorate familiarize with the presence of female politicians. Second, political experience at the municipal level may be a first step toward a political career at the national level.

Estimates of the effect of improving gender balance in municipal councils on local spending may be contaminated by the presence of unobservable confounders (such as voters' preferences, selection of candidates along unobservable traits, strategic interactions among candidates and parties and time-varying local heterogeneity) as well as measurement errors in observed expenditure data. To overcome these difficulties, we rely on the quasi-experimental nature of the change in institutional setting forced by Law 215/2012, which reformed elections of Italian municipal councils by introducing a gender quota on candidates. The reform introduced both a candidate gender quota and the possibility of expressing a double preference when voting, if the preferences expressed by the voter are for candidates of different gender. These specific features of the law were enforced exclusively in municipalities of size larger than 5,000 residents, thus identifying a control and a treatment group of municipalities according to their size. Our empirical strategy exploits exogeneity in the geographic variability of implementation of the gender quota reform (by municipality size) and the timing of introduction of the reform (affecting only municipal elections taking place after 2012). For identification, we rely on the exogenous changes of female representatives in councils that are attributable to the introduction of the gender quota reform and explore the consequences of such changes on aggregate and disaggregate municipality spending.

In the first stage of our estimation, we look at the effect of quotas on the gender composition of councils. We find that the reform increased the percentage of women in municipality councils by 13.89 percentage points in our preferred specification. This figure is stable across specifications of the estimating model, and robust with respect to the selection of the sample. The increase in the share of female councilors has produced compositional changes among the group of elected female councilors. The gender quota reform reduces the share of employed female councilors but rises the share of students, unemployed and self-employed women, thus reducing the average age of female councilors. We do not detect effects in terms of education.

In the second stage of the empirical analysis, we investigate the effects of the gender quota on local spending. We find robust evidence that the introduction of the quota increases municipality spending in public security services of about 15% in treated municipalities (as opposed to expenditure in the absence of the reform) whereas it reduces administration spending by a comparable amount. Our identification strategy does not allow to disentangle whether the effects on spending are driven by changes in the (unobservable) traits of the council members that are strictly related to their gender, or rather by changes in the composition (along observable and unobservable traits) of the council elected under the quota. We can hence interpret the reduced form estimates as evidence that rising the chances of female candidates to be elected as councilors (through the introduction of a gender quota) affects local spending.

Using an instrumental variable strategy, we find that a 1 percentage point increase in the share of elected female councilors induced by the gender quota reform rises expenditure in security services by 1% and reduces administration costs by a comparable amount. We show that such estimates are robust to endogeneity issues, to relevant sample selections and to potential confounding policies. Impacts on other expenditure items are either insignificant (for education and social services expenditures) or not robust across specifications (for urban management and productive services expenditures).

Our findings contribute both to the international literature investigating the consequences of the presence of females in elected bodies on local policymaking, as well as to the literature focusing on the effect of gender quotas on the Italian constituencies. Gender quotas in municipal elections in Italy were first enforced in 1993, when it was introduced the requirement of a minimum proportion of candidates of each gender in the ballot. This aspect of the 1993 electoral reform was then abrogated by the Constitutional Court in 1995, so that gender quotas were in place exclusively for three subsequent years. Most of the papers on gender quotas in Italy consider the 1993 reform, focusing on the impact of female politicians on public spending (Rigon and Tanzi 2012), on the ability to complete the electoral mandate (Gagliarducci and Paserman 2016), on the efficiency of politicians (Baltrunaite et. al. 2014) and on electoral turnout (De Benedetto et. al. 2014). The gender quota reform has been shown to carry long-term effects of gender composition in municipality councils (De Paola et al. 2010).

The closest contribution to our paper is Braga and Scervini (2017), which exploits the 1993 gender quota reform to identify the effect of rising the share of female councilors on the efficacy of local policies targeted to women and children (proxied by fertility rate) and the efficiency of the municipal administration (proxied by the size of the municipal executive). We extend Braga and Scervini (2017) in two directions: first, by evaluating the consequences of the latest available gender quota reform in Italy, introduced in 2012; second, by using spending items drawn from municipal balance sheets data as monetary outcomes related to relevant local policymaking.

Baltrunaite et. al. (2019) use a regression discontinuity design to investigate whether the 2012 reform did increase the share of female councilors, and whether this is driven by the presence of quotas or by the presence of the double preferences system. Their results support the interpretation that the 18% increase in female councilors induced by the reform is mostly driven by an increase in the preference votes received by female candidates.[1] Our identification strategy differs from theirs (and hence provides an additional validation for their results) insofar it exploits geographic variability across time in the adoption of the reform within a difference-in-differences framework.

The rest of the manuscript is structured as follows. Section 2 introduces the institutional characteristics of Italian municipal elections and of the reform (2.1) and the types of municipal expenditure we consider (2.2). Section 3 describes the data (3.1) and the identification strategy (3.2). Section 4 presents the results, and Section 5 concludes.

[1] Baltrunaite et. al. (2019) exploit a discontinuity in the electoral rule assignment, varying as a function of the municipality size being above or below 5,000 residents, and estimating variations in the elected fraction of women at the discontinuity. Our identification strategy relies instead on differences in variation of budget outcomes in the pre to post treatment period (year 2013) across control and treatment municipalities. Controlling for variations across the threshold in a control group allows to account for unobservable drivers of local expenditure related to demographic size of the municipality.

2. Gender quotas in the Italian municipal electoral system: Reforms and hypotheses

This paper focuses on Italian municipalities, whose functions and competences are defined by ordinary national and regional laws (Braga and Scervini, 2017). The jurisdiction of municipalities covers different policy areas, most of which concern the provision of local services, such as urban planning, economic development, waste collection, and childcare services. Municipalities are endowed with an annual financial budget that is managed within the limits fixed by the Constitution. Although local autonomy has increased in the last decades, municipalities are still subject to some important constraints; among others, municipalities can voluntarily choose neither the tax base nor the tax rate of local taxation system.

Municipal administration is composed by three main bodies: the mayor, the municipal council and the municipal executive board. The head of the municipality, who is responsible of all its administrative and financial functions, is the mayor (*sindaco*), who is democratically elected and remains in power for a period of five years. The mayor shares the executive power of the municipality with the municipal executive board (*giunta comunale*), a collegial body composed of a variable number of members (*assessori comunali*) appointed by himself/herself. The municipal council (*consiglio comunale*) is the elected body representing all the political forces of the territory. Among its functions, the municipal council approves the budget, the decisions and the decrees concerning municipal policies. This body remains in charge for five years and it also has the power to end the term of office of the mayor's mandate at any time. The size of the municipal council is established by the national law and varies depending on size of the municipal area.

2.1 Electoral rules for Italian municipal councils and the 2012 reform

Electoral rules in Italy change according to the size of the municipality. Due to the specificities of our identification structure, in the paper we mainly focus on municipalities with less than 15,000 residents. In these municipalities, the mayor is elected with a majoritarian system. Each candidate is supported by one list only, the candidate with the relative majority of votes is elected, and his/her list gets 2/3 of the council seats. The remaining seats are assigned in a proportional way to the other lists.

Our interest is on the gender quota reform introduced by Law n. 215/2012. This law introduces measures to increase female presence on municipal offices. Importantly, these measures apply only to municipalities with more than 5,000 residents. The law intervenes in a twofold manner in the electoral process. First, it establishes that neither gender can be represented by more than 2/3 of the total number of candidates on party lists. Non-compliance is punished by removing the names of candidates of the most represented gender, typically males, exceeding 2/3 of the total. Second, this law introduces double preference voting conditioned on gender: each voter is given the option of expressing his/her preference to two candidates, instead of only one, provided that they are of different genders. If the two names indicate candidates of the same gender, non-compliance is punished with the elimination of the second name.

We explore the extent to which the introduction of the gender quota reforms affects municipality spending by rising the share of seats in councils attributed to female candidates, thus expanding opportunities for women to be represented in policymaking at the local level.

2.2 Gendered policy preferences and municipal spending

This paper investigates whether an increase in the share of female councilors affects the policy implementation process at municipality level. As an objective indicator of local policies, we consider information on local spending, collected from municipal current accounts (*bilanci consuntivi*), which provides the cleanest measure of short-term consequences of local policymaking. We classify current municipal spending in six categories: *education* (spending in child-care, preschool services, local spending related to primary and secondary education, school meals and educational programs), *security* (local and municipal police services and programs supporting the administration of the territory), *administration* (spending for local administration services), *urban management* (including urban planning, management of green areas and urban cleaning services, management of municipal public housing), *social services* (social assistance, local welfare and spending on socialization events in domains such as culture, sport and tourism), and *productive services* (including road lights, waste disposal, public waters management, and spending towards local development initiatives).[2] Each category includes information on personnel costs, infrastructure use and financing and additional costs which are instrumental to the provision of the corresponding services.

Among the policy indicators that we consider, spending in social services is traditionally seen as the most correlated with the female composition of the municipality council. Some contributions find evidence that female councilors (as opposed to male counterparts) lean toward polices that benefit women or children, and towards expanding access to social welfare (Chattopadhyay and Duflo 2004; Clots-Figueras 2011; Funk and Gathmann 2015; Svaleryd 2009), whereas other contributions do not detect significant correlations in these dimensions (see for example Ferreira and Gyourko 2014; Cabaleiro and Buch 2020). Therefore, we may expect social expenditure to increase, if it changes, with the share of female councilors. It has to be noted, however, that policies that benefit women and children at a local level may enter different spending categories than social services. There is growing evidence that an increase in the female presence at a local level translates in increasing non-social spending driven by expenditure for productive services, such as street cleaning (Cabaleiro and Buch 2020) or street lightning, as well as increasing spending in services related to local security, which in our categorization are included in the security item (Hernández-Nicolás et al. 2018). Given that our focus is on municipalities, we expect to find similar effects on spending. Finally, there is evidence that a larger presence of female politicians decreases administration spending, which may suggest an increase in the efficiency of administration (Braga and Scervini 2017; Cabaleiro and Buch 2018, 2020).[3]

[2] A detailed description of the content of the six spending categories is contained in the Appendix, Table A.1. The classification reflects the organization of budget data mandated by the law and it is, to some extent, related to the classification presented in the unpublished working paper version of Baltrunaite et al. (2019), where reduced form effects of the gender quota reform on spending are analyzed within a RDD setting.

[3] It is common interpretation that lowering spending on administration increases administration efficiency. This is one of the possible interpretations, as we only observe the level of spending, and not the level of services provided. However, services provided under the "administration" spending category are mostly compulsory services at municipal level (such as tax revenues collection).

3. Empirical strategy

3.1 Data on municipal councils and spending

We collect data on the composition of municipal councils from administrative registries provided by the Italian Ministry of the Interiors. The "Registry of local and regional administrators" (AARL), collects digitalized records of the members of municipality councils and of the mayors of every Italian municipality on a yearly basis since 1985. Records include demographic characteristics of elected candidates such as gender, place and date of birth, education, and occupational status. Responses have been extensively reclassified into macro categories to gain consistency in classification across years. Information about political parties and local political list affiliations of the council members, the date of beginning and end of the mandate and the role in the administration (mayor) are also reported. We use individual data on council members and mayors to generate aggregate statistics at the municipality-year level. In election years, when municipalities display two or more councils operating within the same calendar year, we consider only information about the newly elected council, and we assign this information to the specific municipality-year cell. We also drop from the sample those observations corresponding to the years in which a given municipality was placed under outside management (*commissariamento*). Our largest sample includes information about the universe of Italian municipalities (about 8,000) over the period 2002-2018, for a total of 134,265 observations with valid information on the municipality council and the gender composition. Relevant sample cuts will be highlighted in the next section. A detailed description of the administrative datasets that we use in this paper as well as the harmonization procedure that we adopt is reported in the appendix, Table A.1.

(Table 1 about here)

Table 1 reports the descriptive statistics of the largest sample. Over the period 2002-2018, the average size of an Italian municipality council is of 18.67 members, 21.76% of which are women. This figure varies largely across municipalities. Albeit 95% of municipality councils can count on at least one elected female candidate, the median share of women in Italian municipalities over the period considered is just about 20%. Only 11.1% of mayors across all municipalities and years are women. Elected female candidates are younger (42 years) than male candidates (47 years) and have lower chances of holding a position as entrepreneur or employed/self-employed worker (2.2% and 70%, respectively) with respect to male counterparts (4.9% and

75%, respectively). Nonetheless, elected women are, on average, more educated than elected men: the proportion of women in councils that have at least a secondary education diploma is 75.2%, while 67.6% of the male candidates holds a similar degree. Gender differences in political affiliation to major national parties are of lesser importance in municipality elections, where 85.9% of elected candidates are issued from local mixed civic lists (*liste civiche*), whose political orientation cannot be clearly identified.

Municipality-level data about demographics and human capital composition come from the Italian Statistical Institute (ISTAT). Relevant demographic information includes population size, density and age structure in each municipality over the period 2002-2018 (see Table 1 for details). The online census data tracker from ISTAT provides the municipality-level composition of the population in terms of education and labor market participation (employed, unemployed, housekeeper, retired) of the residents of each Italian municipality in 2011, the last available census year. Finally, we use synthetic measures of tax declarations at municipality level (average taxes paid, quartiles for declared revenues) collected in fiscal years 2008-2013 by the Ministry of Economy and Finance, which we use to proxy the potential fiscal revenues of the municipality. We match yearly data from ISTAT and AARL using the common municipality identifier. We exclude from this matching those municipalities that change province belonging or name over the period considered. Most of the changes occur in year 2009 and concern a marginal number of municipalities.

Lastly, we use the administrative data on municipal balance sheets (*Bilanci Consuntivi*) from the Ministry of Interior, Department for Internal and Territorial Affairs, to construct indicators of yearly spending that are specific to each municipality. Municipal balance sheets report information on aggregate municipality spending during the budget year over a large array of policy items and are elaborated by each municipality. Balance sheets are available from the Ministry of Interiors since 1998, but their reporting format has been largely revised in 2007 and later in 2016, making it difficult to compare aggregate expenditure items reported before 2007 or after 2016. We have hence limited the time frame for our estimates to municipality balance sheets recorded after 2007. For identification reasons discussed in Section 3.2 below, we also limit the time frame to records in and before 2013.

(Table 2 about here)

(Figure 1 about here)

As discussed in Section 2.2, we categorize these expenditure items at municipality level into six spending categories: education, security, administration, urban management, social services and productive services. On average, education has the highest share of spending (28%), followed by urban management, social and productive services (between 15% to 20%), security (9%) and administration (3%).[4] Table 2 reports the descriptive statistics of municipality expenditures and shows the presence of substantial heterogeneity in spending across municipalities. Figure 1 shows that the expenditure shares have been relatively stable over the period, even though average aggregate spending has been growing by about 15% over the period 2007-2013.

3.2 Identification strategy

The goal of this paper is to assess the effect of an exogenous increase of one percentage point in the share of female councilors on local policies, measured by aggregate municipality spending as well as disaggregate spending across relevant items. To do so, we exploit the features of the gender quota reform introduced by Law 215/2012 to divide municipalities into a treatment and a control group according to their demographic size at the moment of the introduction of gender quotas. All municipalities with population size larger than 5,000 residents enter the treatment group, whereas municipalities with less than 5,000 residents in 2012 are in the control group (the indicator T1 identifies the treatment group in the data). Large municipalities (above 15,000 individuals), which were already subject to gender representation rules when the Law 215/2012 was enforced, as well as municipalities in autonomous regions (Valle d'Aosta, Province Autonome di Trento e Bolzano, Friuli-Venezia Giulia, Sicilia, Sardegna) have been dropped from the analysis, reducing the main sample to 107,403 municipality-year observations. The share of treated municipalities (indicator T1) within the using sample is 0.218, and the share of

[4] Budget data are incomplete for many municipalities of small size, the problem being more relevant for what concerns administration expenditure item. Besides, some municipalities cannot be correctly identified across merged datasets. As a result, the sample size varies systematically across expenditure items and shrinks in size for administration expenditure items.

all observations corresponding to municipalities holding local council elections in or after 2013 is 0.25 (see Table 1).

(Figure 2 about here)

We combine the geographic and temporal variation in the likelihood that an election takes place in a treatment municipality to identify the effect of interest. As reported in Figure 2, our data display large geographic heterogeneity across the country in terms of changes in gender composition of municipality councils around the period of implementation of the reform. We exploit this heterogeneity as a source of identification.

Our empirical analysis evolves in two stages. First, we use the largest sample (2002-2018) to estimate the consequences of gender quotas on the gender composition of Italian municipality councils over the long run. Figure 3 shows the distribution of municipality council elections taking place over 2002-2018, alongside the average share of women that are in the municipality council (thick lines) in any given year in both the treatment (solid lines) and control (dashed lines) groups of municipalities. Identification of the effects of gender quotas on the gender composition of elected councils rests on a parallel trend assumption, implying that in the absence of the gender reform, the gender composition in municipalities larger than 5,000 residents would have followed the same trend observed in the control group.

(Figure 3 about here)

As Figure 3 shows, the gender balance in treatment municipalities has sharply increased after the introduction of Law 215/2012. Over the first period, the effect is driven by those municipalities in the treatment group that elect a new council and hence become subject to the new gender reform. A large majority of the new council elections takes place in 2013 and 2014, explaining the sudden jump in the proportion of female candidates. The difference in trends across treatment and control groups in Figure 3 implies an aggregate effect of the gender quota of about 15 percentage points. We evaluate the robustness of such effect within a "dynamic" difference-in-differences design which allows to tackle the effect of potential confounders.

The estimating equation is as follows:

$$W_{iter} = \alpha_0 + \alpha_1 T_i + \alpha_2 P_e + \alpha_3 T_i * P_e + \alpha_4 X_{ite} + \theta_i + \theta_t + \theta_{rt} + \theta_e + \theta_{t-e} + \varepsilon_{iter}, \quad (1)$$

where W_{iter} is the percentage of elected females observed in year t for a municipality council elected in year $e \leq t$ in municipality i (located in region r). The election year e is specific of the municipality and the time (it) and varies accordingly. We maintain the notation e to highlight that observations can be clustered along the lines of legislatures, which vary across time within the same municipality. Moreover, T_i denotes whether municipality i is in the treatment group (we consider T1 as the baseline indicator, alternative treatments are used in robustness checks) and P_e is an indicator of whether the council ruling municipality i at time t was elected after December 31, 2012, that is $e \geq 2013$. The indicator $T_i * P_e = 1$ indicates those observations corresponding to treated municipalities whose council was elected *after* the introduction of the gender quota reform. Conversely, $T_i * P_e = 0$ for those municipalities in the control group ($T_i = 0$) as well as for observations corresponding to treated municipalities whose council operating in year $t \geq 2013$ was elected before the introduction of Law 215/2012 (that is, $P_e = 0$ as $e < 2013 \leq t$). For these municipalities, the treatment indicator will switch as soon as a new council is elected after 2013 under the new gender quotas legislation.

The most complete specification of model (1) includes controls X_{ite} for the council operating in a given year (size of council, the indicators for party affiliation of elected council), as well as characteristics of the electorate and the municipality (such as municipality and year specific employment rate, average education level, age structure, population size and density). The model includes municipality fixed effects (θ_i), year fixed effects (θ_t) and flexible region-specific shocks (θ_{rt}). The latter indicators allow us to account for time-varying determinants of gender-related voting behaviors that are specific to the macro-context of the municipality. The complete specification also includes election fixed effects (θ_e) and fixed effects for each year since last election (θ_{t-e}). Together with year fixed effects, these variables account for the dynamics of the electoral cycle within the legislature.

The effect of interest, α_3, measures the causal impact of gender quotas on the outcome variable. Identification relies on variations of gender composition across legislatures, elected before or after the introduction of Law 215/2012, and compares these variations across treatment and control municipalities. The treatment is dynamic in the sense that there are some municipalities in the post-reform period (in particular in years 2013-2015) that are exposed to the law only after a new council is elected. Additional checks for the implications of the reform by characteristics of the elected women, as well as robustness checks involving the inclusion of

Special Statute regions or relevant cuts in the sample size along the lines of municipality size and years, are discussed in the next section.

Note that the gender quota reform has, by construction, a direct positive effect on the number of female candidates on the ballot. This may increase the likelihood that the candidates elected under the quota regime are woman. On top of this direct effect, the reform has some indirect consequences. First, the reform may affect the gender composition of local government bodies other than the municipality council, such as the executive board whose composition depends on females representativeness in the council. This is particularly plausible in municipalities with less than 15,000 residents, as the executive board members are chosen among council members. As Figure 3 shows, the rise in female councilors in treatment municipalities is matched by the rise in the share of female executives (thin line). This change is remarkable in the post-reform period for treated municipalities, and it is likely induced by the contemporaneous change in the council composition. Second, the introduction of the gender quota reform may affect selection of female candidates along the lines of characteristics that may (or may not) be related to their gender. Some of these characteristics may have consequences on local policymaking. We investigate the consequence of the gender quota reform in terms of compositional changes in the elected council along the lines of employment, education and age.

Our identification strategy does not allow, however, to disentangle the effects of the reform that can be imputed to the gender of the elected candidates from those that are attributable to the characteristics of the "marginal councilor", i.e. those candidates who would not be elected in the absence of the quota reform. The reform improves the likelihood that the marginal councilor elected locally is a woman, compared to what would have happened had the reform not taken place. The marginal councilor likely differs from the rest of the council under a variety of traits. To be able to interpret our result as the consequence of rising gender balance in the opportunities to be elected, we rely implicitly on the assumption that the process of selection of females into politics is the same in treatment and control municipalities. As such, the change from pre- to post-reform composition of the share of female councilors in treatment municipalities would have been the same observed in the control municipalities had the reform not taken place.

The second empirical contribution investigates whether rising the share of women in municipal councils by effect of the gender quota reform affects the pattern of municipality spending. To do so, we further restrict the baseline sample to years 2007-2013 to cope with the confounding effects of a reform of municipality spending regulation (mandated by Law 138/2011 and approved at the end of 2011), which extended the Italian Domestic Stability Pact, DSP, to municipalities of size smaller than 5,000 residents and above 1,000 residents. The DSP has been introduced in response to the European Stability and Growth Path in 1999, to constrain municipal fiscal and spending policies. Its objective is to set fiscal rules that limit the fiscal gap of municipalities, by introducing a formal target balance requirement, thus introducing limits to municipal spending capacities based on criteria of financial virtuosity. In the period covered by our analysis, i.e., after 2007, the DSP requirements were imposed to municipalities of size larger than 5,000 residents. Starting with reporting year 2013, these requirements have been extended to municipalities of smaller size, while municipalities with less than 1,000 residents have not been affected by the policy. Available literature suggests that the effect of the DSP reform was limited in budget year 2013 by the effects of the Budget Law 2012, which relaxed the definition of spending targets for the budget year 2013 for the municipalities affected by the Law 138/2011 (Corte dei Conti 2014, Aassve et al 2019). We limit the confounding effect of DSP implementation on the control group by dropping from the using sample the data for municipalities observed after 2013.[5]

Our first concern is to identify the direct effect of the Law 215/2012 on average spending patterns. These effects can be estimated through the following *reduced form* regression:

$$Y_{iter} = \beta_0 + \beta_1 T_i + \beta_2 P_e + \beta_3 T_i * P_e + \beta_4 X_{ite} + \delta_i + \delta_t + \delta_{rt} + \delta_e + \delta_{t-e} + \varepsilon_{iter}, \quad (2)$$

where Y_{iter} is the level of expenditure in each of the six spending items (in log aggregate or per-capita terms, as well as in shares relatives to total expenditure) observed in municipality i for budget reporting year t and generated by the council elected in year $e \leq t$. Given that the sample is restricted to years 2007-2013, $P_e = 1$ only for those municipalities holding elections in 2013. The main treatment $T_i * P_e = 1$ identifies municipalities in the treatment group whose council is elected in year 2013, whereas $T_i * P_e = 0$ when $T_i = 0$ or if the council managing municipality i in 2013 was elected before that date and hence under different electoral rules than Law

[5] Municipal elections in 2013 were held in April/May. Cutting from the sample the data for municipalities holding an election after 2013 does provide a lower bound on the effect of the reform on spending, as it limits the possible influence of the new council on current spending. However, we believe that the benefit of avoiding possible confounds overcomes the problems of observing the effects of the reform for a short time span.

215/2012. Differently from (1), we only observe municipalities one year (2013) after the gender quota introduction, henceforth the dynamic aspect of identification is not present. The model controls for time and municipality fixed effects, as well as for electoral cycle dummies and yearly shocks specific to the region. Identification relies on a parallel trend assumption: in the absence of the Law 215/2012, the trend in spending of treated municipalities would be parallel to that of "control" municipalities. The effect of interest, β_3, measures the reduced form impact of the gender quota reform on municipality spending.

Our second interest is to assess the extent to which the reduced form effects are driven by a change in female composition of the municipality council. To recover causal estimates of the effect of interest, we rely on an instrumental variable strategy which exploits the geographic and temporal variation in the introduction of gender quotas in municipality council elections. We use as an instrument the indicator $T_i * P_e$, taking on value $T_i * P_e = 1$ for municipalities which are in the treatment group (i.e., municipalities with 5,001-15,000 residents) and hold elections after the introduction of Law 215/2012, whereas $T_i * P_e = 0$ otherwise. In the sample considered for this analysis, 21.5% of municipalities are in the treatment group, whereas 1% of the sample municipalities (751) hold elections in 2013 (see Table 2). The exogeneity of the instrument rests on the assumption that unobservable drivers of municipality spending are uncorrelated with the municipality size, which defines the assignment to the gender quotas rules introduced by Law 215/2012. Furthermore, the introduction of the reform did not disrupt the scheduling of elections, decided on the basis of an administrative design enforced before 2012.

We quantify the contribution of rising female participation in councils on local spending through the following linear model, which includes controls for observables and for municipality, year, electoral cycle fixed effects and region-level shocks:

$$Y_{iter} = \beta_0 + \beta_1 T_i + \beta_2 P_e + \beta_3^{IV} \widehat{W}_{iter} + \beta_4 X_{itr} + \delta_i + \delta_t + \delta_{rt} + \delta_e + \delta_{t-e} + \varepsilon_{iter}, \quad (3)$$

The main treatment variable in model (3), $\widehat{W}_{iter}$, is the share of women in elected councils that is predicted by estimating model (1) (first stage) on the dataset we use to estimate the reduced form model (2). The predicted percentage of women in municipality council is then plugged in the main regression (3) (second stage). The effect of interest, β_3^{IV}, measures the growth rate of expenditures which follows from a one percentage point increase in the share of women in the elected council. To cope with the high dimensionality of the estimating model (including about

7500 coefficients for municipality, year and electoral cycle fixed effect and year-region shocks), standard errors of the relevant coefficients are bootstrapped 500 times.[6]

The exclusion restriction is satisfied if there is no confounding time-varying treatment which affects municipalities in the treatment group in 2013 and that is related to spending performances of the council. There are three potential threats to identification. First, the wage of the mayor sharply increases in municipalities of size larger than 5,000 residents, thus rising the expected quality and the spending pattern of the municipal executive boards. This effect is, however, not time-varying and is captured by municipality fixed effects. Second, the central government transfer cuts and the implementation of the DSP in control municipality may also affect budget spending patterns (Marattin et al. 2019). As already argued, the sample we are using (limited to 2007-2013) has been selected to deal with these confounding factors. In Section 4.2, as a robustness check, we consider dropping municipalities of size 1,001 to 5,000 residents from the control group, providing additional support to the exclusion restriction condition we are using. In the next section, we additionally check the robustness of our estimates to reduction in the size of the pre-treatment group (by focusing on years 2010-2013) and the introduction of additional municipality controls that limit heavily the sample size. Placebo tests based on manipulations of the policy timing, the treatment group definition and the randomization of assignment of the share of women in councils within municipality and across years, provide further support for the exclusion restriction.

The third threat to identification comes from the confounding effect of time-varying unobservables that are related to the size of the municipality as well as to local expenditure patterns. Examples could be the introduction of policies affecting the local fiscality, variations in governmental transfer to municipalities or in the characteristics of the tax base, as well as

[6] Estimation of high-dimensional fixed effects models rises substantially the computational burden of traditional 2SLS standard errors. A similar problem arises in the estimation of structural quantile treatment effects models with instrumental variables (Andreoli, Casalone and Sonedda 2018 and Brunello, Fort and Weber 2009). Following this literature, we resort on resampling methods to estimate standard errors. To do so, we first identify the using sample from the reduced form regression (model 2), we bootstrap 500 subsamples (with replacement) clustered by municipality from the using sample and for each sub-sample we run first stage regression (model 1), we estimate predictions and use predictions to run the second stage regression (model 3). The variance of the second stage regression coefficients across boostrapped samples gives the second stage standard errors and allows to incorporate uncertainty in first stage estimates. Alternatively, the alternating projections method (Correira 2016) provides computationally feasible approximations of the standard errors. Estimates based on this method largely coincide with bootstrapped standard errors (tables available upon request).

access to EU- or region-funded local development projects. In these situations the effect of the treatment, assigned only to municipalities holding elections after the introduction of Law 215/2012, may be confounded with that of a *eligibility to the gender quota reform* indicator, which identifies municipalities of size larger than 5,000 observed after 2012. Some of these municipalities would have been subject to the gender quota reform had they held elections in 2013. Reduced form effects of the eligibility indicator reflect only in part the consequences of changes in the gender composition of the municipality board. If the maintained exclusion restriction is valid, none of the effects could be attributable to changes in the reform after eliminating from the estimating sample those municipalities where elections take place in 2013.

4 Results

The empirical analysis is structured as follows: Section 4.1 considers the effects of gender quotas on the composition of municipal councils, while Section 4.2 focuses on the effects of the reform on the municipal spending patterns.

4.1 Effects of the quota reform on the gender composition of councils

(Table 3 about here)

Baseline estimates of the effects of the gender quota reform on gender composition of municipal councils are reported in Table 3. We first estimate an unconditional model (column 1). The introduction of the gender quota increases the share of women in councils by 14.38 percentage points (pp henceforth). The effect is remarkably stable after incrementally controlling for municipality and years fixed effects and region-level shocks (column 2), election and year fixed effects and distance from election fixed effects (column 3), demographics (column 4) and population human capital (column 5), which corresponds to our preferred specification in equation (1). Baseline estimates reveal that the share of female councilors is 13.89 pp larger in post-reform treated municipalities compared to what this share would have been in the absence of the gender quota. The 2012 gender quota reform has a large effect on the “intensive margins”: it rises by 33% the probability that in a municipality at least 20% members of the newly formed municipality council are women (Table 3, column 6). The reform has also implications for the gender composition of the municipal executive board, which detains the legislative power and includes the deputies and the mayor.[7] Results are displayed in column 7, which shows that Law 215/2012 has increased the female share in the executive board by 12.29 pp, an effect comparable in size to the one found for councils. While council size is mandated by the law, the size of the executive board is chosen by the mayor. Model (8) shows evidence that the gender quota reform affects the size of the executive, which rises by 1.2 pp (or 0.2 board members) on average after quotas are introduced. This is evidence that the gender rebalancing of the municipality board induced by the reform may come at the cost of increasing the size of the executive.

An additional inspection of Table 3 reveals interesting conditional correlations with the covariates. First, municipalities with larger councils tend to display a larger female share, hinting that the gender divide becomes more relevant when the number of available seats in municipalities councils is rationed. Rising the extensive margins of representation could indeed contribute to reduce gender imbalances. Second, municipalities with a larger population display a smaller share of female representatives. Interestingly, cities with older population and with a larger share of retired women in the population have a larger share of female representative, while the share decreases with the share of unemployed women. These findings could be suggestive of both substantive representation considerations (older women may find their policy agenda more represented by female politicians, as the care of elderly and children is traditionally classified as a feminine issue), and availability of qualified female politicians (municipalities where there is a larger share of unemployed women have a lower share of qualified women).

(Table 4 about here)

We further explore the compositional effects of gender quotas along the lines of education, employment status and age of the elected female candidates. Table 4, panel A, reports the results of diff-in-diffs analyses where the dependent variables are the percentage of women in council who are employed (column 2), unemployed/retired/students (column 3), high educated (column 4) as well as the average (log of the) age of women (column 5). Effects on composition by employment, education and age are also reported for the entire council for comparison (columns 6-9). The outcome variables are all normalized by the size of the population of interest (women

[7] Executive boards have a small size, about 7 members on average, 20% of which are women on average.

in council or total council size), implying that effects capture compositional differences exclusively. The gender quota reform has induced a sizable compositional effect in terms of employment status of elected female councilors in favour of woman that are not employed (3.7 pp change). The effect is driven by the fact that, albeit on average the proportion of councilors that are woman and have a certain employment status grows by effect of the reform, effects are highly heterogeneous across employment status groups and different from counterfactual composition of councils. Table A.2 in the appendix shows that the share of councilors that is employed or self-employed and is a women rises by 8.76 pp, whereas the percentage of women unemployed, students or entrepreneur rise by approximatively 1 pp. As a consequence, the proportion of female councilors that are employed grows at a slower rate compared to those that are unemployed, yielding the compositional effect.

The gender quota reform has no compositional effects in terms of education, insofar the change in the share of woman that is high educated in post-reform treated municipalities varies by -0.27 pp, the effect being not significantly different from zero. Effects estimated in the baseline setting can be explained by the rise in the share of councilors that are highly educated women (10.81 pp increase) whereas the growth in the share of the low-educated woman (without a high-school diploma) is small (0.83 pp) but significant. Such changes are not sufficiently strong to produce compositional effects in terms of education. These estimates are reported in Table A.3 in the Appendix. Interestingly, the reform causes a reduction in the share of councilors that are males and high educated, yielding a compositional effect for male councilors. This reflects on the aggregate composition of the average council (model 8, Table 4), where we find evidence that the reform reduces the share of high educated councilors by 2.22 pp. This result is in contrast with Baltrunaite et al. (2014), where it is found that gender quotas introduced in Italy in 1993 improved the average quality of politicians due to a reduction in the share of low-education elected men.[8]

[8] The difference between our findings and the ones in Baltrunaite et al. (2014) may be explained by the different nature of gender quotas in the two reforms, in particular to the presence of double preferences by gender. Specifically, if gender bias is negatively correlated with voters' education, then those voters who are willing to express a second preference for a highly educated woman are most likely the same voters who express their preference for a highly educated male. As a consequence, preferences for highly educated politicians are more disperse across male and female politicians and a lower share of politicians with high education may be elected.

The introduction of gender quotas has reduced the average age of elected women by 2%, and the average age of councilors by 3%, thus indicating that the rise in the proportion of younger women fostered by the new gender quota regime substitutes for older male councilors (Table 4, models 5 and 9). Table A.4 in the Appendix confirms this interpretation by breaking down the effects of the reform on the percentage of male and female councilors by age group (18-30, 31-50, 51+). Results are consistent with those in Baltrunaite et al. (2015), where it is found that the introduction of a gender quota in Italy in 1993 reduced the average age of elected politician by affecting the composition by age of the groups of male councilors.

Compositional effects of the reform may vary according to the incidence of the gender quota on local council gender composition. We distinguish municipalities whose average share of women in the pre-reform period is above and below the median female share (about 20%) and replicate the estimating model (1) for these groups of municipalities separately. Results are in panels B and C of Table 4. We find that the effects of the gender quota reform on the share of woman in council in municipalities below median is twice the effect in municipalities above median, reflecting that the efficacy of the quota was greater in municipalities where there was a larger gender gap in council composition in pre-treatment period. Interestingly, our estimates suggest that after the introduction of the reform there was a significant reduction in the share of female councilors with high education in municipalities with above-median share of female councilors. The effect may be explained by a capacity constraint in the pool of potential candidates. In treatment municipalities with relatively small female participation in the pre-reform period, the marginal female candidate is likely more educated compared to the marginal candidate observe in municipalities with relatively large female participation, provided that the election outcome mirrors candidates' relevant characteristics.[9] This mechanism is consistent with evidence from Table 4 that council "quality" grows in below-median municipalities (consistently with the findings of Baltrunaite et al. 2014) whereas quality may even reduce by effect of the quota reform in above-median municipalities.

Robustness checks. As shown in Figure 3, the share of female councilors has increased sharply in treated municipalities in 2013, but it has also increased in the control group over the same period (albeit at a slower pace). This change may be due to spillover effects of the reform

[9] In the regressions, differences in composition of the resident population are addressed by municipality fixed effects and trends.

on the preferences of candidates and voters. A way to reduce the influence of spillover effects is to limit the analysis to elections taking place in the first few years of implementation of Law 215/2012, at the cost of neglecting medium-term consequences of the norm. An alternative strategy is to consider both municipalities located around the 5,000 residents threshold as well as smaller municipalities, which are likely less strategic for political parties (on average, 84.6% of elected councilors in small municipalities are affiliated to local civic lists not directly controlled by major national parties), where voters are less exposed to information about consequences of gender biases on local policies and where local councils are less informative about gender imbalances due to small sample size of the municipality council.

To address these concerns, we consider additional treatment specification and test robustness of our results (see Table 1 for summary statistics): Treatment T2 expands the baseline treatment T1 by including large cities among the treated group, while still excluding autonomous regions (117,570 observations); treatment T3 is like T1, albeit the municipalities in the treatment group are limited to those with a population size ranging between 5,000 and 8,000 residents (96,597 observations); treatment T4 and T5 expand T1 and T2 (respectively) by including treatment and control municipalities in autonomous regions (122,723 and 134,265 observations, respectively); treatment T6 limits the time frame to the period 2010-2018 (56,390 observations) in order to avoid considering the long run implications of gender quota introductions in the 1990s (see Braga and Scervini, 2017). Treatment T7 limits treatment and comparison group assignment to years 2010-2013, thus allowing to focus on the short run effects of the quotas (25,334 observations). Table A.5 in the appendix reports the results of the analysis with our best specification (eq. (1)), performed with these alternative specifications of the treatment. The effect estimated after reducing the group of treated municipalities to those with population 5,000-8,000 (treatment T3) or to those observed after 2010 (treatment T6) or before 2013 (treatment T7) virtually coincides with the effects based on our preferred specification. The effect is slightly smaller, ranging from 10 to 12 pp, when the treatment group is extended to municipalities with more than 15,000 residents, as well as to municipalities located in autonomous regions. These checks confirm the validity of the baseline specification and the robustness of the implied effects.

4.2 Effects of the gender quota reform on municipal spending

Results of Section 4.1 confirm that the introduction of gender quotas in Italy improved gender balance in elected municipality boards. In this section, we investigate the effects of the reform on local policymaking, as captured by municipality spending.

(Table 5 about here)

The effects of interest are collected in Table 5. Each panel of the table reports estimates of the reduced form model (RF, equation (2)) as well as IV estimates of coefficients from estimating regressions (1) and (3), for aggregate (panel A) and per capita (panel B) log expenditure and for each spending category as share of total expenditure (panel C). Reduced form estimates in panel A reveal that the gender quota reform does not have a significant impact on aggregate expenditure (consistently with existing evidence, see Cabaleiro and Buch 2020). The gender quota reform has an effect on selected expenditure items. First, the introduction of the reform reduced administration costs by 15.3%, thus supporting the hypothesis that female councilors improve municipal efficiency. Second, it increased expenditure in security services by 15.3% and expenditure in productive services by 9.6%. Results are consistent with previous finding in the literature showing that female local politicians target welfare-enhancing policies which may not be related to social spending (Cabaleiro and Buch 2020, Hernández-Nicolás et al. 2018). Expenditure in education, the largest expenditure item, and social expenditure, instead, are not affected by the reform.

The estimated reduced form effects on aggregate spending coincide with effects based on expenditure items measured in (log of) per capita terms (panel B), thus confirming that municipality fixed effects and population size controls are efficiently capturing the consequences of population size heterogeneity on expenditure patterns at municipality level.

Even though the reduced form effects are large in size, the significant ones concern only selected expenditure items which account for a relatively small share of aggregate expenditure. We do not detect any significant reduced form effects on the composition of expenditure (panel C). This is due to the fact that the share of expenditure for administration, security and productive services are the smallest expenditure items in the data (see Figure 1), and changes in composition of expenditure may be too noisily estimated due to the contribution of other expenditure items that were largely unaffected by the policy.

The magnitude of these effects has to be compared with the first stage impact of the reform on female composition of municipality councils. In the using sample we find that the gender quota introduction rises the share of female councilors by 14.8 pp on average, this figure being stable across specifications. Effects estimated in the short run (up to 2013) confirm findings in Table 3. We exploit the introduction of the gender quota reform to produce variations in the gender composition of municipality councils that are exogenous with respect to potential sources of endogeneity and to measurement error in the expenditure items, which would bias the magnitude of the estimated coefficients towards zero (as shown in panel A of Table A.6, none of the direct effects of the share of woman in council on expenditure is significant or sizable in magnitude). IV estimates for equation (3) are reported in panel A and reveal that a one pp increment in the share of female councilors that is induced by the gender quota reduces administration costs by 1.01%, whereas it rises expenditure in security services by 1.03%, and expenditure in productive services by 0.65%. The effects on urban management and in social services are noisily estimated and statistically insignificant. Our first stage estimates (panel D, common to all specifications) allow to rule out concerns of weak instruments (all F-tests values are above 65): the reform, excluded from the main regression, is a valid instrument for the share of women in municipality councils.

(Table 6 about here)

Table 6 delves deeper into the mechanisms driving the effects in Table 5. First, we investigate whether the baseline effects can be explained by the contextual increase in the share of female elected candidates in municipal executive boards. Differently from councils, the size and composition of the municipality board is decided by the elected parties. Panel A of Table 6 shows that the impact of gender quotas is only imperfectly transmitted into the gender composition of municipalities boards (about 8 pp increase across first stage regressions). Nonetheless, the direction of second stage effects is in line with those documented in Table 5: rising female shares of elected executives rises expenditure in security (1.74%), whereas effects on productive services and on administration are about 1% in magnitude and significant.

We further investigate the extent to which the effects are driven by the characteristics of the elected. Panel B to D of Table 6 report IV estimates of the effects of rising by one pp the share of women in councils that are employed or of those that are not employed (panel B), the share of women that are highly educated (panel C) and the average age of women in councils (panel D), on aggregate expenditure (total and by expenditure item). We do not find evidence of compositional effects in the using sample: despite the fact that the first stage effects of the reform are similar in term of magnitude (but not always in terms of significance) to those estimated in Table 4, we cannot rule out the possibility of weak instrument (F-tests from panels B, C and D are below or very close to 10 in all specifications).

Masculine vs. Feminine issues. Some contributions in the literature have tried to classify government spending in terms of their consequences for masculine/feminine/neutral policy issues (see Dolan 2004 and references therein). Replicating such interpretation within the actual setting is a challenging task for at least two reasons. First, as shown empirically by Chattopadhyay and Duflo (2004), what can be considered a feminine issue at a local level may vary from region to region. Second, our spending categories include diverse items which may in turn be perceived as more feminine or masculine. For example, social services, which are generally classified as feminine, include in our classification also expenditure for sports, which is a more masculine one. Table A.6 addresses this second aspect, by reporting the effects of rising female participation in councils on selected spending categories which can be extrapolated from the budgetary data. We note that the reform has a positive and significant effect on one of the education expenditures (middle secondary education), which was not significant when pooled with the other education items. Moreover, the social services category includes masculine/neutral items such as sports and tourism, which decrease significantly, and a feminine issue such as social spending, which increases, even though not significantly so.

We now discuss a series of checks on the choice of the estimating sample, the definition of the treatment and control groups, as well as the set of control variables. We address potential challenges to identification by analyzing the effects of the gender quota reform on relevant outcomes in a reduced for setting.

Identification checks. In Table A.7, we test the robustness of our identification strategy. Identification crucially relies on the definition of the "control group" (for which $T_i * P_e = 0$). First, we investigate the extent to which the *eligible but not treated* status (identifying municipalities for which $T_i = 1$ and $t = 2013$ but $P_e = 0$) as a policy treatment explains expenditure patterns. After excluding from the sample municipalities where $T_i * P_e = 1$, we find (panel B of Table A.7) that eligibility has a positive and significant effect on aggregate expenditure as well as expenditure in education and urban management, substantially magnifying the reduced form effects estimated from the baseline model and reported in Table 5 (all not statistically significant). Conversely, the reduced form effects of eligibility on expenditure in security, administration and social services are significant but attenuated (about a third) compared to effects in Table 5. The differences in magnitude estimated in the two tables reveal that the effects of the reform are not confounded by municipalities that are eligible to the reform, but have not yet experienced changes in gender composition of their council as of 2013. We cannot draw similar conclusions for what concerns expenditure in productive services, where the reduced form effect of eligibility to the gender quota reform magnifies that of the reform itself (column 7 in Table 5). None of these effects, albeit present in the second stage, can be explained by a change in the gender composition of the municipality council, as long as first stage effects are always small and insignificant (with F-test values close to zero).

A second concern is that using treatment municipalities that hold elections after 2013 in the control group (for which $T_i * P_e = 0$) could lead to overestimating the counterfactual spending for the control group, thus yielding a downward biased second stage estimates. To cope with this potential source of bias, we consider expanding the reduced form estimates from model (2) with an indicator for these municipalities in the "control group" (panel C in Table A.7), as well as estimating the baseline model after dropping municipalities for which $T_i = 1$ and $P_e = 0$ (at the cost of reducing the estimating sample by about 23%, see panel D in Table A.7). Both models replicate the reduced form estimates of Table 5, suggesting robustness of our results with respect to the definition of the control group as well as to the source of variation in gender composition identified by the gender quota reform.

Our third concern is that municipalities that held elections in 2013 are compared to control municipalities that are likely located on a different point of the electoral cycle, i.e., did not hold elections in 2013. If the expenditure decisions along the electoral cycle are correlated with the treatment status, controlling for year and electoral cycle fixed effects may not be sufficient to rule out the electoral cycle effect. We eliminate potential unobservable effects due to the election cycle by reducing the sample to municipalities that are exactly located on the same point of the electoral cycle, i.e., municipalities that hold elections in 2013. Among those, we identify treatment and control municipalities in the pre-reform period data by following the same municipalities in election years previous of 2013 (most likely in 2008 and 2003). We find that the sign and magnitude of the reduced form estimated coefficients is robust to the cycle (panel E in Table A.7), even though some of the effects are not significant. The introduction of the gender quota among municipalities holding elections in 2013 reduced spending in administration by -12.65%, whereas the reform has some effects on expenditure in security and productive services (9.5% and 6.9%), but these are not statistically distinguishable from zero. Effects on other expenditure items have a much smaller magnitude and are insignificant. The overall reduction in significance may be the consequence of the sharp reduction in the sample size (to less than 10% of the original).

Robustness checks. We check the robustness of out preferred estimates in Table 5 vis-à-vis the definition of the main estimation sample. Reduced form estimates of interest are collected in Table A.8. The first concern is that identification relies on variations in gender composition of municipality councils across legislatures, not calendar years. Using municipality-year observations reduces efficiency of the estimated effects without necessarily adding useful identifying information. In panel A of Table A.8 we report estimates of the effects of interest from the sample where outcome, treatment and controls have been averaged at the municipality-legislature level. Estimated effects coincide in size and significance with baseline estimates.

Our second concern is that the significant effect of the reform on spending in administration is driven by sample selection. We estimate our preferred specification (model (2)) on the administration sample (29,884 observations). Results in panel B of Table A.8 reveal that, within this sub-sample, the reform yields a significant reduction in administration spending (-15.3%) and an increment in expenditure for productive services (11.2%). The effects are non-significant on all other expenditure items, included expenditure in security (albeit the estimated magnitude for the coefficient is large compared to other expenditure items). The latter insignificant effect may be due to rising uncertainty in estimates from the relevant sample cut, rather than to sample section issues.

Our third concern is that local spending policies may be affected by the political orientation of the council, which in turn is correlated with the gender composition of the candidates lists, as well as by the fiscal revenues available to the municipality. We extend the baseline model by controlling for the share of elected councilors affiliated to left, center or right parties (panel C) and for the income distribution at the municipality level using, information on fiscal revenues (panel D). Estimated coefficients are comparable to the reduced form estimates in Table 5.

Next, we verify the robustness of our estimates to the duration of the pre-treatment period, as well as to heterogeneity in demographic size of the control group. Reducing the sample to municipalities observed in calendar years 2010 to 2013 reduces the extent of business cycle variations in local expenditures. Magnitude of the effects reported in panel F of Table A.8, estimated using the 2010-2013 sample, are in line with baseline estimates, but significance is lost for most of the effects. We also consider reducing the sample in terms of municipalities, by dropping those of size 1,000-4,999 that are subject to the effective introduction of the spending review procedure in 2014. Effects are in panel E of Table A.8. The reform has no impact on total expenditure and on most of the expenditure items, except for security.

We conclude with a battery of placebo tests to assess the relevance of the gender quota instrument on the expenditure items. Results are in Table A.9 of the appendix. First, we simulate situations in which the gender quota introduction is arbitrarily anticipated to 2012 (panel A) or to 2010 (panel B) in the same municipalities in the treatment groups that voted in 2013. These simulated scenarios never yield significant effects of rising women share on municipality spending, irrespectively of the expenditure item. Second, we simulate a policy experiment by setting $T_i * P_e = 1$ for any eligible municipality i in 2010 that held an election in the period $e \in \{2010, 2011, 2012, 2013\}$ (panel C). As expected, the treatment indicator does not yield significant first stage results, whereas the second stage effects have unrealistic signs and magnitudes, differing substantially from those estimated by the baseline model. Lastly, as a falsification test, we randomize the share of women in council across years within each municipality. As shown in panel D, no first stage effect survives the test, thus excluding concerns for spurious correlations that may have been present in previous regressions.

5 Conclusions

Female under-representation in politics rises representation concerns and can bear consequences for local policymaking. In this paper, we contribute to the debate by exploring the short-term effects of the introduction of a gender quota which exogenously increased gender balance in Italian municipal councils on the level and type of municipal spending.

We have built a large dataset combining different administrative records about the composition of Italian municipality councils and executive boards by gender, education and occupation, the demographics and human capital distribution at municipality level and the local patterns of expenditures in education, security, administration, urban management, social services and productive services. The introduction of a gender quota reform mandated by the Law 215/2012 has caused an exogenous variation in the gender composition of councils in municipalities larger than 5,000 residents which hold council elections in or after 2013. On average, the reform raised by 13.7 percentage points the share of female elected politicians, a result that is robust across specifications. We explore the quasi-natural variation in gender balance within Italian municipal councils introduced by the Law 215/2012 to identify the effect of the reform on the municipality expenditures.

Our preferred estimates show that increasing the share of female councilors by one percentage point increases expenditure in security of a magnitude ranging from 0.7% to 1%, the effect being driven by expenditure on local security. This effect is robust to a large battery of checks on the definition of the control group, on the mechanisms leading the effects, on the sample selection and on placebo treatment tests. We find a similar effect on expenditure in productive services, whereas a one percentage point increase in the share of female councilors contextually reduces expenditure in administrative services by about 1%. In both cases, the effects are not robust, reflecting the consequences of time-varying unobservable confounders not tackled by the estimating model specification, as well as the existence of board size effects on the councils gender composition.

Our results are aligned with existing evidence on the fact that rising women representation in politics increases the efficiency of local bodies without expanding aggregate budgets (Braga and Scervini 2017, Cabaleiro and Buch 2020). Evidence survives under a variety of specifications and robustness checks. Overall, our results are consistent with available evidence in the literature that welfare enhancing policies at the local level may not necessarily be included in social expenditure, as they may be related with items such as local policing, security and administration of local events (Cabaleiro and Buch 2020, Hernández-Nicolás et al. 2018).

An important caveat for our analysis is that we observe spending data for a short period after the introduction of the policy (1 year). It is therefore possible that other spending categories, such as education or social spending, may be affected as well in the long run, and that their change may simply take place at a slower pace (or be lagged). This aspect is left for future investigations.

Finally, we provide evidence that the effects on municipality expenditures that we estimate are enhanced by the rise in the share of women in the municipality board that are educated, employed and relatively young. We do not detect evidence of significant compositional effects on local expenditure policies, except along the lines of female employment.

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Figures and tables

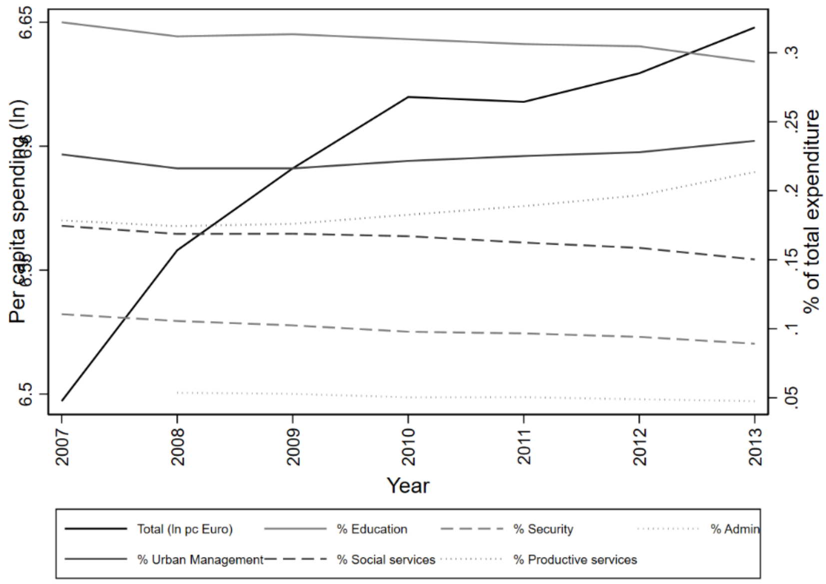

Figure 1: per capita spending (ln) across Italian municipalities, by item

Panel a) Changes in % women in council, before-after 2013

Panel b) Treated municipalities (baseline T1)

Figure 2. Geographical distribution of the baseline treatment indicator

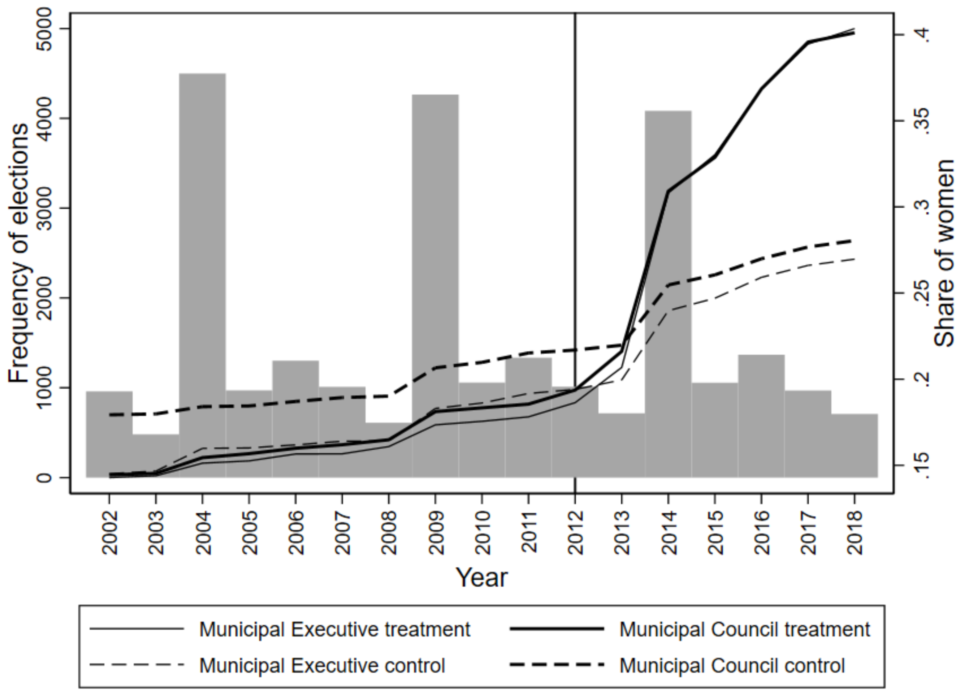

Figure 3. Identification of the effects of gender quotas on women participation in councils and in executive boards of Italian municipalities

Table 1. Descriptive statistics of municipalities and municipal election outcomes.

	Mean	Sd	Min	Max	N
Characteristics of the municipality council and executive board:					
Size of municipal council	18.67	6.229	2	79	134265
% women in council	21.76	12.68	0	85.71	134265
of which:					
% At least secondary education	75.26	33.62	0	100	134265
% Less than secondary education	24.74	33.62	0	100	134265
of which:					
% Entrepreneurs	2.285	9.609	0	100	127221
% Employee/self employed	70.01	32.74	0	100	127221
% Unemployed, housekeeper, student	27.71	32.43	0	100	127221
% men in council	78.24	12.68	14.29	100	134265
of which:					
% At least secondary education	67.60	21.69	0	100	134265
% Less than secondary education	32.40	21.69	0	100	134265
of which:					
% Entrepreneurs	4.948	7.918	0	100	134248
% Employee/self employed	75.38	18.45	0	100	134248
% Unemployed, housekeeper, student	19.67	18.10	0	100	134248
Average age of women in council	42.48	7.677	18	85	96746
Average age of men in council	47.06	4.528	28.92	77.33	102964
% women and unemployed/housekeeper	1.726	3.968	0	50	134248
% women and student	0.877	2.612	0	33.33	134248
% women and entrepreneurs	0.513	2.098	0	41.18	134248
% women and employee/self employed	15.18	11.50	0	85.71	134248
At least a woman in council (dummy)	0.948	0.223	0	1	134265
At least 20% of women in council (dummy)	0.501	0.500	0	1	134265
% women in the executive	20.52	18.19	0	100	134168
Mayor is a woman (dummy)	0.111	0.314	0	1	134265
% municipal councils affiliated to:					
Center party	3.637	12.69	0	100	134265
Left party	4.483	13.75	0	100	134265
Right party	5.980	16.89	0	100	134265
Civic list	85.90	27.13	0	100	134265
Municipality characteristics:					
Population (ln)	7.805	1.309	3.401	14.78	133577
Families (ln)	3.598	0.607	0	13.80	131541
Density (ln)	275.4	603.1	0	13157.1	131541
% old (65+)	0.256	0.0315	0.0794	0.527	133460
% working age (35-65)	0.159	0.0439	0.0204	0.520	133460
% secondary education	5.700	1.463	0	17.01	133460
% women with university degree	4.082	1.632	0.190	37.38	131242
% women housekeepers	8.726	3.209	0.549	34.75	131537
% women unemployed	26.94	3.367	7.595	69.86	131537
% retired	13.12	3.187	1.538	37.38	131537
Average taxes per capita (Euro)	16570.2	3756.7	5869.7	63894.7	47241
Treatment indicators (dummy):					
Municipality holds election in or after 2013	0.252	0.434	0	1	134265
T1 - municipality size between 5000 and 15000.	0.218	0.413	0	1	107403
T2 - municipality size larger than 5000	0.286	0.452	0	1	117570
T3 - municipality size between 5000 and 8000.	0.131	0.337	0	1	96597
T4 - T1, including autonomous regions	0.217	0.412	0	1	122723
T5 - T2, including autonomous regions	0.284	0.451	0	1	134265
T6 - T1, limited to 2010-2018	0.223	0.417	0	1	56390
T7 - T1, limited to 2010-2013	0.215	0.411	0	1	25334

Note: extended sample based on 2002-2018 data on the universe of municipalities.

Table 2: Descriptive statistics of municipal expenditures

	Mean	SD	Min	Max	N
Expenditure (millions Euro)					
Total	6.583	58.4	0	5533.2	78183
Education	2.128	20.3	0	1471.6	78426
Security	0.711	8.76	0	722.8	78426
Administration	0.194	2.53	0	281.1	46276
Urban management	1.346	11.1	0	1305.5	78426
Social services	1.335	12.0	0	882.8	78426
Productive services	0.909	7.61	0	1065.9	80883
Expenditure per capita (Euro)					
Total	773.8	430.4	0	9656.7	77952
Education	238.6	155.3	0	3691.3	77949
Security	71.36	78.4	0	3744.7	77949
Administration	27.82	100.4	0	6643.2	46032
Urban management	174.9	148.3	0	6246.8	77949
Social services	136.8	142.3	0	4333.3	77949
Productive services	135.7	93.8	0	3522.2	77952
Composition of expenditure (%)					
Education	28.61	13.5	0	92.64	78179
Security	8.486	6.17	0	93.50	78180
Administration	2.686	3.01	0	68.52	46204
Urban management	19.92	9.13	0	98.61	78179
Social services	15.20	9.81	0	84.39	78180
Productive services	15.99	7.32	0	79.44	78180
Women in municipality political bodies:					
% women in council	19.07	11.3	0	85.71	79192
% women in executive board	17.53	16.5	0	100	79622
T1 - 5000 and 15000 residents vs less (dummy)	0.215	0.41	0	1	63576
Municipality holds election in or after 2013	0.00903	0.095	0	1	79192

Note: data restricted to period 2007-2013 to all municipalities.

Table 3. DiD baseline estimates

	% wemen in the municiplaity council					At least 20% women in council	% women in executive	Size of executive (% of council)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post*treat	14.38***	14.23***	14.16***	13.92***	13.89***	0.33***	12.29***	1.20***
	(0.34)	(0.36)	(0.36)	(0.37)	(0.37)	(0.01)	(0.55)	(0.17)
Post	7.97***	5.08***	4.68	4.44	4.53	0.08	2.51	-0.17
	(0.18)	(0.31)	(4.70)	(4.71)	(4.73)	(0.21)	(7.69)	(1.97)
Treat	-2.69***	-1.27*	-1.24*	-1.32*	-1.30*	-0.05	-1.51	-0.73***
	(0.26)	(0.72)	(0.72)	(0.74)	(0.73)	(0.03)	(1.09)	(0.26)
Constant	19.74***	18.32***	20.47***	39.72	219.15***	6.61**	140.09	-2.53
	(0.13)	(0.46)	(1.67)	(29.74)	(80.78)	(2.95)	(128.51)	(36.43)
Election controls								
Size of council			-0.04	-0.03	-0.04	0.01***	0.01***	-0.36***
			(0.05)	(0.05)	(0.05)	(0.00)	(0.00)	(0.09)
Municiplaity characteristics controls								
Population (ln)				-3.20	-24.99**	-0.81**	-13.21	4.71
				(4.50)	(10.54)	(0.38)	(16.38)	(4.66)
Families (ln)				1.41	2.55	0.10	-0.46	-0.40
				(1.30)	(1.92)	(0.06)	(2.59)	(0.69)
Density (ln)				-8.57	-16.56	-0.54	-49.03	1.83
				(19.45)	(20.97)	(0.85)	(30.33)	(8.43)
% old (65+)				8.43*	8.62*	0.43**	18.88**	-1.38
				(4.91)	(5.01)	(0.20)	(8.39)	(1.81)
% working age (35-65)				-4.38	-4.73	-0.03	-8.95	-1.06
				(3.93)	(3.98)	(0.16)	(6.48)	(2.39)
Municipality education and labor market controls								
% secondary education					-0.01	-0.00	0.00	0.01
					(0.08)	(0.00)	(0.13)	(0.04)
%Women with university degree					0.49	0.03*	1.47	-0.18
					(0.54)	(0.02)	(1.08)	(0.19)
% women housekeepers					0.75	0.03	3.17*	0.32
					(0.93)	(0.04)	(1.76)	(0.48)
% women unemployed					-1.66**	-0.06**	-3.51**	-0.15
					(0.72)	(0.03)	(1.38)	(0.34)
% women retired					1.37*	0.05	3.05**	0.24
					(0.79)	(0.03)	(1.49)	(0.36)
Additional controls								
Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region*year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Election FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
N	107403	107381	107381	105682	105431	105431	105406	105430
R2	0.186	0.595	0.597	0.596	0.596	0.480	0.476	0.370

Note: regressions based on years 2002-2018 limited to municipalities below 15,000 residents. Post is for elections taking place in 2013 onward, treat is for baseline treatment T1. Effects in all models except (6) are in percentage points, effects in models (6) can be understood as growth rates. Election FE include election year dummies and indicators for years from last municipal election. All models report OLS estimates with robust standard errors clustered at municipality level. Significance: * = 10%, ** = 5%, *** = 1%.

Table 4. DiD model: effects by characteristics of elected

Dependent variable	% women in council	Female councilors				All councilors			
		Employed (%)	*Not employed (%)*	*High education (%)*	*Age (ln)*	*Employed (%)*	*Not employed (%)*	*High education (%)*	*Age (ln)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
All municipalities									
Post*treat		-3.69***	3.27**	-0.27	-0.02***	-1.60**	1.90**	-2.22***	-0.03***
		(1.29)	(1.29)	(1.17)	(0.01)	(0.81)	(0.83)	(0.73)	(0.00)
N		99304	99304	105431	75788	99304	99304	105431	105430
R2		0.405	0.410	0.388	0.523	0.465	0.464	0.604	0.599
Municipalities with average % women in council below median (~ 20%)									
Post*treat	19.35***	-6.48***	6.47***	2.43	-0.03*	-2.25*	2.45**	-2.19**	-0.03***
	(0.49)	(2.12)	(2.10)	(1.98)	(0.02)	(1.17)	(1.21)	(1.08)	(0.00)
N	51300	45418	45418	51300	34373	45418	45418	51300	51299
R2	0.486	0.407	0.414	0.350	0.506	0.489	0.489	0.619	0.599
Municipalities with average % women in council above median (~ 20%)									
Post*treat	9.30***	-1.60	0.84	-2.71**	-0.02*	-1.23	1.61	-2.33**	-0.02***
	(0.51)	(1.62)	(1.63)	(1.36)	(0.01)	(1.12)	(1.15)	(1.01)	(0.00)
N	54131	53886	53886	54131	41415	53886	53886	54131	54131
R2	0.431	0.405	0.406	0.446	0.534	0.444	0.441	0.591	0.601

Note: regression based on years 1998-2018 limited to municipalities below 15000 residents. Post is for councils elected in 2013 onward, Treat is for council elections taking place in municipalities identified by T1. Effects are always in percentage points except for models (5) and (9), which are interpreted as growth rates. Controls as re in Table 3, model 5. All OLS regressions include robust standard errors clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table 5. IV estimates on municipal spending: baseline

	Total expenditure	Expenditure items:					
		Education	*Security*	*Administration*	*Environment*	*Social Services*	*Productive services*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A) Aggregate (ln)							
RF: Treat*post	0.0122	0.0001	0.1533**	-0.1532**	0.0334	0.0411	0.0965*
	(0.0224)	(0.0309)	(0.0623)	(0.0657)	(0.0525)	(0.0425)	(0.0504)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
IV 2nd stage: % women	0.0008	0.0000	0.0103**	-0.0101***	0.0022	0.0028	0.0065**
	(0.0014)	(0.0020)	(0.0041)	(0.0039)	(0.0033)	(0.0027)	(0.0031)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
B) Per capita (ln)							
RF: Treat*post	0.0120	0.0001	0.1533**	-0.1532**	0.0334	0.0411	0.0965*
	(0.0224)	(0.0309)	(0.0623)	(0.0657)	(0.0525)	(0.0425)	(0.0504)
R2	0.863	0.879	0.757	0.654	0.794	0.869	0.810
IV 2nd stage: % women	0.0008	0.0000	0.0103***	-0.0101**	0.0022	0.0028	0.0065**
	(0.0014)	(0.0020)	(0.0039)	(0.0040)	(0.0032)	(0.0027)	(0.0033)
R2	0.863	0.879	0.757	0.654	0.794	0.869	0.810
C) % of total expenditures							
RF: Treat*post		-0.0059	0.0060	0.0012	0.0012	-0.0026	0.0010
		(0.0063)	(0.0039)	(0.0035)	(0.0065)	(0.0047)	(0.0051)
R2		0.868	0.790	0.514	0.793	0.855	0.841
IV 2nd stage: % women		-0.0004	0.0004	0.0001	0.0001	-0.0002	0.0001
		(0.0004)	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0003)
R2		0.868	0.790	0.514	0.793	0.855	0.841
D) First stage coefficients							
Treat*post	14.9139***	14.8793***	14.8830***	15.1911***	14.8916***	14.8818***	14.8821***
	(1.4366)	(1.4363)	(1.4529)	(1.8809)	(1.4364)	(1.4365)	(1.4369)
R2	0.664	0.664	0.671	0.766	0.664	0.664	0.664
*F (treat*post=0)*	*107.78*	*107.31*	*104.93*	*65.23*	*107.48*	*107.33*	*107.27*
N	62191	62144	55533	29884	62164	62156	61934

Note: regressions based on years 2007-2013 and municipalities of size smaller than 15,000 residents. The sample size varies across specifications. Panels A, B and C report reduced forms estimates (RF) and two-stages least squares (IV 2[nd] stage). Panel D estimates are from OLS regression. Effects in panels A and B are growth rates, whereas effects in panels C and D are in pp. All models control for treatment and post indicators, year FE, municipality FE, region*year FE, election controls, demographics and population human capital at municipality level. All regressions include robust standard errors clustered at municipality level. Second stage SE are bootstrapped 500 times. Significance level: * = 10%, ** = 5%, *** = 1%.

Table 6. IV estimates on municipal spending: channels.

	Total expenditure	Expenditure items:					
		Education	*Security*	*Administration*	*Environment*	*Social Services*	*Productive services*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A) % Women in board							
IV 1st stage: Treat*post	8.9030***	8.8594***	8.8014***	8.5815***	8.8732***	8.8558***	8.8516***
	(2.0158)	(2.0166)	(2.0438)	(2.5725)	(2.0168)	(2.0168)	(2.0176)
*F-test : treat*post=0*	*19.51*	*19.30*	*18.55*	*11.13*	*19.36*	*19.28*	*19.25*
IV 2nd stage: % women	0.0014	0.0000	0.0174**	-0.0179**	0.0038	0.0046	0.0109*
	(0.0024)	(0.0034)	(0.0069)	(0.0073)	(0.0056)	(0.0044)	(0.0056)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
B) % Women in council by employment:							
Employed							
IV 1st stage: Treat*post	-11.1046**	-11.1313**	-11.5369**	-11.5920**	-11.1418**	-11.1228**	-11.1638**
	(4.4624)	(4.4624)	(4.6148)	(5.3159)	(4.4626)	(4.4618)	(4.4630)
*F-test : treat*post=0*	*14.81*	*14.80*	*16,07*	*12.92*	*14.76*	*14.72*	*14.71*
IV 2nd stage: % women	-0.0011	-0.0000	-0.0133**	0.0132**	-0.0030	-0.0037	-0.0086*
	(0.0021)	(0.0026)	(0.0053)	(0.0053)	(0.0044)	(0.0038)	(0.0046)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
Not employed							
IV 1st stage: Treat*post	9.4449**	9.4742**	9.9797**	9.1721*	9.4852**	9.4660**	9.5014**
	(4.4812)	(4.4809)	(4.6087)	(5.4897)	(4.4811)	(4.4805)	(4.4813)
*F-test : treat*post=0*	*6.19*	*6.22*	*6.25*	*4.76*	*6.23*	*6.21*	*6.26*
IV 2nd stage: % women	0.0051	0.0000	0.0396***	-0.4798***	0.0144	0.0178	0.0429**
	(0.0089)	(0.0128)	(0.0153)	(0.1771)	(0.0202)	(0.0169)	(0.0206)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
C) % Women in council with high educaton							
IV 1st stage: Treat*post	2.4037	2.2557	3.8663	0.3193	2.3116	2.3086	2.2516
	(4.2427)	(4.2431)	(4.3845)	(5.4890)	(4.2435)	(4.2430)	(4.2446)
*F-test : treat*post=0*	*4.44*	*4.47*	*4.69*	*2.79*	*4.48*	*4.46*	*4.50*
IV 2nd stage: % women	0.0051	0.0000	0.0396***	-0.4798***	0.0144	0.0178	0.0429**
	(0.0089)	(0.0128)	(0.0153)	(0.1771)	(0.0202)	(0.0169)	(0.0206)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
D) Average age of women in council (ln)							
IV 1st stage: Treat*post	0.0099	0.0098	0.0078	0.0220	0.0098	0.0099	0.0099
	(0.0232)	(0.0232)	(0.0241)	(0.0336)	(0.0232)	(0.0232)	(0.0232)
*F-test : treat*post=0*	*0.32*	*0.28*	*0.78*	*0.00*	*0.30*	*0.30*	*0.28*
IV 2nd stage: age of women (ln)	1.2326	0.0055	19.6207**	-6.9743**	3.3902	4.1452	9.7814**
	(2.1894)	(3.0175)	(7.6377)	(2.7376)	(5.2945)	(4.1008)	(4.8635)
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
N	62191	62144	55533	29884	62164	62156	61934

Note: regressions based on years 2007-2013 and municipalities of size smaller than 15,000 residents. Outcomes always refer to the log of aggregate expenditure (expenditure items by column). Effects are always interpreted as growth rates. All models control for treatment and post indicators, year FE, municipality FE, region*year FE, election controls, demographics and population human capital at municipality level. All regressions include robust standard errors clustered at municipality level. Second stage SE are bootstrapped 500 times. Significance level: * = 10%, ** = 5%, *** = 1%.

Appendix

Table A.1. Description of data sources

Administrative records on elected politicians – *Archivio storico delle amministrazioni regionali e locali AARL*, (2002-2018).

Source: Italian Ministry of Interior, Department of Interior and Territorial affairs
Site: https://elezionistorico.interno.gov.it/

Variables: ISTAT identification code of Municipality; ISTAT code of Region; ISTAT code of Provinces; Date of election. For each elected candidate, the database reports : Level of office held in Council; Civil list affiliation of candidate; Political affiliation of candidate (see replication code for assignment of parties on left-right scale based on position with national parliament wings); Education level of candidate (higher diploma achieved); Age of candidate; Gender of candidate; Employment status of candidate.

Archive of national 2011 census aggregate tables, by municipality, and Socio demographic characteristics and dynamics of the population by year (2002-2018)
Source: ISTAT- National Statistics Institute and Italian Population Census
Site: www.demo.istat.it
Variable: Resident population in each municipality: by gender; by age; by immigration status; by employment status and occupation; by education level.

Individual Income Tax Declarations aggregate data by municipality of residence – *Imposta sui redditi da persona fisica IRPEF*, (2008-2013)
Source : Ministry of Economics and Finance
Site: https://www1.finanze.gov.it/finanze3/pagina_dichiarazioni/dichiarazioni.php
Variables: Data on income declarations at municipality level: Frequency of taxpayers distribution across 8 pre-tax income brackets; Total taxable income declared in each bracket; Pre-tax income level per capita; Quartiles of the distribution of pre-tax income per capita; Total amount of municipality pre-tax income.

Data on Municipal Spending – *Certificati consuntivi di bilancio* (2007-2013)
Source: Italian Ministry of Interior – Department of Interior and Territorial affairs
Site: https://finanzalocale.interno.gov.it/apps/floc.php/in/cod/4
Variables: Selected indicators of budgeted expenditures in current budgeting year. Indicators are aggregated in budget items following the classification of the Italian budget reporting rules, provided by Law 216/2010 (*D.lgs. 26 novembre 2010, n. 216, Art. 3*). These aggregate items define expenditure on the fundamental operations of municipalities (*Funzioni fondamentali e classificazione delle relative spese*) and are collected in Boxes (*Quadri*) 4 and 13 on the online database of municipality budgets (the same indicators are used to determine standard expenditure needs). Consistently (where possible) with the classification of expenditure provided by the Law, we identify the following aggregates:
- Education (*funzioni di istruzione pubblica*), gathering expenses on public childcare (age 0-2), kindergarten (age 2-6), primary and secondary (middle and upper) schooling, other expenses.
- Security (*funzioni di polizia locale*), gathering expenses in local/administrative/municipal police and other minor items;
- Administration (*funzioni generali di amministrazione*), gathering aggregate expenditure in administration and other minor items.
- Urban management (*edilizia residenziale pubblica e piani di edilizia*), gathering expenditure on public housing, urbanization and construction.
- Social services (*funzioni del settore sociale*), gathering expenditure on social spending, local welfare state, and socialization events on the domains of cultural, sport and touristic activities.
- Productive services (*funzioni nel campo di viabilità e trasporti e servizi essenziali*), gathering expenditure on fundamental public services such as public lightening and waste management, as well as on promotion of local development initiatives.

Table A.2. DiD model: compositional effects by employment and gender

Dependent variable	Composition of council: % member of council that are women and				
	Retired	*Unemployed*	*Student*	*Entrepreneurs*	*Employed or self-employed*
	(2)	(3)	(4)	(5)	(6)
Post*treat	0.07	0.73***	0.36***	0.66***	8.76***
	(0.09)	(0.12)	(0.09)	(0.11)	(0.48)
Post	-2.80**	-2.85	-0.30	-0.63	3.86
	(1.25)	(2.05)	(1.12)	(0.81)	(3.95)
Treat	-0.21	-0.35	0.04	-0.02	-1.02
	(0.23)	(0.23)	(0.14)	(0.25)	(0.98)
Constant	41.59**	48.97*	-12.68	-20.90	169.34**
	(17.47)	(28.41)	(21.12)	(20.91)	(77.68)
N	105430	105430	105430	105430	105430
R2	0.545	0.470	0.354	0.437	0.510

Note: regression based on years 1998-2018 limited to municipalities below 15000 residents. Post is for councils elected in 2013 onward, Treat is for council elections taking place in municipalities identified by T1. Effects are always in percentage points, except in model (10) which can be interpreted as growth rates. All models control for year FE, municipality FE, region*year FE, election FE and controls, population size, demographics and population human capital at municipality level. All OLS regressions include robust standard errors clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table A.3. DiD model: compositional effects by education and gender

Dependent variable	Composition of council: % women and:		Share (%) of women with high education	Composition of council: % men and:		Share (%) of men with high education
	High educated	*Low educated*		*High educated*	*Low educated*	
	(1)	(2)	(3)	(4)	(5)	(6)
Post*treat	10.81***	0.83***	-0.27	-13.02***	0.09	-1.64**
	(0.47)	(0.15)	(1.17)	(0.57)	(0.37)	(0.72)
N	105431	105431	105431	105431	105431	105431
R2	0.533	0.514	0.388	0.637	0.699	0.624

Note: regression based on years 1998-2018 limited to municipalities below 15000 residents. Post is for councils elected in 2013 onward, Treat is for council elections taking place in municipalities identified by T1. Effects are always in percentage points. Controls are as in Table 3, model 5. All OLS regressions include robust standard errors clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table A.4. DiD model: compositional effects by age and gender

Dependent variable	Composition of council: % member of council that are women and			Composition of council: % member of council that are men and		
	Aged 18-30	*Aged 31-50*	*Aged 51+*	*Aged 18-30*	*Aged 31-50*	*Aged 51+*
	(1)	(2)	(3)	(4)	(5)	(6)
Post*treat	2.19***	2.19**	-4.38***	0.00	0.02***	-0.02***
	(0.74)	(1.06)	(0.97)	(0.00)	(0.01)	(0.01)
N	99304	99304	99304	105430	105430	105430
R2	0.291	0.280	0.392	0.324	0.400	0.479

Note: regression based on years 1998-2018 limited to municipalities below 15000 residents. Post is for councils elected in 2013 onward, Treat is for council elections taking place in municipalities identified by T1. Effects are always in percentage points. Controls are as in Table 3, model 5. All OLS regressions include robust standard errors clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table A.5. DiD model robustness checks: definition of treatment

Dependent variable	% women in the municipality council					
Type of treatment "T"	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*
	(1)	(2)	(3)	(4)	(5)	(6)
Post*treat "T"	12.24***	14.26***	12.52***	10.90***	13.87***	14.52***
	(0.33)	(0.50)	(0.36)	(0.32)	(0.42)	(1.64)
Post	5.54	5.60	9.41***	8.80***	9.91***	1.93
	(4.53)	(4.69)	(2.65)	(2.49)	(3.06)	(2.35)
Treat "T" (model specific)	-0.10	-1.93**	-1.02	0.08	-2.00*	-1.84
	(0.72)	(0.79)	(0.69)	(0.69)	(1.05)	(4.22)
Constant	169.75**	160.93**	192.32***	136.41*	378.82***	211.15
	(80.92)	(80.11)	(74.07)	(74.16)	(126.56)	(721.82)
N	114773	94849	120543	131179	55753	25259
R2	0.609	0.572	0.601	0.613	0.699	0.866

Note: regression based on years 1998-2018. Post is for elections taking place in 2013 onward. Treatment indicators (by column) are defined as in Table 1. Effects are always interpreted in percentage points. Election FE include election year dummies and indicators for years from last municipal election. Controls are as in Table 3, model 5. OLS regressions with robust standard errors clustered at municipality level. Significance: * = 10%, ** = 5%, *** = 1%.

Table A.6. IV estimates on aggregate municipal spending (ln): Disaggregated expenditure item

	Reduced form: expenditure item		First stage: % women in council		Second stage: expenditure item	
	Coeff.	*SE*	*Coeff.*	*SE*	*Coeff*	*SE*
Public childcare						
Treat*post	-0.0875	(0.1570)	15.5436***	(1.8779)		
% women in council					-0.0056	(0.0102)
N	37065		37065		37065	
Kindergarten						
Treat*post	-0.0259	(0.0293)	14.9646***	(1.4414)		
% women in council					-0.0017	(0.0020)
N	61826		61826		61826	
Primary education						
Treat*post	0.0068	(0.0679)	14.2109***	(1.4492)		
% women in council					0.0005	(0.0043)
N	51955		51955		51955	
Secondary education (middle)						
Treat*post	0.0943**	(0.0480)	14.8167***	(1.4325)		
% women in council					0.0064**	(0.0032)
N	58154		58154		58154	
Secondary education (upper)						
Treat*post	0.0576	(0.0558)	13.9013***	(1.5650)		
% women in council					0.0041	(0.0038)
N	45871		45871		45871	
Other education expenditures						
Treat*post	-0.0513	(0.0400)	14.9422***	(1.4584)		
% women in council					-0.0034	(0.0027)
N	60146		60146		60146	
Local police						
Treat*post	0.1486**	(0.0621)	14.8829***	(1.4529)		
% women in council					0.0100**	(0.0043)
N	55530		55530		55530	
Administration						
Treat*post	-0.1541**	(0.0657)	15.1911***	(1.8810)		
% women in council					-0.0101**	(0.0042)
N	29873		29873		29873	
Urbanization						
Treat*post	-0.1741	(0.1533)	15.9189***	(1.7625)		
% women in council					-0.0109	(0.0089)
N	39471		39471		39471	
Public housing						
Treat*post	0.1043	(0.2098)	15.7845***	(2.6667)		
% women in council					0.0066	(0.0130)
N	18204		18204		18204	
Social spending						
Treat*post	0.0603	(0.0512)	14.8822***	(1.4368)		
% women in council					0.0041	(0.0032)
N	62085		62085		62085	
Culture						
Treat*post	-0.0907	(0.0769)	14.3740***	(1.4765)		
% women in council					-0.0063	(0.0050)
N	54803		54803		54803	
Sport (facilities, events)						
Treat*post	-0.1231*	(0.0733)	14.5104***	(1.4356)		
% women in council					-0.0085*	(0.0048)
N	57274		57274		57274	
Tourism						
Treat*post	-0.3607**	(0.1688)	14.2877***	(1.9741)		
% women in council					-0.0252**	(0.0113)
N	34289		34289		34289	
Waste management						
Treat*post	0.1479	(0.0976)	15.0942***	(1.4469)		
% women in council					0.0098	(0.0063)
N	60505		60505		60505	
Public lighting						
Treat*post	-0.0265	(0.0336)	14.9655***	(1.4632)		
% women in council					-0.0018	(0.0023)
N	58540		58540		58540	

Note: regression based on years 2007-2013 and municipalities of size smaller than 15,000 residents. The main treatment variable is the % of women in municipality council. Dependent variables are aggregate spending (in log) in each item. All models specified as in Table 5. All regressions include robust standard errors clustered at municipality level, second stage SE are bootstrapped 500 times. Significance level: * = 10%, ** = 5%, *** = 1%.

Table A.7. Reduced form estimates on municipal spending: Identification checks.

	Total expenditure	Expenditure items:					
		Education	*Security*	*Administration*	*Environment*	*Social Services*	*Productive services*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A) OLS estimates							
% women in council	-0.0001	-0.0001	0.0004	-0.0008	0.0000	0.0001	0.0001
	(0.0002)	(0.0003)	(0.0006)	(0.0007)	(0.0003)	(0.0003)	(0.0003)
N	62191	62144	55533	29884	62164	62156	61934
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
B) Using *eligibility* indicator, excludes municipalities with T1=1 holding elections in 2013							
IV 1st stage: Eligibility	0.1715	0.1741	0.1946	0.1838	0.1771	0.1852	0.1679
	(0.2673)	(0.2674)	(0.2722)	(0.2317)	(0.2673)	(0.2673)	(0.2678)
F test: Eligibility=0	*0.41*	*0.42*	*0.51*	*0.63*	*0.44*	*0.48*	*0.39*
RF: Eligibility	0.0496***	-0.0245***	0.0524***	-0.0455**	0.2127***	0.0023	0.2935***
	(0.0069)	(0.0082)	(0.0159)	(0.0225)	(0.0197)	(0.0106)	(0.0225)
N	61749	61703	55122	29550	61723	61715	61493
R2	0.981	0.974	0.887	0.793	0.930	0.962	0.927
C) Baseline model, add control for municipalities with T1=1 holding elections after 2013							
RF: Treat*post	0.0160	-0.0019	0.1566**	-0.1563**	0.0497	0.0412	0.1192**
	(0.0225)	(0.0308)	(0.0623)	(0.0657)	(0.0527)	(0.0425)	(0.0507)
N	62191	62144	55533	29884	62164	62156	61934
R2	0.980	0.973	0.886	0.794	0.930	0.961	0.927
D) Baseline model, excludes from sample all municipalities with T1=1 holding elections after 2013							
RF: Treat*post	0.0144	-0.0035	0.1580**	-0.1473**	0.0422	0.0439	0.1035**
	(0.0227)	(0.0313)	(0.0632)	(0.0648)	(0.0539)	(0.0429)	(0.0521)
N	50517	50471	44213	23455	50495	50485	50297
R2	0.973	0.966	0.856	0.739	0.922	0.946	0.940
E) Baseline model, excludes from sample all municipalities not holding elections in 2013							
RF: Treat*post	-0.0150	-0.0128	0.0957	-0.1265*	0.0206	0.0216	0.0697
	(0.0244)	(0.0338)	(0.0685)	(0.0671)	(0.0620)	(0.0496)	(0.0535)
N	4403	4401	4112	2129	4401	4399	4401
R2	0.978	0.972	0.881	0.721	0.934	0.949	0.939

Note: regressions based on years 2007-2013 and municipalities of size smaller than 15,000 residents. The IV estimates are obtained from a two steps procedure as in table 6. The dependent variable in models OLS and IV 2nd stage is always the log of expenditure at municipality level. The treatment, sample selection and controls vary across panels. Controls are as in Table 5. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table A.8. Reduced form estimates on municipal spending: Robustness checks.

	Total expenditure	Expenditure items:					
		Education	*Security*	*Administration*	*Environment*	*Social Services*	*Productive services*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A) Municipality-legislature sample							
RF: % women in council	0.0251	0.0117	0.1713**	-0.1698*	0.0354	0.0619	0.1002
	(0.0298)	(0.0409)	(0.0811)	(0.0962)	(0.0629)	(0.0573)	(0.0626)
N	15462	15457	14283	11009	15460	15460	15427
R2	0.984	0.978	0.910	0.829	0.953	0.968	0.954
B) Subsample of adopted in model (4-administration) in Table 5							
RF: % women in council	-0.0135	-0.0056	0.0978	-0.1532**	0.0362	-0.0201	0.1123**
	(0.0252)	(0.0336)	(0.0784)	(0.0657)	(0.0607)	(0.0470)	(0.0572)
N	29884	29864	27066	29884	29873	29875	29756
R2	0.982	0.980	0.922	0.794	0.937	0.971	0.929
C) Aggregate expenditure (ln); controls for policital orintation of the council							
RF: % women in council	0.0121	-0.0002	0.1540**	-0.1527**	0.0336	0.0410	0.0972*
	(0.0224)	(0.0309)	(0.0624)	(0.0657)	(0.0523)	(0.0425)	(0.0504)
N	62191	62144	55533	29884	62164	62156	61934
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
D) Aggregate expenditure (ln); controls for fiscal revenues levels and distribution at municipality level							
RF: % women in council	0.0122	0.0001	0.1533**	-0.1532**	0.0334	0.0411	0.0965*
	(0.0224)	(0.0309)	(0.0623)	(0.0657)	(0.0525)	(0.0425)	(0.0504)
N	62191	62144	55533	29884	62164	62156	61934
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926
E) Aggregate expenditure (ln); Control group limited to municipalities below 1000 residents							
RF: % women in council	0.0076	-0.0003	0.4584**	-0.0363	-0.0140	0.0277	0.0275
	(0.0412)	(0.0698)	(0.1935)	(0.1175)	(0.0662)	(0.0734)	(0.0590)
N	29770	29728	24272	14070	29749	29742	29661
R2	0.987	0.979	0.919	0.832	0.948	0.973	0.941
F) Aggregate expenditure (ln); Specific treatment: most conservative, limited to period 2010/2013 (treatment T7)							
RF: % women in council	0.0084	0.0048	0.0885	-0.1167*	0.0352	0.0328	0.0789
	(0.0223)	(0.0297)	(0.0568)	(0.0659)	(0.0524)	(0.0402)	(0.0496)
N	24913	24893	22182	19609	24901	24896	24808
R2	0.983	0.982	0.938	0.852	0.944	0.974	0.937

Note: regressions based on years 2007-2013 (except panel F) and municipalities of size smaller than 15,000 residents. RF is for reduced form estimate. The dependent variable is always the log of aggregate expenditure (total and by expenditure item) at municipality level. Effects are always interpreted as growth rates. All models in all panels control for treatment and post indicators, year FE, municipality FE, region*year FE, electoral cycle FE, demographics and population human capital at municipality level. All OLS estimates, SE are always robust and clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.

Table A.9. IV estimates on municipal spending: Placebo tests.

	Total expenditure	Expenditure items:					
		Education	*Security*	*Administration*	*Environment*	*Social Services*	*Productive services*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A) Effects simulated in 2012 using municipalities with treat*post=1 in 2013							
IV 2nd stage: % women in council	0.0272	0.0346	0.2201	0.9898	0.0489	0.0240	0.0085
	(0.0520)	(0.0594)	(0.1469)	(1.9158)	(0.1387)	(0.0884)	(0.1530)
IV 1st stage: Treat*post	0.2349	0.2398	0.2140	-0.0286	0.2334	0.2321	0.2291
	(0.4307)	(0.4307)	(0.4249)	(0.2425)	(0.4308)	(0.4308)	(0.4312)
N	56075	56037	50071	25188	56056	56048	55846
R2	0.983	0.976	0.890	0.792	0.937	0.963	0.936
B) Effects simulated in 2010 using municipalities with treat*post=1 in 2013							
IV 2nd stage: % women in council	-0.0316	-0.0485	0.3892**	0.9664	0.0264	0.0149	0.1814
	(0.0612)	(0.0663)	(0.1553)	(7.0036)	(0.1720)	(0.0898)	(0.1680)
IV 1st stage: Treat*post	0.2545	0.2595	0.2150	0.0167	0.2607	0.2577	0.2463
	(0.4931)	(0.4928)	(0.4829)	(0.2895)	(0.4930)	(0.4930)	(0.4932)
N	56075	56037	50071	25188	56056	56048	55846
R2	0.983	0.976	0.890	0.792	0.937	0.963	0.936
C) Effects simulated in 2010 on municipalities where election took place in 2010-2012.							
IV 2nd stage: % women in council	3.5680**	-0.4166	1.2174***	-0.4845***	6.7541***	0.4121	15.0539***
	(1.4904)	(1.3866)	(0.3640)	(0.1058)	(1.7613)	(0.6146)	(3.3963)
IV 1st stage: Treat*post	0.0056	0.0082	0.0543	0.2704	0.0103	0.0238	0.0055
	(0.5421)	(0.5425)	(0.5543)	(0.6673)	(0.5427)	(0.5421)	(0.5433)
N	62044	61997	55388	29758	62017	62009	61787
R2	0.980	0.973	0.886	0.793	0.929	0.961	0.926
D) Falsification test: % women in council randomized within municipalities across years.							
IV 2nd stage: % women in council	0.0149	0.0001	0.1752**	-0.1070**	0.0412	0.0507	0.1196**
	(0.0278)	(0.0349)	(0.0682)	(0.0420)	(0.0630)	(0.0474)	(0.0609)
IV 1st stage: Treat*post	0.8181	0.8244	0.8748	1.4324	0.8108	0.8099	0.8069
	(1.4836)	(1.4839)	(1.5129)	(1.8596)	(1.4840)	(1.4840)	(1.4844)
N	62191	62144	55533	29884	62164	62156	61934
R2	0.980	0.973	0.886	0.794	0.929	0.961	0.926

Note: regressions based on years 2007-2013 and municipalities of size smaller than 15,000 residents. The IV estimates are obtained from a two steps procedure as in table 6. Second stage effects are always interpreted as growth rates, whereas first stage effects are in percentage points variations. All models in all panels control for treatment and post indicators, year FE, municipality FE, region*year FE, electoral cycle FE, demographics and population human capital at municipality level. Standard errors are bootstrapper 500 times and are always robust and clustered at municipality level. Significance levels: * = 10%, ** = 5%, *** = 1%.