Full Length Article

Do women commemorate women? How gender and ideology affect decisions on naming female streets

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A B S T R A C T

Street names are not neutral identifiers to navigate through cities but are charged with strong symbolic connotations and reflect power relations within society. A growing body of geographic scholarship documents a strong gender bias in the urban namespace, where women only represent a small fraction of streets named after people. This article investigates whether the lack of women in political decision-making roles contributes to explaining their marginalization in urban toponyms. More specifically, we study the impact of the gender and ideology of town mayors on their decisions to commemorate women in the street map. Focusing on the universe of Spanish towns during the period 2001–2023, we find through fixed effects panel data models and regression discontinuity design that the mayor's gender does not affect the percentage of female-named streets, while the ideology of the governing party does. Our findings thus indicate that it is ideology rather than gender what shapes politicians' preferences regarding the commemoration of women in the street map. We argue that this is because, on the one hand, strong political parties can impose their agenda on local leaders, making irrelevant differences in their gender and, on the other, the ideological cleavage is more relevant than the gender one to account for differences in attitudes towards symbolic gender policies. A natural implication of our results is that simply having more female politicians will hardly suffice to address the gender gap in street names and in other symbolically charged policies.

1. Introduction

Women are vastly underrepresented in street names. An analysis of 32 major cities located in 19 European countries resulted in that only 9% of streets named after people commemorate female figures (EDJN, 2023). In Spain, a study of the whole street map found a share of female-named streets of 12% (Gutiérrez-Mora & Oto-Peralías, 2022), while another article about Romania found that women only represent a tiny fraction of 4% (Rusu, 2024a).

This strong gender bias in street names, far from being unnoticed and uncontroversial, is on the agenda of social movements and some political parties who are actively pushing to achieve a more egalitarian representation of women (Alderman, 2022; Bigon & Zuvalinyenga, 2021; UNESCO, 2024). Recent survey data from Spain show that 59% of respondents agree that priority should be given to women's names to correct their underrepresentation on the streets (Gutiérrez-Mora & Oto-Peralías, 2024). Along this line, the electoral program of the Spanish Socialist Party for the 2023 municipal election commits to name at least two thirds of new streets after women (PSOE, 2023).

Urban toponyms are not neutral identifiers to navigate through cities. They are charged with strong symbolic connotations and reflect power relations within society (Azaryahu, 1996; Rose-Redwood et al., 2010). This is arguably the reason why they matter to both politicians and citizens, to such an extent that -for example- "in some years, more than 40 percent of all local laws passed by the New York City Council have been street name changes" (Mask, 2020, p. 1). The marked underrepresentation of women in the street map and in memorial landscapes in general has attracted the attention of geographers and other social scientists to uncover the factors and processes behind it (Alderman & Inwood, 2013; Drozdzewski & Monk, 2020; Mamvura et al., 2018; Rusu, 2024a). In this article, we employ a quantitative approach to investigate the impact of the gender and ideology of local rulers on the percentage of female-named streets.

Street names provide an interesting measure to analyze whether women, when achieving leadership political positions, pursue policies favoring their interests as a (still) underrepresented collectivity in many

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dimensions of society. While there is some evidence pointing to this direction (Baskaran & Hessami, 2023; Clots-Figueras, 2011; Lippmann, 2022), other recent studies find opposite results (Carozzi & Gago, 2023; Cavallini et al., 2023). Using street-name data presents several attractive features to investigate this issue. It is a gender-specific policy, entirely discretional by the local government, and very granular, as it can be quantified every year at the municipality level. Moreover, street names bear a major symbolic meaning since they encapsulate the societal views, values, and priorities over the issue being commemorated, potentially affecting behaviors and identity by naturalizing the social and cultural meanings inscribed on them (Azaryahu, 1996; Buchstaller et al., 2024; Drozdzewski, 2014; Oto-Peralías, 2018; Rose-Redwood et al., 2010).

We employ standard regression analysis and regression discontinuity design (RDD) to analyze the effect of the mayor's gender and ideology on female-named streets for the universe of Spanish municipalities during the period 2001–2023. Leveraging on the classifier algorithm developed by Gutiérrez-Mora and Oto-Peralías (2022), we create a yearly indicator measuring the percentage of streets named after women among those named after people for each one of the Spanish municipalities. At the aggregate level, the percentage of female streets has slowly increased from 9.76% in 2001 to 12.74% in 2023, but hiding a high heterogeneity across cities. For instance, Madrid has 18.3% of female streets while Valencia (the third largest city in Spain) only 9.4%.

We first show that there exists a positive cross-section relationship between the number of years a town council has been headed by a woman and the female share in street names. This positive relationship however vanishes when employing municipality fixed effects panel data models. The latter suggests that some characteristics of municipalities (such as younger populations, higher importance of the service sector, etc.) jointly lead to a more feminized street map and more women mayors. This is further corroborated through an RDD analysis of close gender-mixed electoral races. In contrast, the ideology of the mayor's political party consistently influences the female share in street names. Specifically, left-wing mayors increase the percentage of female-named streets in cross-section, fixed effects panel data, and RDD models. Thus, our findings indicate that it is ideology rather than gender what determines the agenda and decisions of policy makers.

While the determinants of the low proportion of female-named streets in the cityscape are complex, reflecting historic power imbalances and other factors involved in the politics of memory (Drozdzewski & Monk, 2020), this paper contributes by quantitatively examining the role of two of these factors -gender and ideology. Indeed, the absence of women from political decision-making roles has been frequently referred to as one of the explanatory factors behind their underrepresentation in street names. Perhaps surprisingly, the results show that this is not the case. At least for Spanish local politics, women do not seem to commemorate women more than men do, implying that having female political leaders *per se* does not suffice to achieve greater gender equality in the streetscape. These results are consistent with quantitative studies examining the effect of the gender of politicians on substantive gender policies (Bagues & Campa, 2021; Carozzi & Gago, 2023).

The rest of the paper is organized as follows. Section 2 presents a brief overview of the related literature and outlines a simple conceptual framework to guide the analysis. Section 3 summarizes the institutional background. Section 4 describes the data and the analytical approach. Section 5 presents the cross-section, panel data, and RDD results. Finally, Section 6 discusses the results and concludes.

2. Related literature and conceptual framework

2.1. Related literature

A growing body of research analyzes urban toponyms through critical lens, asserting that they are not innocent or neutral identifiers with a simple orientation purpose but convey a strong symbolic power. Street names "make up the very foundations of urban spatial imaginaries" (Rose-Redwood et al., 2018, p. 309). They exert a subtle but continuous influence by naturalizing the social and cultural meanings inscribed on them, thus becoming powerful instruments for legitimizing the status quo (Azaryahu, 1996; Drozdzewski, 2014; Rose-Redwood et al., 2010).

A distinctive feature of street names is their ability to introduce a version of history and cultural values into the common space of everyday life, contributing to the reproduction of this narrative (Azaryahu, 1996). This symbolic power is reflected in the frequent renaming of streets that accompanies major political changes, by which political regimes seek to "naturalize" their authority (Gonzalez- Faraco & Murphy, 1997; Palonen, 2008). Drozdzewski (2014) emphasizes how street naming involves a politics of memory, where a particular version of history and society is chosen and given prominence in the public arena. Even in democratic societies, one group's version of history is preferred over another because memory is a social construction. Thus, the process of naming "sheds light on power relations -how some social groups have the authority to name while others do not- and the selective way in which such relations reproduce the dominance of certain ideologies and identities over others" (Rose-Redwood et al., 2010, p. 462).

Both what is chosen and not for representation in the public memory landscape have the potential to shape public opinion. It conveys the notion of who deserves to be remembered and who does not (Drozdzewski & Monk, 2020). The fact that ethnic minorities and marginalized groups are underrepresented in the "sites of memories" is hardly surprising. In this regard, the exclusion of women from the streetscape is particularly remarkable as they represent half of the population. Rusu (2024a) highlights the contrast between the significant progress in gender equality in terms of legal rights, political participation and economic opportunities, and the still strongly male-dominated memorial landscapes. The representation of women is not only much less frequent but, when they appear, it is often in allegorical, fictional or mythical forms (Drozdzewski & Monk, 2020).

Scholars seeking to explain the underrepresentation of women (particularly, "real" ones) in the cityscape emphasize two factors, which we can call historical-sociological and political. On the one hand, women have historically been excluded from public life and, as a result, their work has been less known and recognized, making them less likely to be publicly commemorated (Gutiérrez-Mora & Oto-Peralías, 2022). Weidenmuller et al. (2015) argue that cultural landscapes are not consciously designed and built to represent or reproduce established gender stereotypes. Instead, they "seemingly innocently reflect broader power structures within society", but in fact normalize and naturalize these power structures (p. 454). Similarly, Monk (1992: 126) states that the type of female representations "conveyed to us in the urban landscapes of Western societies is a heritage of masculine power, accomplishment, and heroism".

On the other hand, the lack of women in political decision-making roles has often been considered an explanatory factor for their lack of presence in the streetscape. For instance, Drozdzewski and Monk (2020) link women's lack of power and limited control over the urban environment to their absence (and gendered representations) in public landscapes. With respect to commemorative practices following wars and conflicts, male-dominated decision-making bodies downplay the importance of women, who are generally forgotten (Mamvura et al., 2018; Mcdowell, 2008). Relatedly, Hayden (1997) stated the importance of women's participation in the decision-making process, while Alderman and Inwood (2013) emphasize the right to take a central role in this process to achieve a more inclusive toponymy. Similarly, after reviewing initiatives to address the gender bias in street names, Novas (2018: 127) notes that "women's participation in decision-making processes promotes a more inclusive [street map]".

This paper also relates to recent quantitative research that employs street names and related data to shed light on the causes and consequences of symbolic disputes in the political arena. The Francoist memory debate in Spain provides a fertile ground to explore the use

politicians make of street names as a contested symbolic element. Ruipérez-Núñez and Dinas (2023) document that mayors of the main right-wing party (PP) are less likely to remove Francoist names from streets and, conversely, mayors of the main left-wing party (PSOE) are more likely to do so. Villamil and Balcells (2021) show that the removal of Francoist names produced an increase in electoral support for the Spanish new far-right party (VOX). Similarly, Rozenas and Vlasenko (2022) find that the demolition of Soviet monuments in Ukraine promoted the mobilization of the pro-Russian vote. Ochsner and Roesel (2017) reveal how a far-right party in Austria gained more votes after connecting Muslims with the Ottoman Siege of Vienna, especially in places with more monuments and streets commemorating those past events. Focusing on the whole Romanian street map, Rusu (2024b) studies street names changes after the fall of state socialism and finds that politicized names, in more prominent streets, and located in older and more prestigious cities were more prone to change.

Most closely related to this article, two recent papers provide some quantitative evidence on the determinants of feminized street maps based on comprehensive national-level databases. Gutiérrez-Mora and Oto-Peralías (2022) find that Spanish municipalities with a higher female share in street names tend to have larger, better educated and younger populations, larger service sectors, more separations and divorces, and lower gender gaps in labor force activity rate, education and housework. They also show that people living in towns with a higher female share have on average more egalitarian gender views, and that provinces with a higher female share have also historically had more prominent women. For the case of Romania, Rusu (2024a) shows that historical, regional, ethnic, and political factors along with the location and prominence of the streets within the urban network are important to account for the percentage of female-named streets. Specifically, streets located in county capitals, in less prominent areas within the city, and in less ethnically diverse communities tend to have relatively more female names. The findings of both studies thus reinforce the importance of historical-sociological factors as determinants of gendered street names. In contrast, our article aims to investigate the importance of the gender and ideology of town mayors, hereby informing the debate on whether the lack of women in political leadership positions is responsible for their underrepresentation in the symbolic cityscape.

Finally, our work also relates to quantitative studies trying to understand whether having women occupying political representative positions favors policies promoting gender equality. Lippmann (2022) shows that female representatives in the French parliament focus on different topics, particularly on women-related ones. Bochenkova et al. (2023) show through RDD that Brazilian municipalities where female candidates closely won witnessed a reduction in both the homicide rate and violence against women. There are also some papers with mixed results such as Baskaran and Hessami (2023), who document through RDD that the presence of women in Bavarian town councils increases the provision of childcare services, but this effect is not found in the case of female mayors.

There are other works finding little evidence of an effect on substantive gender policies. Bagues and Campa (2021) document that the implementation of gender quotas in party list affected the gender composition of Spanish town councils, but not the mayor's gender or social policies. Similarly, Cavallini et al. (2023) show that the introduction of gender quotas in Italian municipalities was effective in increasing female representation but did not affect social services expenditures, while Jung (2022) finds little evidence of the mayor's gender affecting the gendered budget in Korean cities. More related to our setting, Carozzi and Gago (2023) study the determinants of gender sensitive policies in Spanish municipalities during the period 2010–2014 through RDD analysis. Focusing on mixed electoral races, they do not find evidence of the mayors' gender affecting these policies, while the ideology of the political party does affect them. Our work contributes to this empirical research agenda by focusing on a novel and different policy, charged with strong symbolic connotations.

2.2. Conceptual framework

The importance attached to participating in the decision-making process suggests that both the gender and ideology of town mayors matter for street naming policies. This sub-section outlines a simple conceptual framework, summarized in Fig. 1, to better understand whether and to what extent these two attributes of mayors affect policy making. We conjecture that two conditions must be satisfied for a mayor's attribute to have an impact on policies. First, the existence of a cleavage among the general population along this attribute or dimension, so that -for instance- left-wing people and women have different policy preferences than right-wing people and men, respectively. Second, town mayors are sensitive to citizens' preferences in the sense that they represent their preferences (along these cleavages) and translate them into policies.

We acknowledge that even if the first condition is not satisfied, it is still possible an effect on policy outcomes if town mayors constitute a vanguard group more aware of their group circumstances and aspirations. This would be the case if mayors for any reason (education, activism, etc.) are more aware of the underrepresentation of the social group to which they belong and the symbolic importance of that, hereby implementing naming policies to address it. For simplicity, in what follows we let aside this possibility.

Gender and ideology might matter differently for policy making if both attributes differ in at least one of these conditions. Considering perceptions about gender equality in general, there exists a political cleavage along both dimensions. Thus, according to a recent survey by the Spanish Sociological Research Center (CIS, 2024), the percentage of respondents who think that gender inequalities in Spain are large is substantially higher for women and for left-wing respondents. However, the ideological cleavage is more salient: the difference between left-wing and right-wing respondents is 32.2 percentage points (pps.) while between women and men 19 pps. This implies that, everything
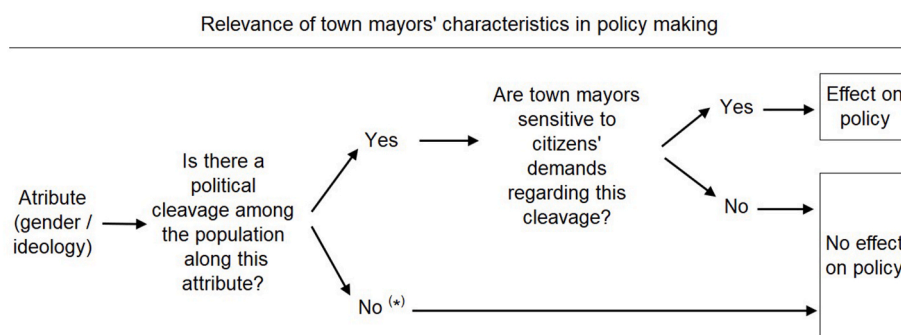

Fig. 1. Conceptual framework
(*) Still possible an effect on policy if town mayors represent a vanguard group more aware of their group circumstances and aspirations.

else equal, the impact of the mayors' ideology will be stronger than that of their gender.

Let us turn now to the sensitivity of mayors to their group's demands and the willingness to translate them into actual policies. Considering ideology, Cabeza Pérez et al. (2023) analyze regional party manifestos in Spain and document a left-right divide in gender issues, suggesting that mayors from left-wing parties are likely to be sensitive to their ideological group demands. In contrast, with respect to gender, some research suggests that female mayors do not represent the policy preferences of their gender group and therefore do not convert them into policies. Carozzi and Gago (2023) argue that in political systems where parties are strong and can impose their agendas on candidates, differences in gender within parties are relatively unimportant. Consistent with this, they show that women are in general more supportive of gender policies than men, which however does not translate into the behavior of female mayors. If this is also the case for street naming, we would also expect the effect of ideology to be stronger.

According to this framework, symbolic policies might produce different outcomes compared to substantive ones if they differ in terms of these two conditions. While the boundaries between both types of policies are not precisely defined (Anderson, 2003), the former tend to focus on communication (language) and perception, potentially influencing beliefs, emotions and cognition. They include gestures, promises, commemorative events, and other forms of symbolic action seeking to demonstrate commitment to certain values, set political agendas or shape public opinion. In contrast, substantive policies are designed to bring about real and material changes in gender equality, and may include subsidies, gender quotas, legislation enforcing equal pay, provision of public services, etc. (Boussaguet & Faucher, 2020; Mazur, 1995).

Following Anderson (2003) and Mazur (1995), we understand this classification as a continuum rather than a dichotomy, where street naming policies are closer to the symbolic pole but also produce real and tangible (material) changes in the street map. The fact that symbolic policies are not economically costly implies that their implementation is more discretional (less financially constrained). In addition, symbolic policies are delivered immediately, as opposed to -for instance- setting up a new public service. Both features favor citizen accountability, which makes symbolic policies particularly attractive when voters are in favor of them, but unattractive otherwise. On the other hand, due to their symbolic goals, these policies are highly ideologically charged, with the potential to generate fierce controversies, as has been well documented (Alderman & Inwood, 2013; Capdepón, 2020; Villamil & Balcells, 2021).

When bringing these features of a symbolic policy such as street naming to our framework, we can make two observations. First, its symbolic character arguably makes the ideological cleavage more salient, while it is difficult to anticipate the influence on the gender cleavage. Second, its easier accountability affects the second condition in either direction depending on voters' support. If they are in favor, town mayors are more likely to be sensitive to citizens' preferences but if voters' support is unclear, this easier accountability acts as a deterrent.

Following this discussion of the conceptual framework, we establish two hypotheses: *H1*, female mayors, because of their gender identity, will increase the female share in street names. This would imply that there is a cleavage along the gender dimension in naming female streets and that female mayors are sensitive to their gender group demands. As discussed above, this hypothesis tests one of the two main arguments to explain gender bias in street names, namely, the lack of women in leadership political positions. The other hypothesis (*H2*) states that left-wing parties, because of their higher affinity with feminist movements and demands, are more willing to raise the presence of women in street names. In this respect, it is well established in the literature that political actors use street names to assert their political and social values, so left-wing parties are arguably more determined to pursue egalitarian street naming policies.

3. Institutional background

There are about 8100 municipalities in Spain, which constitute the lowest tier of the territorial government structure. They are ruled by a town council elected by the population every four years following a proportional voting system. The town council is headed by the town mayor, who exerts strong political leadership and plays a central role in municipality elections. The mayor is elected by a majority of votes by the town councilors. Typically, the mayor is the first candidate of the most voted party list, but there may be party coalitions to select an alternative candidate. Political parties compete in elections through closed lists of candidates. During the study period, local elections took place in 2003, 2007, 2011, 2015 and 2019.

Gender quotas in candidate lists were introduced by law in 2007 and 2011 in municipalities with more than 5000 and 3000 inhabitants, respectively. Since then, at least 40% of candidates must be of each gender, both considering the whole party list and each block of five positions within the list. While the introduction of gender quotas increased the percentage of women councilors, it failed to increase the proportion of women mayors (Bagues & Campa, 2021).

The percentage of women mayors has experienced a slow but steady increase since the first democratic local election in 1979, from 1.3% in that year to 10.1% in 1999 (the term before our panel data analysis begins), and to 22.6% in 2019. Considering the ideological dimension, the share of left-wing mayors has fluctuated between 37.3% and 49.3%, coinciding with the crises and recoveries of the main left-wing party (PSOE).

Among many other functions, municipalities are in charge of naming streets. Previously, until 1979, the Ministry of Territorial Administration oversaw changes in the name of streets proposed by municipalities. However, with the democratization of town councils, Royal Decree 1710/1979 put an end to this prerogative of the Central Government and, since then, street naming has been an exclusive responsibility of local governments. The Spanish street map is largely populated by commemorative names, which make up approximately 54% of the total number of streets (Oto-Peralías, 2018). Many of them commemorate people and, among these, only a small proportion are named after women. According to Gutiérrez-Mora and Oto-Peralías (2022), the percentage of female-named streets has slowly increased from 9.76% in 2001 to 12% in 2020. This aggregate value hides a high heterogeneity across municipalities. For example, Fuenlabrada, near Madrid, is the town larger than 100,000 inhabitants with the most egalitarian street map (33.7%), while on the opposite side we find Santa Coloma de Gramenet (3.6%), near Barcelona.

4. Data and analytical approach

4.1. Data

In order to quantify the gender bias in street names, we calculate the indicator female share as follows:

$$FS_{m,t} = F_{m,t} / (M_{m,t} + F_{m,t}) \times 100$$

where $M_{m,t}$ and $F_{m,t}$ are the number of streets named after men and women respectively in each municipality, *m*, for each period, *t*, which can be years or political terms. This indicator is used in levels for the initial cross-section regressions and in first differences (ΔFS) for the panel regressions. Despite the female share being constructed as a continuous variable, its evolution may be rather discrete, particularly for small and medium-sized municipalities, as it depends on whether there is a new male or female-named street. To take this into account, we construct a binary indicator that takes the value of 1 if the female share increases with respect to the previous period (ΔFS_b).

We collect the street-name data from the *StreetNamesDatabase* (Carmona-Derqui et al., 2023), which extracts the original data from the *Electoral Census Street Map* (INE, 2023). We employ the algorithm

developed by Gutiérrez-Mora and Oto-Peralías (2022) to classify streets according to their gender, if any. Essentially, the classifier algorithm follows a dictionary-based method and is implemented as a rule-based system. It is fed with long lists of male and female forenames, and names of famous figures, amounting in total to several thousand terms. We extend these lists and update the classification of streets, including the years 2002, 2003, 2021, 2022, and 2023.

Through a request to the Spanish Transparency Office, we get the data about the gender and political party of each mayor that has ruled every Spanish municipality since the first local election of 1979 until 2015. Data concerning the 2019 election were collected from the website of the Ministry of Territorial Policy, where the gender has been inferred from the mayor's name. In addition, we collect data on candidate lists and electoral results for all municipal elections from the website of the Spanish Ministry of Interior.

We manually classify the ideology of political parties into four exclusive categories: left, right, center, and independent. The classification has been made through the following criteria. First, we follow the denomination that parties make about themselves. Some of them do not use our four categories, but instead others like conservative or communist that are related to ours. Second, parties that do not exhibit these denominations but are associated or federated with others which do so, are assumed to have the same ideology as these ones. Third, to simplify, we do not inquire about town-specific parties in municipalities with less than 1000 inhabitants. Fourth, the independent category is used as a residual group for parties not associated with the right, left or center. The decision to create this residual group might not be ideal but is the best available solution and, in any case, municipalities governed by independent parties only represent 6.5% of observations over the whole period (as reported in Table A3 in the Appendix, this percentage ranges between 5 and 9.9%). This four-category classification, despite imperfect, improves some previous works that only focus on the two main parties at the national level (PP and PSOE). Across political terms, the percentage of municipalities with left-wing mayors ranges between 37% in 2011–2015 and 49% in 2019–2023.

We also gather annual data on the population of each town and the number of streets, which are used as control variables in the regressions. To save space, the descriptions and sources as well as the descriptive statistics of all the variables employed in the analysis are provided in Tables A1 and A2 in the Appendix.

4.2. Analytical approach

First, we begin by estimating a cross-section regression model to explain the female share in street names as a function of the cumulative time (in years) a municipality has had a left-wing and a female mayor. As the female share is a stock variable, which reflects the percentage of female-named streets at a point in time, it can be understood as the outcome produced by all the different local governments across decades. Thus, this model allows us to estimate the long-run relationship of the mayors' gender and ideology with the female share. We estimate this model for two years, 2001 and 2023. The model is estimated with and without the interaction between female mayors and left parties.[1]

Second, to better isolate the effect of the gender and ideology of town mayors, we estimate two-way fixed effects panel data models, which include comprehensive sets of dummy variables for both periods and municipalities. These models only exploit variation within municipalities and neutralize shocks in each period that are common to all municipalities. We estimate this model for two dependent variables: i) the first difference of the female share ($\Delta FS = FS_t - FS_{t-1}$), and ii) a dummy variable that takes the value 1 if the female share increases with respect to the previous period (ΔFS_b).

We consider two time frequencies, years and political terms. We first estimate the regressions using annual data, from 2001 to 2023, but street names changes are better observed if we consider the entire political term (4-year periods between elections) as policy outcomes are expected to be delivered within the political term horizon rather than annually. The main independent variables are two binary indicators measuring whether a left-wing political party and a woman, respectively, are ruling the town council on the 1st of January (annual panel) or in most of the 4-year period (term panel). We also control for population and number of streets, in logarithm.

Finally, we shed more light on the causal effect through an RDD analysis. The two-way fixed effects model goes a long way in identifying whether changes in the mayorship produce changes in street names. However, one might argue that some time-variant omitted factors may jointly determine who reaches political power and citizens' demands for street name changes, so variation in the female share might be due to these unobservable factors. The RDD, by comparing close electoral victories, can better isolate the effect of the mayor's gender and ideology.

Our RDD is framed as a candidate model, based on the discontinuity created by the threshold of 50% of votes which determines if a candidate rules or does not (Ruipérez-Núñez & Dinas, 2023). The model is estimated for two types of candidates, namely, those belonging to left-wing parties and female candidates. In the first case, the sample focuses on electoral races where the two most voted candidates belong to a left-wing party and a right-wing one. In the second, it focuses on gender-mixed races, that is, when the two most voted candidates are a man and a woman.

We employ a sharp and a fuzzy version of the model. The sharp version estimates whether exceeding the 50%-vote threshold (either for a female or left-wing candidate) has an effect on ΔFS. The fuzzy version complements the previous one by taking into account that a candidate with less than 50% of votes can be elected as mayor by a coalition of parties or by being the most voted candidate in the absence of a coalition. The fuzzy model is a two-stage model where the first stage calculates the probability of being elected mayor when surpassing the 50%-vote threshold, while the second stage estimates the effect of the calculated probability on ΔFS.

5. Results

5.1. Cross-section and fixed effects panel models

Panel A in Table 1 presents the cross-section results for the years 2001 and 2023. Column 1 shows that there is a positive and significant relationship between the number of years a left-wing party has been ruling a municipality (from 1979 until 2001) and the female share in street names in 2001. The coefficient implies that 10 additional years of a left-wing government increase the female share by 0.47 pps. The coefficient on the time a woman has been mayor is larger in size but less precisely estimated. Column 2 adds the interaction between these two variables, which turns out to be negative and close to zero. Columns 3 and 4 report similar results when the independent variables refer to the period 1979–2023 and the dependent variable to 2023. The most noticeable difference is that the coefficient on female mayors is more precisely estimated (arguably because of more instances of female mayors in the data).

These results indicate that municipalities that have voted for left-wing and women-led governments have more feminized street maps. However, it does not mean that the former is causing the latter as there may be other factors left uncontrolled jointly affecting both the profile of mayors and the female share in street names. To make progress towards the identification of the effect, Panels B and C report results from two-way fixed effects models applied to annual data and political term periods, respectively. These models neutralize all time invariant characteristics of municipalities as well as common factors affecting all municipalities each period.

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[1] We refer the reader to the Methodological Appendix for more details about the models employed.

Table 1
Cross-section and fixed-effects models.

Panel A: Cross-section results	Female share in 2001		Female share in 2023	
	(1)	(2)	(3)	(4)
Years with left-wing mayors	0.047**	0.06**	0.038**	0.031
	(0.023)	(0.024)	(0.016)	(0.02)
Years with women mayors	0.168*	0.319**	0.1***	0.069
	(0.092)	(0.148)	(0.038)	(0.072)
Years left-wing x Years women mayors		−0.018		0.002
		(0.012)		(0.003)
Obs	6127	6127	6127	6127
Panel B: Fixed-effects annual data	Δ female share		Δ female share: binary	
	(1)	(2)	(3)	(4)
Left mayor	0.028***	0.03***	0.01***	0.011***
	(0.004)	(0.005)	(0.002)	(0.002)
Woman mayor	−0.006	−0.001	−0.002	0.000
	(0.005)	(0.006)	(0.002)	(0.002)
Left mayor x Woman mayor		−0.01		−0.005
		(0.01)		(0.004)
Municipality and year fixed-effects	Yes	Yes	Yes	Yes
Obs	134801	134801	134801	134801
Panel C: Fixed-effects political terms (4 years)	Δ female share		Δ female share: binary	
	(1)	(2)	(3)	(4)
Left mayor	0.072***	0.076***	0.028***	0.031***
	(0.012)	(0.013)	(0.005)	(0.006)
Woman mayor	−0.013	−0.004	−0.008	0.001
	(0.013)	(0.016)	(0.006)	(0.007)
Left mayor x Woman mayor		−0.019		−0.017
		(0.026)		(0.011)
Municipality and pol.term fixed-effects	Yes	Yes	Yes	Yes
Obs	30640	30640	30640	30640

Notes: Variables' descriptions are provided in Table A1. The regression models in Panel A include a constant term, the population's average age, the service sector weight in employment, the education level, the log of population, and the log of total number of streets, while in Panels B and C a constant term, the log of total population, and the log of number of streets, all omitted for space considerations. Heteroskedasticity-robust standard errors are in parentheses in Panel A, while standard errors clustered at the municipality levels are reported in Panels B and C. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Both panels show a fairly consistent pattern: having a left-wing mayor increases the female share in street names, both using continuous and dichotomous measures (columns 1 and 3, respectively). For instance, the coefficient in Panel C-column 3 of 0.028 implies that the percentage of municipalities increasing the female share during a given political term is about 3 pps. higher for those with left-wing

governments (vs. an average of 11%). In contrast, the gender of the mayor is inconsequential, with a near-zero coefficient. The inclusion of the interaction between both independent variables does not change this picture, as the coefficient is small and statistically insignificant. These results are illustrated in a more descriptive way in Fig. 2: the ideology but not the gender of mayors is what affects the commemoration of
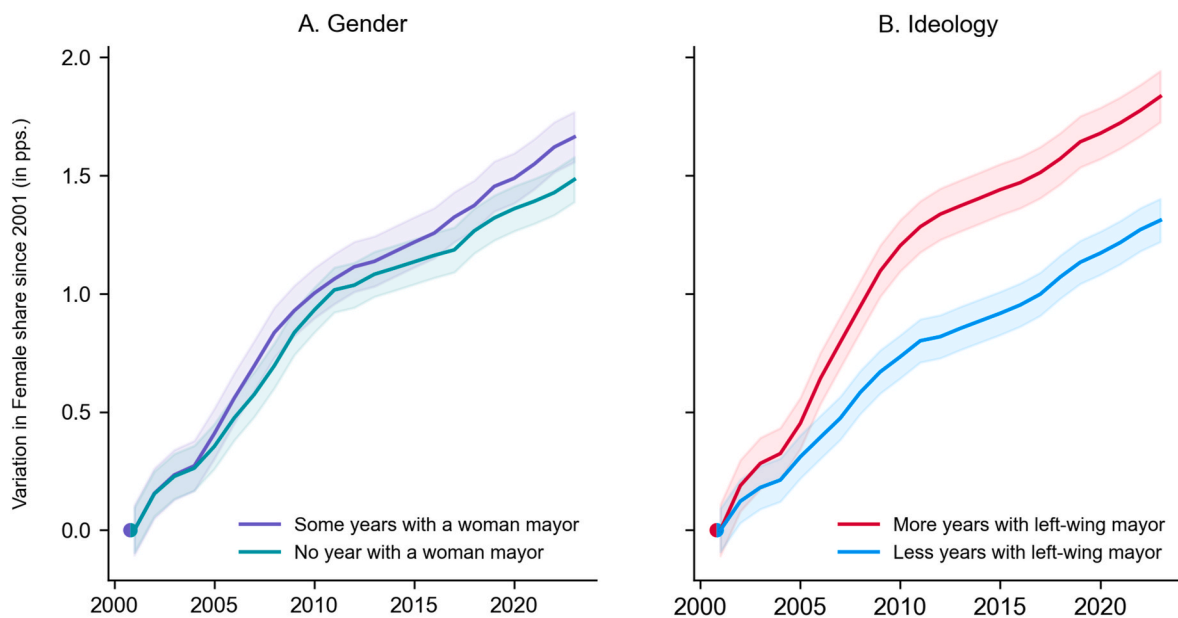
Fig. 2. Increase in the female share depending on the mayor's gender and ideology (period 2001-2023)
Notes: The figure shows the average increase in the female share with respect to 2001 (in pps.). Municipalities are classified into two groups according to the median of the number of years with a woman (A) or left-wing mayor (B) during the period 2001–2023.

women in the street map.

We conduct several robustness checks to the fixed effects models. First, we add variables measuring local governments controlled by centrist and independent political parties. In our preferred 4-year panel data models, besides the left-wing, only the centrist coefficient appears marginally significant when the dependent variable is the binary indicator of an increase in the female share. Second, to corroborate that the category of independent parties is not affecting our findings, we remove observations of municipalities governed by these parties. Third, we rerun the regressions focusing on municipalities governed by parties with absolute majority of votes, so mayors elected in these cases are not the result of party coalitions after the elections. Fourth, we employ the de Chaisemartin and D'Haultfœuille (2020)'s model, which accounts for heterogeneous treatment effects. Since this model is designed for a single treatment variable, we run it separately for each of our interest variables, left-wing mayor and woman mayor, considering the other one as an additional control. The results of these robustness tests, reported in Tables A5 and A6 in the Appendix, are fully consistent with our fixed effects baseline results.

Finally, the fact that the cross-section relationship between female mayors and the female share in street names vanishes with fixed effects panel models may be due to both unobservable municipality characteristics and the different time periods analyzed in each case. Considering the latter, it is possible that female mayors exerted an effect before 2001 but not afterwards. While we cannot assess the relative importance of each possibility due to lack of data on street names before 2001, Table A4 provides suggestive evidence that the effect of female mayors could exist before 2001 but has clearly vanished afterwards. Thus, there is a positive cross-section relationship between years with female mayors during 1979–2001 and the female share in street names in 2001, but no relationship is observed between years with female mayors during 2001–2023 and the change in female streets during that period.

5.2. RDD results

This section presents the results from the RDD analysis which provides a more credible identification because it compares close electoral races where the population voted very similarly, just below and above the 50%-vote threshold, but producing a different outcome in terms of who becomes mayor. The validity of this method requires municipality characteristics to be very similar across the threshold, the only discontinuity being the ideology or gender of the elected mayor. Table A7 reports the results from estimating the sharp RDD model on indicators such as education, average age, service sector share in employment, and gender difference in participation rate. For none of these municipality variables there is a jump at the vote threshold (except in one case -Panel B, column 2). In contrast and as expected, there is a sharp discontinuity in ideology and gender (column 5).

In addition, to properly identify the effect of gender and ideology both discontinuities should not overlap. That is, there should not be a discontinuity in mayors' gender in left-right races and should not be a discontinuity in mayors' ideology in gender-mixed races. The last column of Table A7 shows that this is the case.

One potential source of bias in this type of RDD models is that the candidate's characteristic of interest may be correlated with others, affecting their selection into close electoral races (Marshall, 2024). We acknowledge that some characteristics are likely to vary particularly for female candidates, such as age, occupation, and level of education. Indeed, Carozzi and Gago (2023) find that female mayors are 4.8 years younger, which is not surprising given that women have traditionally participated less in politics. We thus recognize that the discontinuity in gender and ideology may be accompanied by other attributes characterizing typical women and left-wing politicians. Following Bucchianeri (2018), we aim to identify the effect of electing a female mayor rather than the effect of gender in isolation of other attributes typically present in women politicians who participate in close races with men. Therefore,

we interpret the results accordingly by expanding the definition of the "treatment" to a bundle of characteristics correlated with gender (and ideology) which are -after all- typically thought as joint attributes.

Fig. 3 summarizes the RDD results. Panels A and C show that surpassing the 50%-vote threshold strongly increases the probability of having a left-wing mayor in the case of a left-right electoral race, and of having a woman mayor in the case of a gender-mixed race. Panel B shows that surpassing the 50% left-vote threshold increases the female share in street names, while Panel D does not report any discontinuity when exceeding the 50% female-vote cutoff. The latter results mean that left-wing mayors from close electoral races tend to increase the female share of street names, whereas women mayors do not.

Table 2 provides the coefficients from the RDD results for the two types of electoral races. Panel A shows the sharp version of the RDD model, which indicates a discontinuity when the left-vote surpasses the 50% threshold. Focusing on column 2, the percentage of municipalities increasing the female share during a given political term is 2.2 pps. higher for those with left-wing governments originating from close electoral races (vs. an average of 10.5%). This effect is very similar to the analogous one from the fixed effects models (Table 1, Panel C, col. 3). In contrast, the effect of having women mayors is again small and insignificant (even carrying a *negative* sign). Panel B corroborates these findings for the fuzzy version of the model.

We use the full sample available for each electoral race, but Table A8 in the Appendix shows that the results are robust to different bandwidths, namely, restricting the sample to the percentage-vote ranges 20–80%, 30–70%, and 40–60%. Moreover, the results are robust when including 50 province dummies to only exploit variation within these territorial units (Table A9).

5.3. Why does ideology but not gender affect decisions on naming female streets?

The failure of female mayors to increase the presence of women in the street map is somewhat surprising but is consistent with null results reported in previous work focusing on substantive gender policies, such as Bagues and Campa (2021) and Carozzi and Gago (2023). The latter argue that in political systems with strong parties which impose their agendas to candidates, differences in gender within parties are largely inconsequential. Consistently, they show that women are in general more supportive of gender policies than men, which however is not reflected in the behavior of female mayors.

Building on this insight, we take advantage of an online survey conducted in 2023 to a sample of about 2000 Spanish respondents with an item asking for their opinion on whether "priority should be given to women's names to correct their underrepresentation on the streets" (Gutiérrez-Mora & Oto-Peralías, 2024).[2] Overall, 58% of respondents agree or strongly agree with this policy. In Table 3, we regress this indicator on the gender and ideology of the respondent. Interestingly, women agree 15.7 pps. more than men, but the ideological difference is even larger as left-wing respondents agree 49.5 pps. more than right-wing ones. Fig. 4 graphically illustrates these differences where one can clearly observe that differences along the ideological axis are larger than across gender.

For comparison purposes, we also report the differences in gender

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[2] The survey was conducted in June–July 2023 and distributed through several channels, including a representative sample of 1000 Spanish respondents through a specialized online survey company (*Netquest, 1000 questionaries*), ads in social networks (*Facebook*, 773 questionaries), and through the networks of interviewers of a survey company (*Dataestudios*, 352 questionaries). The results reported in the main text are based on the full sample of 2000 respondents, while Table A10 and Figure A1 in the Appendix show that the results are analogous when focusing on the representative sample of 1000 Spanish respondents.
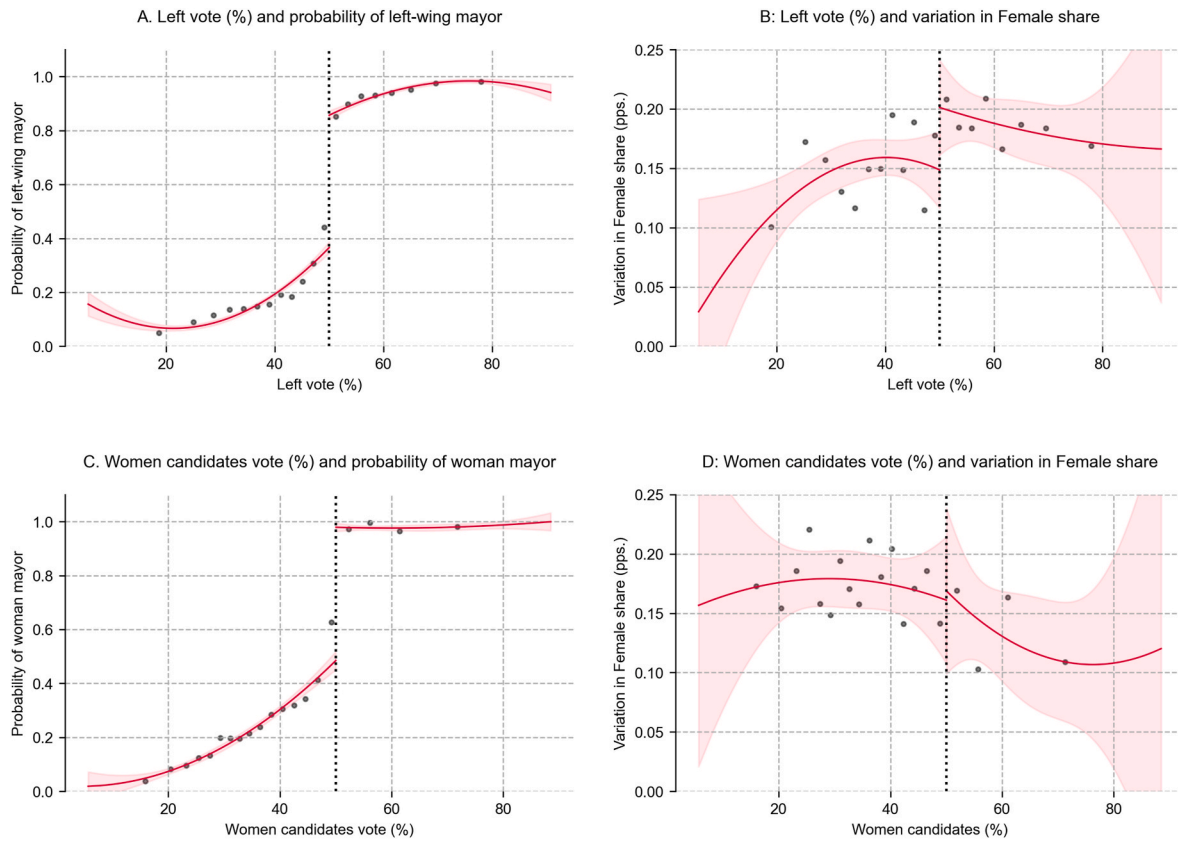
Fig. 3. RDD analysis: gender, ideology, and variation in the female share.

Notes: Dots represent local averages (20 equal-size bins). The red lines draw the estimates of the quadratic polynomial of the relationship between the running variables (either left vote (%) or women candidates vote (%)) and each of the y-axis variables, along with the 95% confidence intervals. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Table 2

RDD results.

Panel A: Sharp RDD model	Left vs right electoral race		Female vs male electoral race	
	Δ fem. share	Δ fem. share: binary	Δ fem. share	Δ fem. share: binary
	(1)	(2)	(3)	(4)
Vote share	0.001	0.000	0.000	0.000
	(0.001)	(0.000)	(0.001)	(0.001)
Vote share ≥50	0.039**	0.022***	−0.028	−0.005
	(0.018)	(0.008)	(0.027)	(0.012)
Vote share x "Vote share ≥50″	0.000	0.000	0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.001)
Election year fixed-effects	Yes	Yes	Yes	Yes
Obs	17955	17955	7950	7950
Panel B: Fuzzy RDD model	Left vs right electoral race		Female vs male electoral race	
	Δ fem. share	Δ fem. share: binary	Δ fem. share	Δ fem. share: binary
	(1)	(2)	(3)	(4)
Vote share	0.000	0.000	0.000	0.000
	(0.001)	(0.000)	(0.001)	(0.001)
Prob. being elected mayor	0.067**	0.038***	−0.054	−0.009
	(0.032)	(0.015)	(0.050)	(0.023)
Vote share x Prob. elected mayor	0.001	0.000	0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.001)
Election year fixed-effects	Yes	Yes	Yes	Yes
Obs	17955	17955	7950	7950

Notes: Variables' descriptions are provided in Table A1. Vote share stands for the percentage of vote of left-wing parties (columns 1 and 2) and female candidates (columns 3 and 4). The regression models include a constant term, the log of total population, and the log of number of streets, omitted for space considerations. Standard errors clustered at the municipality levels are reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table 3
Survey evidence on citizens' preferences for female-named streets.

	Agree with: "priority should be given to women's names to correct their underrepresentation on the streets" *(symbolic policy)* (1)	Agree with: "small progress made in gender equality in housework and care" *(a non-symbolic dimension)* (2)
Woman	0.1571***	0.1988***
	(0.023)	(0.023)
Ideology: centrist	0.2568***	0.1529***
	(0.028)	(0.028)
Ideology: leftist	0.4954***	0.3054***
	(0.030)	(0.030)
Intercept	0.2333***	0.17***
	(0.025)	(0.025)
Obs	1521	1762

Notes: Variables' descriptions are provided in Table A1. Standard errors reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

role attitudes regarding an important non-commemorative dimension, namely, whether the respondent thinks that small progress in gender equality has been achieved in housework and care. Notably, a similar pattern emerges although with some qualifications: the ideological cleavage is again more important than the gender one but the difference is smaller. Specifically, while the coefficient on women is larger in column 2, the ones on the ideological variables are smaller. The latter is consistent with the discussion in Section 2.2, where we conjecture that symbolic policies generate more intense ideological controversies. Moreover, these results are entirely in line with the ones from the larger survey conducted by the Spanish Sociological Research Center discussed above (CIS, 2024), hereby supporting the validity of the online survey results.

This evidence contributes to explaining the results in two ways. In terms of our conceptual framework, the coefficients in column 1 (Table 3) indicate that gender and ideology satisfy the first condition (i. e., the existence of political cleavage), but differences in attitudes are notably larger along ideological than along gender lines, particularly for symbolic policies such as street names, so these differences are easier to

translate into actual policies. As a result, the large coefficient on leftist ideology is reciprocated with the evidence that left-wing mayors increase the female share in street names. The fact that the coefficient on women is large and significant in column 1 but there is no effect of female mayors means that the second condition of our framework is not satisfied for gender, that is, female local leaders are not responsive to their gender group preferences. Otherwise, female mayors would implement more naming decisions favoring women compared to male mayors.

6. Discussion and conclusions

Street names are contested places of public commemoration (Rose-Redwood et al., 2018; Ruipérez-Núñez & Dinas, 2023; Villamil & Balcells, 2021). Divergent worldviews and political values are frequently in dispute for their inscription into the street map. The underrepresentation of women in street names does not go unnoticed and is part of the agenda of social movements, community groups, journalists, and political parties. Besides encapsulating social and political values, street names may exert influence by affecting the knowledge, judgment, and attitudes of people exposed to them (Oto-Peralías, Carmona-Derqui, & Gutiérrez-Mora, 2024).

We document that the ideology but not the gender of town mayors affects the decisions to commemorate women, a dimension overlooked by the extant literature. We do so by using street-name data as a granular measure of women's symbolic representation which can be discretionally changed by town councils. Through fixed effects panel data models and RDD and using data from Spanish municipal elections during the period 2003–2019 (amounting to 5 political terms), we consistently show that left-wing mayors increase the female share of street names, but women mayors fail to do so.

Why do female mayors not commemorate women more than male mayors? On the one hand, political parties are strong in Spain and may impose their agendas, limiting the freedom of choice of their members, as argued by Carozzi and Gago (2023). Perhaps more importantly, the ideological cleavage is more relevant than the gender one to account for differences in gender attitudes, particularly for symbolic policies. This implies that policy decisions on naming female streets are more likely to be observed along the ideological dimension than along the gender one.
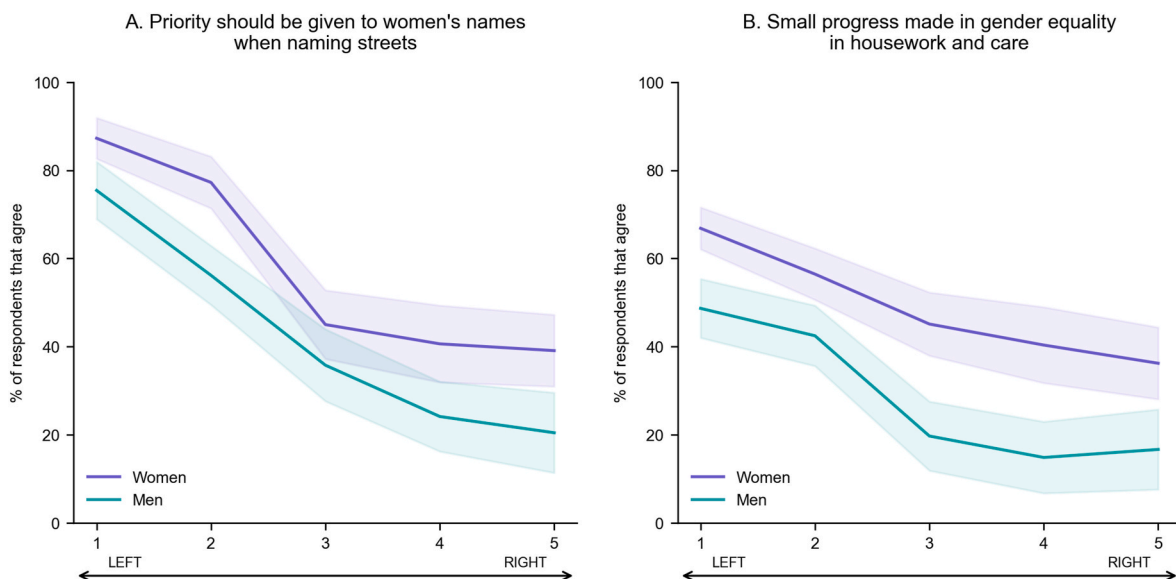
Fig. 4. Gender role attitudes in the population by gender and ideology.
Notes: The figure shows the percentage of respondents that agree with each statement, depending on their gender and ideology, as well as the 95% confidence interval. Data come from an online survey of ~2000 Spanish individuals; the effective sample being 1521 observations due to missing values. The original ideological scale (0–10) is aggregated into a 1–5 one as follows: 1 (0, 1, 2), 2 (3, 4), 3 (5), 4 (6, 7), 5 (8, 9, 10).

Our findings are potentially generalizable to other countries sharing a related institutional environment -such as a decentralized street naming decision process and democratically elected local governments- as well as similar political cleavages along the ideological and gender dimensions. While our work is the first to provide evidence for street naming policies, previous research focusing on more substantive gender policies finds analogous results for countries like Italy, Canada and South Korea (Cavallini et al., 2023; Franceschet et al., 2024; Jung, 2022).

This paper thus sheds new light on the ideological and gender cleavages in commemorative naming policies, an area where women are vastly underrepresented. In line with previous research focusing on substantive gender policies, it is the ideology rather than the gender of politicians what matters for improving the symbolic representation of women in the cityscape. This new evidence informs the literature on the politics of naming, where it is often emphasized the importance of participating in the decision-making process (Alderman & Inwood, 2013; Mamvura et al., 2018; Rose-Redwood et al., 2010). We show that taking part in it is not a sufficient condition for an underrepresented group such as women to gain prominence in the memorial landscape of the street map.

APPENDIX

I. Methodological appendix

We take a first look at the data by estimating a cross-section regression model of the following form through ordinary least squares (OLS):

$$Y_m = \beta_0 + \beta_1 Left\_years\_m + \beta_2 FemMayor\_years_m + \gamma' X_m + \varepsilon_m \tag{Eq. 1}$$

where Y_m stands for the female share in street names of municipality m, $Left\_years\_m$ refers to the cumulative time (in years) of left governments in the town council and $FemMayor\_years_m$ to the cumulative time a women has been mayor, X_m represents a vector of control variables (population's average age, service sector weight in employment, education level, log population, and log total number of streets), and ε_m is the error term. As the female share is a stock variable, which reflects the percentage of female-named streets at a point in time, it can be understood as the outcome produced by all the different local governments along decades. Thus, this model allows us to estimate the long-run relationship of the mayors' gender and ideology with the female share. We estimate this model for two years, 2001 and 2023. The model is estimated with and without the interaction of female mayors and left parties.

To better isolate the effect of the gender and ideology of the town's mayor, we estimate the following two-way fixed-effect panel data model:

$$Y_{m,t} = \beta_0 + \beta_1 Left_{m,t} + \beta_2 FemaleMayor_{m,t} + \gamma' X_{m,t} + \alpha_m + \delta_t + \varepsilon_{m,t} \tag{Eq. 2}$$

where $Y_{m,t}$ refers to one of the following two indicators corresponding to municipality m in period t: i) the first difference of the female share ($\Delta FS = FS_t - FS_{t-1}$), and ii) a dummy variable that takes the value 1 if the female share increases with respect to the previous period (ΔFS_b). We consider two time-horizons, t, years and political terms. We first estimate the regressions using annual data, from 2001 to 2023, but street names changes are probably better observed if we consider the entire political term (4-year periods between elections) as policy outcomes are expected to be delivered within the political term horizon rather than annually. During the study period, local elections took place in 2003, 2007, 2011, 2015 and 2019.

$Left_{m,t}$ and $FemaleMayor_{m,t}$ are binary indicators measuring whether a left-wing political party and a woman, respectively, are ruling the town council on the 1st of January (annual panel) or in most of the 4-year period (term panel). The model includes fixed effects for periods (years or terms), δ_t, and municipalities, α_m. We also add population and number of streets, in logarithm, as controls, $X_{m,t}$. Again, we estimate the model with and without the interaction between female mayors and left-wing parties.

Finally, we shed more light on the causal effect through a RDD analysis. The two-way fixed-effect model goes a long way in identifying whether changes in the mayorship produce changes in street names. However, one might argue that some time-variant omitted factors may jointly determine who reaches political power and citizens' demands for street name changes, so variation in the female share might be due to these unobservable factors. The RDD, by comparing close electoral victories, can better isolate the effect of the mayor's gender and ideology. Our RDD is framed as a candidate model, based on the discontinuity created by the threshold of 50% of votes which determines if the candidate rules or does not (Ruipérez-Núñez & Dinas, 2023). We employ two models, a sharp and a fuzzy one. The equation of the sharp version takes the following form:

$$Y_{m,t} = \beta_0 + \beta_1 (V_{j,m,t} - C) + \beta_2 MD_{j,m,t} + \beta_3 (V_{j,m,t} - C) MD_{j,m,t} + \gamma' X_{m,t} + \delta_t + \varepsilon_{m,t} \tag{Eq. 3}$$

where $(V_{j,m,t} - C)$ is the vote share of candidate j in municipality m and term t, less the 50% threshold, which measures the vote effect below the threshold; $MD_{j,m,t}$ is a binary indicator that captures the discontinuity of the vote effect when the candidate exceeds the 50% vote cut-off; and $(V_{j,m,t} - C) MD_{j,m,t}$ is the interaction of the previous two variables which measures the vote effect above the threshold. In addition, we include time-

fixed effects, δ_t, and the same vector of controls, $X_{m,t}$ as in *Eq. (2)*.

As mentioned above, we also employ a fuzzy RDD, since a candidate with less than 50% of votes can be elected as mayor by a coalition of parties (or by being the most voted candidate in the absence of coalition). It is a two-stage model where the first stage is a regression of the candidate probability to be elected mayor on the variables described in *Eq. (3)*:

$$Mayor_{j,m,t} = \beta_0 + \beta_1\left(V_{j,m,t} - C\right) + \beta_2 MD_{j,m,t} + \beta_3\left(V_{j,m,t} - C\right)MD_{j,m,t} + \gamma'X_{m,t} + \delta_t + \varepsilon_{m,t} \tag{Eq. 4}$$

In the second stage, we introduce the estimation of becoming mayor, $\widehat{Mayor}_{j,m,t}$ as a regressor:

$$Y_{m,t} = \beta_0 + \beta_1\left(V_{j,m,t} - C\right) + \beta_2\,\widehat{Mayor}_{j,m,t} + \beta_3\left(V_{j,m,t} - C\right)\widehat{Mayor}_{j,m,t} + \gamma'X_{m,y} + \delta_t + \varepsilon_{m,t} \tag{Eq. 5}$$

RDD models are estimated through OLS for two types of candidates, j: those belonging to left-wing parties, and female candidates. In the first case, the sample focuses on electoral races where the two most voted candidates belong to a left party and to a right one. In the second, it focuses on gender-mixed races, that is, when the two most voted candidates are a man and a woman.

Table A1
Description of variables

Variable name	Description	Source
Main dependent variables:		
Female share	Female share of street names. It measures the percentage of streets with female names regarding the total number of streets with male and female names.(*)	Carmona-Derqui et al. (2023), Gutiérrez-Mora and Oto-Peralías (2022).
Δ female share	Difference of the female share indicator with respect to the previous period (either a year or a political term, depending on the specification).(*)	See Female share.
Δ female share: binary	Binary version of the previous variable that takes the value of 1 if the female share increases (Δ female share >0) and 0 otherwise.	See Female share.
Main independent variables:		
Years with left-wing mayors	Number of years a left-wing mayor has been ruling the municipality since 1979, measured either in 2001 or in 2023. (**)	Database Alcaldes y Concejales (Ministerio de Política Territorial).
Years with women mayors	Number of years a female mayor has been ruling the municipality since 1979, measured either in 2001 or in 2023.(**)	Request to the Spanish Transparency Office and database Alcaldes y Concejales (Ministerio de Política Territorial).
Left	Binary variable equal to 1 if a left-wing mayor is ruling the town council on the 1st of January (annual panel) or in most of the 4-year period (term panel).	Own elaboration using data from Alcaldes y Concejales (Ministerio de Política Territorial).
Female Mayor	Binary variable equal to 1 if a woman is ruling the town council on the 1st of January (annual panel) or in most of the 4-year period (term panel).	Own elaboration using data from a request to the Spanish Transparency Office and database Alcaldes y Concejales (Ministerio de Política Territorial).
Vote share	Vote share of the left-wing candidate in ideological electoral races and of the female candidate in gender mixed electoral races.	Own elaboration using data from the database Electoral results (Ministerio del Interior).
Control variables:		
Log population	Natural logarithm of the total population of the municipality.	Padrón municipal (www.ine.es)
Log total number of streets	Natural logarithm of the total number of streets in the municipality.	Carmona-Derqui et al. (2023).
Population's average age	The average age of the population of the municipality, measured in 2001.	INE. Censos de Población y Viviendas 2001 (www.ine.es).
Service sector weight in employment	Percentage of workers in the service sector over the total number of workers, measured in 2001.	INE. Censos de Población y Viviendas 2001 (www.ine.es).
Education level	Percentage of population with secondary or higher education, measured in 2001.	INE. Censos de Población y Viviendas 2001 (www.ine.es).
Online survey:		
Agree with "priority should be given to women's names …"	Binary variable equal to 1 if the respondent agrees or strongly agrees with the statement that "priority should be given to women's names to correct their underrepresentation on the streets"	Gutiérrez-Mora and Oto-Peralías (2024).
Agree with: "small progress made in … "	Binary variable equal to 1 if the respondent answers that "small progress made in gender equality in housework and care".	Gutiérrez-Mora and Oto-Peralías (2024).
Woman	Binary variable equal to 1 if the respondent is a woman.	Gutiérrez-Mora and Oto-Peralías (2024).
Ideology: centrist	Binary variable equal to 1 if the respondent indicates a position between 4 and 6 (both inclusive) in the 0–10 ideological scale.	Gutiérrez-Mora and Oto-Peralías (2024).
Ideology: leftist	Binary variable equal to 1 if the respondent indicates a position between 0 and 3 (both inclusive) in the 0–10 ideological scale.	Gutiérrez-Mora and Oto-Peralías (2024).

Notes.
(*) The female share is winsorized to avoid the undue influence of extreme values. These outliers are largely the consequence of the implementation of the algorithm to classify streets by gender, which may create noise particularly in small municipalities (Gutiérrez-Mora & Oto-Peralías, 2022). The female share indicator (in levels) is winsorized at the 95th percentile, while the Δ female share at 1st and 99th percentiles in the annual panel and at the 5th and 95th percentiles in the political term panel.
(**)The variables years with left-wing and female mayors are also winsorized at the 95th percentile.

Table A2
Descriptive statistics

Variable name	Obs	Mean	Std. Dev.	Min	Max
Cross-section					
Female share in 2001	6128	8.61	13.05	0.00	50.00
Female share in 2023	6128	10.79	13.58	0.00	50.00
Years with left-wing mayors in 2001	6128	8.75	8.01	0.00	23.22
Years with left-wing mayors in 2023	6128	16.37	11.73	0.00	32.72

Table A2 (*continued*)

Variable name	Obs	Mean	Std. Dev.	Min	Max
Years with women mayors in 2001	6128	0.84	1.98	0.00	7.04
Years with women mayors in 2023	6128	3.80	4.62	0.00	12.56
Log population in 2001	6128	7.02	1.66	2.56	14.90
Log population in 2023	6128	7.00	1.84	1.95	15.02
Log total number of streets in 2001	6128	4.05	1.04	0.00	8.99
Log total number of streets in 2023	6128	4.25	1.06	0.69	9.05
Population's average age (2001)	6127	44.89	6.37	28.91	71.73
Service sector weight in employment (2001)	6127	47.21	13.08	0.00	100.00
Education level (2001)	6127	48.68	15.35	2.44	100.00
Annual panel					
Δ female share	134,801	0.05	0.52	−1.19	4.14
Δ female share: binary	134,801	0.04	0.19	0.00	1.00
Left	134,801	0.44	0.50	0.00	1.00
Female Mayor	134,801	0.17	0.38	0.00	1.00
Log population	134,801	7.03	1.77	1.39	15.02
Log total streets	134,801	4.18	1.06	0.00	9.05
Political term (4-year) panel					
Δ female share	30,640	0.14	0.66	−0.64	2.61
Δ female share: binary	30,640	0.11	0.31	0.00	1.00
Left	30,640	0.44	0.50	0.00	1.00
Female Mayor	30,640	0.18	0.38	0.00	1.00
Log population	30,640	7.03	1.79	1.61	15.02
Log total streets	30,640	4.21	1.06	0.00	9.05
RDD: ideological race					
Δ female share	17,953	0.16	0.69	−0.60	2.48
Δ female share: binary	17,953	0.13	0.34	0.00	1.00
Feft vote share	17,953	46.74	15.00	5.64	90.78
Log population	17,953	7.60	1.50	5.24	15.00
Log total streets	17,953	4.48	0.97	0.00	9.05
RDD: gender mixed race					
Δ female share	7951	0.17	0.69	−0.60	2.48
Δ female share: binary	7951	0.13	0.34	0.00	1.00
Female vote share	8579	46.17	14.50	6.12	88.49
Log population	8579	7.59	1.52	5.17	15.02
Log total streets	8075	4.52	0.99	0.00	9.05
Online survey					
Agree with "priority should be given to …"	1521	0.59	0.49	0.00	1.00
Agree with: "small progress made in … "	1762	0.45	0.50	0.00	1.00
Woman	1792	0.58	0.49	0.00	1.00
Ideology: centrist	1792	0.41	0.49	0.00	1.00
Ideology: leftist	1792	0.32	0.47	0.00	1.00

Notes: Variables' descriptions are provided in Table A1.

Table A3

Distribution of municipalities by the gender and party ideology of mayors

	Women	Party ideology			
		Left	Right	Center	Independent
	(1)	(2)	(3)	(4)	(5)
Political terms:					
2003–2007	12.9%	43.0%	48.3%	1.9%	5.2%
2007–2011	15.1%	45.6%	44.6%	1.7%	5.5%
2011–2015	18.1%	37.3%	56.3%	1.4%	5.0%
2015–2019	19.7%	42.9%	43.5%	1.9%	9.9%
2019–2023	22.8%	49.3%	40.5%	3.4%	6.8%
All periods (2003–2023)	17.7%	43.6%	46.6%	2.0%	6.5%

Notes: the sum of the percentages of party ideology does not necessarily add up to 1 because there are cases where no party ideology has ruled for more than half of the political term (i.e., two years).

Table A4

Years with female mayors and the female share in street names: comparing the periods 1979–2001 and 2001–2023

	Female share (2001)	Change in the female share (2023–2001)	Female share (2001)	Change in the female share (2023–2001)
	(1)	(2)	(3)	(4)
Years with women mayors unitl 2001	0.165*		0.168*	
	(0.092)		(0.092)	
Years with left-wing mayors until 2001	0.052**		0.047**	
	(0.022)		(0.023)	
Years with women mayors between 2001 and 2023		0.008		0.007

Table A4 (*continued*)

	Female share (2001)	Change in the female share (2023–2001)	Female share (2001)	Change in the female share (2023–2001)
	(1)	(2)	(3)	(4)
		(0.008)		(0.008)
Years with left-wing mayors between 2001 and 2023		0.021***		0.017***
		(0.005)		(0.005)
Log of number of streets	1.907***	0.35***	1.727***	0.351***
	(0.31)	(0.073)	(0.315)	(0.074)
Log of total population	−0.554***	0.201***	−0.681***	0.114**
	(0.21)	(0.044)	(0.229)	(0.052)
Average age			−0.064	−0.044***
			(0.046)	(0.011)
Service sector weight in employment (%)			0.053***	−0.002
			(0.016)	(0.003)
Education level (people with secondary and higher education (%))			−0.028*	−0.006*
			(0.016)	(0.003)
R-sq	0.01	0.05	0.02	0.06
Obs	6128	6128	6127	6127

Notes: Variables' descriptions are provided in Table A1. The regression models include a constant term, omitted for space considerations. Heteroskedasticity-robust standard errors are in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A5
Fixed-effects models: robustness checks

	Annual panel				Political term panel			
Panel A: Adding centrist and independent political party ideologies	Δ female share		Δ female share: binary		Δ female share		Δ female share: binary	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Left mayor	0.031***	0.033***	0.012***	0.013***	0.075***	0.079***	0.03***	0.033***
	(0.004)	(0.005)	(0.002)	(0.002)	(0.012)	(0.013)	(0.005)	(0.006)
Woman mayor	−0.006	−0.001	−0.002	0.001	−0.013	−0.004	−0.008	0.001
	(0.005)	(0.006)	(0.002)	(0.002)	(0.013)	(0.016)	(0.006)	(0.007)
Left mayor x Woman mayor		−0.01		−0.005		−0.019		−0.017
		(0.01)		(0.004)		(0.026)		(0.011)
Centrist mayor	0.027*	0.027*	0.016***	0.016***	0.049	0.05	0.027*	0.027*
	(0.014)	(0.014)	(0.005)	(0.005)	(0.037)	(0.037)	(0.016)	(0.016)
Independent mayors	0.014*	0.014*	0.007***	0.007***	0.002	0.002	0.002	0.002
	(0.008)	(0.008)	(0.003)	(0.003)	(0.02)	(0.02)	(0.009)	(0.009)
Municipality and year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	134801	134801	134801	134801	30640	30640	30640	30640
Panel B: Removing observations of municipalities governed by independent parties	Δ female share		Δ female share: binary		Δ female share		Δ female share: binary	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Left mayor	0.029***	0.031***	0.011***	0.012***	0.072***	0.074***	0.029***	0.032***
	(0.005)	(0.005)	(0.002)	(0.002)	(0.012)	(0.014)	(0.005)	(0.006)
Woman mayor	−0.006	−0.003	−0.002	0.001	−0.01	−0.004	−0.006	0.004
	(0.005)	(0.007)	(0.002)	(0.003)	(0.014)	(0.018)	(0.006)	(0.008)
Left mayor x Woman mayor		−0.007		−0.005		−0.012		−0.018
		(0.01)		(0.004)		(0.027)		(0.012)
Municipality and year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	125610	125610	125610	125610	28509	28509	28509	28509
Panel C: Focusing on municipalities governed by parties with absolute majority of votes	Δ female share		Δ female share: binary		Δ female share		Δ female share: binary	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Left mayor	0.028***	0.027***	0.01***	0.009***	0.076***	0.08***	0.035***	0.037***
	(0.008)	(0.008)	(0.002)	(0.003)	(0.019)	(0.021)	(0.008)	(0.009)
Woman mayor	0.012	0.01	0.002	0	0.019	0.028	0.004	0.009
	(0.009)	(0.011)	(0.003)	(0.004)	(0.021)	(0.028)	(0.009)	(0.012)
Left mayor x Woman mayor		0.005		0.003		−0.018		−0.009
		(0.017)		(0.005)		(0.042)		(0.018)
Municipality and pol.term fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	58680	58680	58680	58680	14657	14657	14657	14657

Notes: Variables' descriptions are provided in Table A1. The regression models include the log of population, the log of total number of streets, and a constant term, all omitted for space considerations. Standard errors clustered at the municipality levels are reported in parenthesis. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A6
Fixed-effects models: robustness to heterogeneous treatment effects

	Annual panel				Political term panel			
	Δ female share		Δ female share: binary		Δ female share		Δ female share: binary	
	AS	WAS	AS	WAS	AS	WAS	AS	WAS
	(1)	(2)	(3)	(4)	(9)	(10)	(11)	(12)
Left mayor	0.023**	0.025**	0.008**	0.011***	0.057***	0.054***	0.023***	0.022***
	(0.010)	(0.010)	(0.004)	(0.004)	(0.016)	(0.016)	(0.007)	(0.007)
	(5)	(6)	(7)	(8)	(13)	(14)	(15)	(16)
Woman mayor	0.008	0.007	0.002	0.001	−0.017	−0.017	−0.008	−0.008
	(0.012)	(0.012)	(0.005)	(0.005)	(0.017)	(0.017)	(0.007)	(0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	116417	116417	116417	116417	24512	24512	24512	24512

Notes: Variables' descriptions are provided in Table A1. Results from the de Chaisemartin and D'Haultfœuille (2020)'s model. AS and WAS stand for average slope and weighted average slope. Standard errors clustered at the municipality levels are reported in parenthesis. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A7
Validity of the RDD

Panel A: Left vs right electoral race

	Municipality education level	Population's average age	Service sector weight	Gender difference in participation rate	Left-wing mayor	Female mayor
	(1)	(2)	(3)	(4)	(5)	(6)
Vote share	−0.102***	−0.028***	−0.131***	0.061***	0.009***	0.002***
	(0.02)	(0.006)	(0.016)	(0.01)	(0)	(0.001)
Vote share ≥50	0.134	0.08	−0.227	0.106	0.577***	0.009
	(0.378)	(0.111)	(0.333)	(0.217)	(0.01)	(0.012)
Vote share x "Vote share ≥50"	0.048	0.007	0.174***	−0.118***	−0.005***	−0.005***
	(0.031)	(0.009)	(0.027)	(0.018)	(0.001)	(0.001)
Election year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs	18273	18273	18273	18273	18278	18278

Panel B: Female vs male electoral race

	Municipality education level	Population's average age	Service sector weight	Gender difference in participation rate	Female mayor	Left-wing mayor
	(1)	(2)	(3)	(4)	(5)	(6)
Vote share	0.026	−0.018**	−0.04*	0.048***	0.008***	0.002**
	(0.025)	(0.007)	(0.021)	(0.014)	(0)	(0.001)
Vote share ≥50	−0.886	0.347**	−0.19	−0.001	0.529***	0.014
	(0.562)	(0.157)	(0.479)	(0.311)	(0.016)	(0.022)
Vote share x "Vote share ≥50"	−0.021	0.034**	0.092**	−0.108***	0.004***	−0.003*
	(0.046)	(0.014)	(0.039)	(0.024)	(0.001)	(0.002)
Election year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs	8072	8072	8072	8072	8075	8075

Notes: Variables' descriptions are provided in Table A1. The regression models include a constant term, the log of total population, and the log of number of streets, omitted for space considerations. Standard errors clustered at the municipality levels are reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A8
RDD results: alternative bandwidths

Panel A: Sharp RDD model	Percentage vote in range 20%–80%				Percentage vote in range 30%–70%				Percentage vote in range 40%–60%			
	Left vs right race		Female vs male race		Left vs right race		Female vs male race		Left vs right race		Female vs male race	
	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Vote share	0.00	0.000	0.001	0.000	0.001	0.001	0.001	0.000	−0.004	−0.002	0.011**	0.003
	(0.001)	(0)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.004)	(0.002)	(0.005)	(0.002)
Vote share ≥50	0.038**	0.021**	−0.034	−0.007	0.038*	0.021**	−0.048	−0.008	0.055*	0.026*	−0.095**	−0.021
	(0.019)	(0.009)	(0.028)	(0.013)	(0.022)	(0.01)	(0.032)	(0.015)	(0.031)	(0.014)	(0.045)	(0.021)
Vote share x "Vote share ≥50"	0.001	0.001	0.001	0	−0.001	−0.001	0.003	0	0.007	0.003	−0.004	−0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.006)	(0.003)	(0.008)	(0.004)
Election year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	17198	17198	7664	7664	14163	14163	6415	6415	8196	8196	3780	3780
Panel B: Fuzzy RDD model	Percentage vote in range 20%–80%				Percentage vote in range 30%–70%				Percentage vote in range 40%–60%			
	Left vs right race		Female vs male race		Left vs right race		Female vs male race		Left vs right race		Female vs male race	
	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary	Δ f.s.	Δ f.s.: binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Vote share	−0.001	−0.001	0.001	0.000	0.000	0.000	0.002	0.000	−0.011**	−0.004*	0.014**	0.004
	(0.001)	(0)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.005)	(0.002)	(0.007)	(0.003)
Prob. being elected mayor	0.064*	0.036**	−0.067	−0.013	0.072*	0.04**	−0.104	−0.018	0.121*	0.056*	−0.2**	−0.045
	(0.034)	(0.016)	(0.055)	(0.026)	(0.042)	(0.019)	(0.069)	(0.032)	(0.072)	(0.033)	(0.094)	(0.044)
Vote share x Prob. elected mayor	0.003*	0.001*	0.001	0	0.001	0.000	0.004	0.001	0.014**	0.005*	−0.005	−0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.006)	(0.003)	(0.011)	(0.005)
Election year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	17198	17198	7664	7664	14163	14163	6415	6415	8196	8196	3780	3780

Notes: Variables' descriptions are provided in Table A1. The regression models include a constant term, the log of total population, and the log of number of streets, omitted for space considerations. Standard errors clustered at the municipality levels are reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A9
Sharp RDD model with province-fixed effects

|	Left vs right electoral race		Female vs male electoral race	
	Δ fem. share	Δ fem. share: binary	Δ fem. share	Δ fem. share: binary
	(1)	(2)	(3)	(4)
Vote share	0.000	0.000	−0.001	0
	(0.001)	(0.000)	(0.001)	(0)
Vote share ≥50	0.04***	0.024***	−0.028	−0.006
	(0.013)	(0.008)	(0.023)	(0.01)
Vote share x "Vote share ≥50"	0.000	0.000	0.003*	0.001
	(0.001)	(0.001)	(0.002)	(0.001)
Election year fixed-effects	Yes	Yes	Yes	Yes
Obs	17953	17953	7951	7951

Notes: Variables' descriptions are provided in Table A1. The regression models include a constant term, the log of total population, and the log of number of streets, omitted for space considerations. Standard errors clustered at the municipality levels are reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.

Table A10

Survey evidence on citizens' preferences for female-named streets: Representative sample of Spanish respondents

	Agree with "priority should be given to women's names to correct their underrepresentation on the streets"	Agree with "small progress made in gender equality in housework and care"
	(symbolic policy)	*(a non-symbolic dimension)*
	(1)	(2)
Woman	0.1824***	0.1578***
	(0.034)	(0.032)
Ideology:	0.2074***	0.1511***
centrist	(0.041)	(0.037)
Ideology: leftist	0.3980***	0.2662***
	(0.046)	(0.044)
Intercept	0.2447***	0.1704***
	(0.035)	(0.032)
Obs	743	884

Notes: Variables' descriptions are provided in Table A1. Standard errors reported in parentheses. *,**, *** denote statistical significance at the 10, 5, and 1% level.
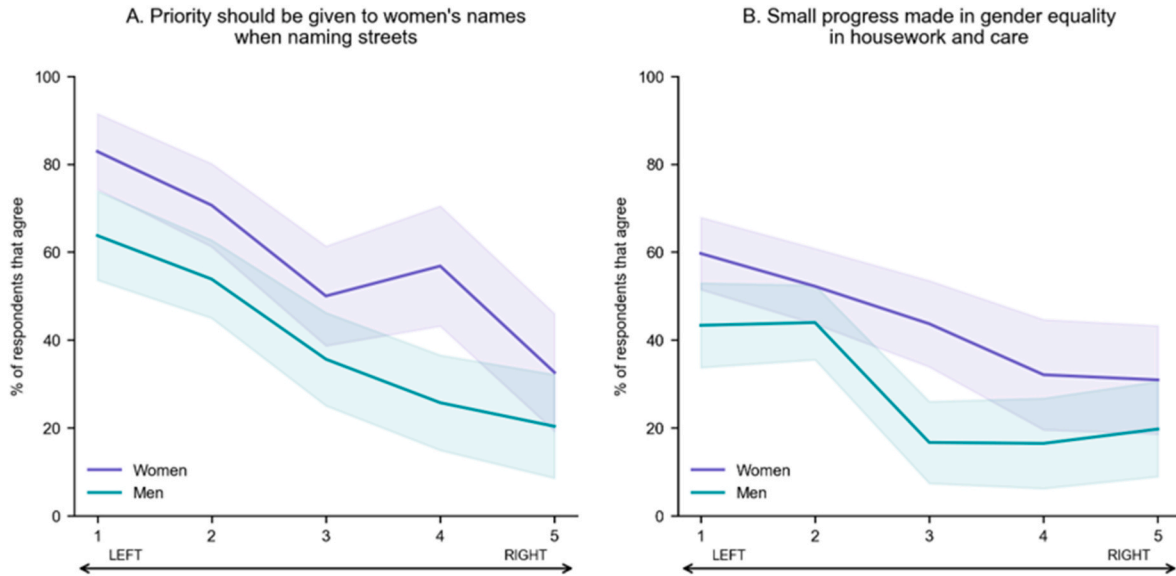
Fig. A1. Gender role attitudes in the population by gender and ideology
Notes: The figure shows the percentage of respondents that agree with each statement, depending on their gender and ideology, as well as the 95% confidence interval. Data come from an online representative survey of ~1000 Spanish individuals; the effective sample being ~800 observations due to missing values. The original ideological scale (0–10) is aggregated into a 1–5 one as follows: 1 (0, 1, 2), 2 (3, 4), 3 (5), 4 (6, 7), 5 (8, 9, 10).

Data availability

The data and code used in the article are available at https://github.com/StNamesLab/ReplicationFiles/tree/main/PoliticalGeography_2024.

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