

García, Israel; Hayo, Bernd

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# The influence of politicians' sex on political budget cycles: An empirical analysis of Spanish municipalities

Israel García<sup>1,2</sup>  | Bernd Hayo<sup>1</sup> 

<sup>1</sup>University of Marburg, Marburg, Germany

<sup>2</sup>Thünen Institute, Braunschweig, Germany

## Correspondence

Bernd Hayo, Marburg Centre for Institutional Economics (MACIE), School of Business and Economics, University of Marburg, D-35032 Marburg, Germany.  
Email: [hayo@wiwi.uni-marburg.de](mailto:hayo@wiwi.uni-marburg.de)

## Abstract

Does a politician's sex influence political budget cycles (PBCs)? We answer this question using a sample of Spanish municipalities from the Madrid region for the period 2010–2019. The Madrid region has a homogeneous set of budget rules that allow consistent categorization of budget expenditure items as either “mandatory” or “non-mandatory” public services. After differentiating between *smaller* and *larger* municipalities, gender influence is studied along two dimensions: the mayor's sex and the share of women in government. Our findings include, in regard to mandatory spending in *smaller* municipalities, that gender-balanced governments induce PBCs. In *larger* municipalities, when the share of women in government is above 60%, electoral spending is increased by up to 10% of an average municipal budget for mandatory spending, and up to 2.2% for non-mandatory. These findings are generally supported in a mixed-gender close election analysis.

## KEYWORDS

gender, fiscal policy, local politicians, Madrid region, political budget cycles, signaling mechanism, Spanish municipalities

## 1 | INTRODUCTION

The last decade has witnessed a rising share of female politicians, leading to a growing body of research on the effect this has had on stereotypes, public opinion, and policy choices. Empirical evidence shows that greater female representation in politics improves the overall quality of politicians by increasing the pool of qualified female politicians and driving out less competent males (Besley et al., 2017; O'Brien & Rickne, 2016). Men and women are known to have different policy preferences, especially in regard to social, health, and education spending (Aidt & Dallal, 2008; Aidt et al., 2006; Bertocchi, 2011). Thus, it is often assumed in the literature that those spending categories are particularly favored by female politicians. Bagues and Campa (2021) call these types of budget items “female” expenditures. Empirical evidence supporting this conjecture is mixed, however, as only a fraction of studies on this topic find that female political representation matters for different policy choices (Hessami & da Fonseca, 2020).

The political economy literature suggests that before an election, incumbent politicians seek to influence voter perceptions of their competence and/or preferences by means of fiscal policy. These election-induced fiscal policy cycles are known as “political budget cycles” (PBCs). Since Rogoff (1990), many authors have assumed a scenario in which voters are dissatisfied with high-spending governments, and thus incumbents who adopt more expansionary fiscal policies may be punished rather than rewarded (Buchs & Soguel, 2022). In this setting, incumbents signal their competence by adjusting the budget in the pre-election period so that specific preferred items receive (new or additional) funding (Brender & Drazen, 2013; Drazen & Eslava, 2010).

In this context, it seems important to know which budget items voters prefer so as to properly assess whether incumbent politicians are, indeed, manipulating expenditure on these items with the aim of influencing voter perceptions. In the empirical literature, the classification of budget items as “visible” or valued by voters appears to be somewhat subjective and context specific. On the one hand, some studies, such as Vergne (2009) and Veiga et al. (2017), find that before elections, funds are shifted from investment expenditures toward current expenditures. On the other hand, Drazen and Eslava (2010) and Repetto (2018) report that opportunistically targeted expenditures are more often associated with infrastructure development projects: roads, schools, water plants, hospitals, and the like. Furthermore, spending areas the literature considers “female” are not easily categorized in terms of “visibility,” for example, a budget item labeled “education” may contain funds for school construction, that is, infrastructure investment, as well as funds for teacher salaries, that is, current expenditure.

We study the influence of gender on PBCs by differentiating between “mandatory services,” that is, budget items that *must* be provided by each municipality, and “non-mandatory services,” that is, services the municipality is not required to provide. Using “mandatory services” avoids the problem of having to decide, more or less arbitrarily, which budget items are “visible” or more likely to be valued by female politicians and whether such politicians actually have the capacity to alter them. In addition, “mandatory services” lend themselves well to electoral manipulation, as local politicians can claim full credit for them (Bueno, 2023). Moreover, we do not use final budget data as a proxy for the provision of public goods, which is standard procedure in the PBC field. Instead, taking an approach we believe is more in line with the theoretical PBC framework, we use the *initial* budget as a signaling mechanism directed at voters.

Accettura and Profeta (2022) and Ordine et al. (2023) are the only works to examine the electoral motives behind gender differences in spending. However, the literature on gender

differences in public policy does not distinguish between electoral and non-electoral periods (Chattopadhyay & Duflo, 2004; Clots-Figueras, 2011; Ferreira & Gyourko, 2014). There are several reasons why the behavior of female politicians may differ between electoral and non-electoral years, and why their engagement in RBC-related activities may differ from that of men. On the one hand, women appear to have stronger preferences for redistribution and equality (Alesina & La Ferrara, 2005; Corneo & Grüner, 2002), to be more risk-averse and less competitive (Croson & Gneezy, 2009; Gneezy et al., 2009), and to be associated with less corruption and less opportunism (Brollo & Troiano, 2016; Dollar et al., 2001). On the other hand, there is evidence of the same level of opportunism as observed for male politicians (Gangadharan et al., 2019; Ordine et al., 2023). Esteve-Volart and Bagues (2012) and Casas-Arce and Saiz (2015) provide evidence that in Spain, before the introduction of gender quotas, there was discrimination against female politicians by party leaders. As a consequence, female politicians, who tend to be more risk-averse and more concerned with the next election than future ones (Ordine et al., 2023), may have felt the need to signal their competence much more strongly than was the case for their male counterparts. This argument is especially relevant for the most visible figure of government—the mayor.

Budgets are generally approved by simple majorities and it thus seems possible that PBC-related spending could depend on the relative shares of men and women in government. Also, in municipal-level policymaking, mayors interact intensively with the local council, making it plausible that the influence of the mayor's sex may be conditional on the share of female councilors. Thus, we study the effect of a mayor's sex conditional on the share of women in government.

To study PBC-related activities at the municipal level, we use data from the Madrid region (Comunidad Autónoma de Madrid) for the period 2010–2019. Municipalities in the Madrid region are subject to a homogenous set of budget rules, which allow consistent categorization of budget expenditure items as either for “mandatory” or “non-mandatory” public services. Note that 2010–2019 was a period of fiscal austerity, characterized by balanced local budgets and constraints on total expenditures due to Organic Law 2012. Therefore, during this period, PBC-related activities could not be accomplished by manipulating deficits or total spending; instead, incumbents had to rely on budget composition to signal their competence and/or preferences. In March 2007, the Equality Act amended Spanish electoral law by introducing gender-balanced candidate lists. The Equality Act positioned Spain among the group of countries with rising shares of female politicians and it has the additional advantage of allowing us to empirically test the influence of gender on PBCs.

Our analysis is based on annual municipal data from the Madrid region over the period 2010–2019, which we study using a dynamic panel-data framework and, as a robustness test, a regression discontinuity design. When conditioning the analysis on two important gender dimensions, female mayor and share of women in government, we find evidence of PBC-related spending. For *smaller* municipalities, we discover that gender-balanced governments engage in PBC-related behavior in terms of mandatory spending. In the case of *larger* municipalities, we find significant gender-related differences in both—mandatory and non-mandatory expenditures. In contrast to previous findings, balanced governments do not prevent PBC-related activities. Furthermore, female-dominated governments tend to engage in opportunistic budget manipulation by increasing electoral spending up to 10% of total expenditures. Overall, our analysis suggests that gender-balanced councils, as mandated by the Equality Act, do not appear to prevent electoral budget manipulation, neither in *smaller* nor *larger* municipalities. Quite to the contrary, we find evidence that increasing the share of

women in government above 60% increases local politicians' PBC-related behavior. Hence, in contrast to some claims in the literature, under specific circumstances, female politicians can behave as opportunistically as males.

Some studies of Spanish municipalities, such as Cabaleiro-Casal and Buch-Gómez (2020) and Bagues and Campa (2021), report limited (or no) gender impact of female politicians on social spending. Other studies show that female mayors tend to be more compliant with legal restrictions on debt, financial sustainability (Cabaleiro-Casal & Buch-Gómez, 2018; Hernández-Nicolás et al., 2018), and budget stability, especially in the presence of a gender-balanced council as mandated by the Equality Act (Balaguer-Coll & Ivanova-Toneva, 2021; Navarro-Galera et al., 2017).

Our results do not corroborate these findings in the literature, that is, we find, conditional on female mayors, that government composition in line with the Equality Act increases PBC spending, but only in *smaller* municipalities. In *larger* ones, a government composition in line with the Equality Act is indistinguishable from a male-dominated government and only when the governing body becomes female-dominated, we find electoral-motivated spending in mandatory and non-mandatory services.

The remainder of the article is organized as follows: Section 2 reviews the related literature. Section 3 outlines some theoretical considerations. Section 4 formulates the empirical strategy. Section 5 presents and discusses the results of our analysis. Section 6 provides the conclusion.

## 2 | LITERATURE REVIEW

The theoretical literature on PBCs begins with Rogoff and Sibert (1988) and Rogoff (1990), who propose models in which more competent incumbents signal their competence before elections by higher public spending or by altering the budget to showcase “more visible” items. Shi and Svensson (2006) and Drazen and Eslava (2010) further develop this perspective. See García and Hayo (2021) for a more comprehensive discussion of the PBC literature.

Earlier empirical literature<sup>1</sup> (Brender & Drazen, 2005; Persson & Tabellini, 2003; Shi & Svensson, 2006) relies on country-level panel data and aggregated fiscal expenditure or deficit as the primary PBC indicators. The focus has now shifted toward a scenario in which voters prefer balanced fiscal budgets, although, at the same time, they may reward high spending on specific, “more visible,” items (Brender & Drazen, 2013; Veiga et al., 2017; Vergne, 2009). Furthermore, it is now common to use data from local governments rather than country-level data. Regional data have a number of advantages. First, it is difficult to control for all sources of cross-country heterogeneity, whereas regions within one country tend to be subject to similar institutional constraints and shocks. Second, using municipal data substantially increases the number of observations for studying PBC-related activities. Third, it is widely believed that citizens are more likely to monitor local government policies and actions than they are to monitor higher-level government action. Moreover, specific groups of voters may be more easily targeted at the local level, meaning that the distinction between targeted and non-targeted expenditures (or taxes) and their opportunistic manipulation is more relevant at this level.

Politicians' perception of “more visible” or targeted items appears to be context specific. On the one hand, some studies, such as Vergne (2009), Veiga et al. (2017), Mandon and Cazals (2019), and Bueno (2023), find that pre-electoral spending shifts from investment toward current expenditures. On the other hand, Kneebone and McKenzie (2001, 757) argue that

“brick and mortar” expenditures are highly visible and beneficial for specific (and potentially large) groups of voters. In line with this, Drazen and Eslava (2010), Repetto (2018), Giacobbe et al. (2024), and Lautenschlager et al. (2024) report that opportunistically targeted expenditures are more often associated with infrastructure development projects, for example, roads, schools, water plants, hospitals, and the like.

Bastida et al. (2013), Benito et al. (2013a), Vicente et al. (2013), Cabaleiro-Casal & Buch-Gómez, (2018, 2021), and Balaguer-Coll and Ivanova-Toneva (2021) analyze local Spanish PBCs in the context of fiscal austerity. The studies examine the effect of elections on debt, budget stability, and capital expenditure. The researchers tend to find significant hikes in capital spending in pre-electoral years, conditional on different political attributes, for instance, majority, government transparency, and party affiliation. Benito et al. (2013b), Guillamón et al. (2013), Benito et al. (2017), and Cabaleiro-Casal and Buch-Gómez (2020) analyze the effect of PBCs on cultural, police, waste collection, and social municipal expenditures, respectively. Again, conditional on political and socioeconomic characteristics, they all find evidence of electoral manipulation.

The share of female politicians has increased in recent years, which, at least to some extent, is due to the introduction of gender quotas. Empirical findings show that increasing the presence of women in government (1) raises the pool of qualified female politicians (O'Brien & Rickne, 2016), (2) improves the quality of all politicians (Baltrunaite et al., 2014; Besley et al., 2017), (3) homogenizes education levels of male and female politicians under closed-list proportional representation (Profeta & Woodhouse, 2022), (4) increases electoral participation, and (5) reduces negative stereotypes about women (De Paola et al., 2010, 2014). The latter result is in line with the findings of Esteve-Volart and Bagues (2012) and Casas-Arce and Saiz (2015), who show that in Spain, before gender quotas, party leaders were not maximizing electoral success, as they included fewer women in the candidate lists than voters would have preferred.

Men and women hold distinctly different policy preferences. Bertocchi (2011) finds that extending the franchise to women increases the size of government, due to higher expenditures on health, education, and social issues (Aidt & Dallal, 2008; Aidt et al., 2006). Funk and Gathmann (2015) studied Swiss survey data and discovered differing preferences between men and women in specific areas, such as health, defense, environmental issues, and welfare spending. Employing representative survey data on Germany, Hayo and Neumeier (2019) show that women are relatively more opposed to fiscal consolidation than men. In addition, there is substantial evidence that women have social preferences different than those of men. Slegten and Heyndels (2019) show that female politicians tend to be more left-wing oriented. For instance, women appear to have a stronger preference for redistribution and equality than men (Alesina & La Ferrara, 2005; Corneo & Grüner, 2002). While Dollar et al. (2001) and Brollo and Troiano (2016) find that greater female representation in government is associated with less corruption and less opportunistic behavior, Gangadharan et al. (2019) and Ordine et al. (2023) present evidence of at least the same level of opportunism. Using a controlled experiment comparing matrilineal and patriarchal communities, Andersen et al. (2008) and Gneezy et al. (2009) report gender differences in competitive behavior and public good provision. In their review of the literature on gender differences in economic experiments, Croson and Gneezy (2009) conclude that women are not only less competitive but also more risk-averse than men. Following the reasoning of Ordine et al. (2023) and combining this with Dittrich and Leipold's (2014) finding that men and women have different discount rates, it is likely that women view the political arena as more temporary than men. In this case, the next election is more important for female politicians than future elections. Therefore, given this different



orientation toward the future and a higher degree of risk aversion, female politicians may be as opportunistically motivated, or even more so, than their male counterparts to increase their re-election chances in the next election.

How gender influences policymaking has become particularly relevant in the empirical literature. Due to its political structure and the availability of regional budget data, India has received a lot of attention in the last 20 years. Using a quasi-experimental setup, Chattopadhyay and Duflo (2004), Clots-Figueras, (2011, 2012), and Bhalotra and Clots-Figueras (2014) provide evidence of gender differences in budget expenditures, particularly those aimed at health and education, areas traditionally considered of special interest to women. Evidence of gender differences at the local level is found in richer economies, too. Besley and Case (2003), Svaleryd (2009), Funk and Gathmann (2015), Braga and Scervini (2017), Clayton and Zetterberg (2018), and Funk and Philips (2019) show significant differences between male and female politicians when it comes to spending on childcare, health, education, and social assistance. However, Gagliarducci and Paserman (2012), Ferreira and Gyourko (2014), and Geys and Sørensen (2019) report that increasing the share of female politicians has no impact on the composition of public spending. Accettura and Profeta (2022) find evidence for both scenarios. When they analyze the full electoral term, they find no spending differences between male and female mayors. However, once the electoral timeline is accounted for, male mayors appear to be more likely to engage in pre-electoral spending on what the authors believe to be “more visible” items. However, most of these effects are significant at only the 10% level. More recently, Ordine et al. (2023) report evidence that women tend to increase capital spending while reducing the total amount of government spending. Furthermore, this is achieved by reducing allocations to items typically considered “more visible” in the PBC literature, such as roads, public lighting, and waste management, while leaving unaffected items considered as “feminine.”

Gender differences are also studied using municipal data in Spain. Cabaleiro-Casal and Buch-Gómez (2018) and Hernández-Nicolás et al. (2018) show that female mayors in Spain tend to be more compliant with legal restrictions on debt and financial sustainability, especially in the presence of a gender-balanced council as mandated by the Equality Act (Navarro-Galera et al., 2017). However, Cabaleiro-Casal and Buch-Gómez (2021) report quite the reverse: the effect of female mayors is very limited and a greater share of female councilors worsens fiscal performance.

Balaguer-Coll and Ivanova-Toneva (2021) condition the effect of female councilors on the mayor's sex and conclude that the combination of a female mayor with an Equality-Act-compliant council results in greater budget stability. Their results also show that in pre-electoral years, female mayors are less likely to engage in PBC-related activities. In a sample of *large* Spanish municipalities, which receive more media coverage in Spain, Cabaleiro-Casal and Buch-Gómez (2020) report a limited gender-related impact on social spending. Bagues and Campa (2021) studied whether the Equality Act had an effect on the proportion of female councilors and female mayors as well as on the composition of public finances. They employ a regression discontinuity design around the 3000 and 5000 population thresholds to check whether budget composition changes around the threshold. They observe no significant variations in the size and composition of public finances, regardless of council composition.

### 3 | THEORETICAL CONSIDERATIONS

Recent PBC literature investigates whether local government incumbents use fiscal policy, in the form of spending composition, to provide specific public goods and signal their competence and/or preferences to the electorate. Empirical studies in this literature look at a number of PBC-relevant

aspects, such as term limits, governor's affiliation with the national party in power, electoral calendar and political cohesion, characteristics of parties and politicians, degree of fiscal decentralization, balanced budget rules, voters' information set, and the role of female mayors and councilors. Despite this wide range of topics, we believe that the extant literature does not sufficiently consider two important aspects.

First, given that public visibility of different budget items is the backbone of the theoretical and empirical literature, it is surprising that most of this literature does not distinguish between the different stages of the budget process (García & Hayo, 2021). Standard procedure is to use final budget data in the form of the amount of money a local government spends on different budget items. This type of data is relatively comprehensive and easy to collect, two useful characteristics for applied work.

This standard procedure, however, implicitly assumes that final budget data are a good proxy for actual public goods provision. Illustrating why this could be problematic, Bradford et al. (1969) decompose the production of public services into two stages: (i) the government uses a vector of primary inputs to produce what the authors call "directly produced" outputs, and (ii) these directly produced outputs are transformed into observable outcomes. Thus, the government uses monetary and non-monetary resources (inputs) to provide directly produced outputs, conditional on the government's allocative and technical efficiency and a vector of environmental factors. Finally, individual citizens consume the final outcome, which is a function of directly produced output and environmental factors. Hence, citizen welfare depends on the final outcome, and this outcome is not solely determined by public service providers (De Witte & Geys, 2011).

The local government efficiency literature acknowledges this complexity and focuses on the first stage, in which basic inputs are transformed into directly produced outputs (Narbón-Perpiñá & De Witte, 2018a, 2018b). Given their non-market nature, budget expenditures and revenues are the most common proxies for municipal resources employed in local service provision. As emphasized by Narbón-Perpiñá and De Witte (2018b) and Aiello and Bonanno (2019), the transformation of public inputs into final outcomes is not straightforward, as environmental influences can have a large impact on the efficiency of the provided municipal services. Rosen and Fullerton (1977, 433) thus conclude that it is problematic to use expenditures on local public benefits as a measure of the quantity and quality of local public services "because of the untenable assumption that output can be measured by expenditures on inputs." Aaberge and Langørgen (2003, 129) agree, "The lack of adequate measures for public output is a major problem in the analysis of demand for public services. Using expenditure as a proxy for output, which relies on the assumption on constant prices, is obviously in conflict with reality." Drazen and Eslava (2010, 41) also allow for the possibility that government policy might not affect individuals' consumption of the public good.

The second important aspect, thus far ignored in the relevant literature, is that classifying budget items as "more visible" or "valued by voters" appears highly context specific. Rogoff (1990, 21) writes that "the incumbent leader has an incentive to bias pre-election fiscal policy toward easily observed consumption expenditures, and away from government investment." Quite the reverse is argued by Drazen and Eslava (2010, 45), who state that "in Colombia, opportunistic targeted expenditures are more often associated with infrastructure development projects." The literature review presented in Section 2 demonstrates that empirical findings are all over the map; some of the studies report a shift in pre-electoral spending toward more current expenditures, whereas others provide empirical evidence of opportunistically targeted investment expenditures. There is not even any evidence of clear regional patterns that would



allow us to conclude that, for example, in Region A, budget item 1 is considered “more visible,” whereas budget item 2 is “more visible” in Region B.

We do not use final expenditures to measure public good output, nor do we engage in an arbitrary categorization of what is, or is not, a “more visible” budget item. As to public goods provision, we consider the initially proposed budget as a signaling mechanism directed at voters. According to the literature on local government efficiency in public goods provision, actual outcomes are strongly influenced by laws and higher federal levels as well as by past budget decisions (Afonso & Fernandes, 2006, 2008; Balaguer-Coll et al., 2007, 2019; Bosch et al., 2012). Although the initial budget is somewhat subject to these influences too, it is much less constrained and can be revised right up until the final budget is adopted. Moreover, the initial municipal budget is published before the actual budget period, thus allowing incumbents to signal their future policy stance. Hence, in contrast to measuring public good output based on backward-looking final budget data, the initial budget can be understood as a forward-looking type of signal for the following budget period, one that reveals the preferences and/or competence of incumbents through their choice of future fiscal policies. As argued by Drazen (2001, 101–102), fiscal manipulation can have a significant effect on votes without necessarily affecting actual economic activity. And finally, typically, it is the initial budget that is reported on and discussed by the media, whereas final budget data are generally available only with considerable delay and are rarely subject to external scrutiny.<sup>2</sup> This could be important, as the media plays a significant role in communicating budget data to the general public (García & Hayo, 2021). Indeed, municipal-level political debates are typically based on the initial budget, not on the final one.

In most decentralized countries, municipalities are required to provide a minimum of services, the standards for which are determined by the higher-level government. Such externally required minimum services have fiscal priority over the rest of the services provided at the municipal level (Balaguer-Coll et al., 2013, 2019; Kalb et al., 2012). By using “mandatory services” as a spending category, we do not have to arbitrarily decide which budget items are “more visible” and/or more likely to be valued by female politicians or whether such politicians can actually influence these items and claim credit for these items (Bueno, 2023). The latter point is emphasized by Geys and Sørensen (2019, 3), who note that higher levels of government impose substantial institutional and budgetary constraints on the local level. Moreover, spending areas considered in the literature to be “female” are not always so easily also categorized as “more visible.”

In Spain, local governments are responsible for a significant number of tasks. The Spanish Constitution grants municipalities a notable degree of budget autonomy and flexibility, but it is also very specific about what services must be provided. Depending on their population, municipalities must provide different levels of basic services<sup>3</sup>:

- All municipalities: public lighting, cemeteries, waste collection, public cleaning, drinking water supply, sewer system, access to urban areas, road surfacing, and food and drink control.
- Municipalities with more than 5000 inhabitants: all of the above, plus public parks, public libraries, and market and waste management.
- Municipalities with more than 20,000 inhabitants: all of the above, plus civil defense, social work, fire safety, sports facilities, and slaughterhouses.
- Municipalities with more than 50,000 inhabitants: all of the above, plus public transport and environmental protection.

We categorize municipal expenditure categories as either mandatory or non-mandatory. Thus, in principle, local political decision-makers can increase spending on mandatory budget items above the minimum and/or change non-mandatory spending.

## 4 | EMPIRICAL STRATEGY

### 4.1 | Institutional context

In 2001, Spain passed the Law of Budgetary Stability to accommodate the European Monetary Union mandate on public finances. Local governments now must comply with the Balanced Budget Rule (BBR), that is, in general, all planned budgets and successive modifications must be balanced. The Ministry of Finance has the right to veto an approved municipal budget if the ministry concludes that the BBR has not been followed. Furthermore, local governments may incur deficits only under special circumstances and with the authorization of the Ministry of Finance. During the economic recession following the global financial crises, that is, from 2009 onwards, local governments (especially those governing *larger* municipalities) suffered a severe worsening of public finances. To maintain budgetary stability at the local level, the Spanish government adopted austerity programs that included tax increases and public spending reductions. In 2011, public budget stability was anchored in the Spanish Constitution (Article 135). Under this provision, local governments are required to adhere to the BBR, and repayment of debt has priority over any other expenditure. A year later, to operationalize the budget stability obligation implemented in the Constitution, the Spanish parliament approved Organic Law 2/2012, “Budgetary Stability and Financial Sustainability.” This law further tightens municipalities’ fiscal limits by regulating government expenditures. In 2013, the Local Government Rationalization and Sustainability Act (No. 27/2013) was introduced to ensure that local governments comply with the rules and regulations previously set out in Article 135 and Organic Law 2/2012. The focus of Act 27/2013 is to clarify municipal responsibilities and eliminate any overlap in responsibility between local and regional or central governments. The Act’s ultimate goal is to make local public administrations conduct themselves based on principles of efficiency and financial stability.

Local elections occur simultaneously across the country every 4 years on the same day. Councilors are elected through a proportional representation system based on closed lists.<sup>4</sup> There are as many electoral ballots as there are parties in each municipality, and each ballot includes as many candidates as the number of possible councilors. To ensure that all voters are sufficiently represented, the number of elected councilors is computed according to the d’Hondt law, in combination with a 5% threshold to avoid a situation where local legislation is dominated by many very small parties. The order in which a party’s candidates are listed determines who will be elected as councilors. In the opening session of the new council, councilors choose the mayor by a simple majority vote. Only candidates placed at the top of the respective party lists are eligible for running as mayor. In principle, council members serve 4-year terms and there are no term limits (Organic Law 5/1985, “General Electoral Regime”). The mayor proposes initiatives and regulations, which are passed, or not, by majority voting in the council. The mayor has control over the municipality’s executive functions and is in charge of explaining and presenting the municipal budget proposal to the council for approval.<sup>5</sup> The council is responsible for monitoring the municipality’s activities and approving the budget and its possible amendments.

In March 2007, the Equality Act mandated gender-balanced candidate lists. According to the Act, at least 40% of the candidates on an electoral list must be female and at least 40% must be male. This quota applies both to the entire party list and to each section of five candidates within the list. For example, in a municipality with 13 councilors, the ballot must contain at least six women and at least six men, plus at least two men and two women within the first five positions and within Positions 6–10. Parties whose candidate lists do not fulfill these requirements are not allowed to participate in the elections. The quota was introduced in 2007 in municipalities with more than 5000 inhabitants; in 2011, it was extended to municipalities with more than 3000 inhabitants.

## 4.2 | Data

The sample is comprised of municipalities from the Madrid region (Comunidad Autónoma de Madrid) for the period 2010–2019. The Madrid region is an interesting case. First, available information at the local level is generally not homogeneous between regions. Thus, building a comparable database using data from municipalities located in different regions is fraught with difficulties. Second, Madrid has no supra-municipal authority between municipalities and regional government, which ensures homogeneity in terms of legal requirements with respect to public services provision and grants.<sup>6</sup> At the same time, the Madrid region is very diverse; it includes a *very large* municipality, some *large* ones, and a considerable number of towns and villages. The majority of municipalities in our sample (55%) have less than 5000 inhabitants; 13% have more than 50,000 inhabitants. Note that, compared to the rest of the country, our sample region underrepresents *smaller* municipalities and overrepresents *larger* ones.<sup>7</sup>

The sample period, 2010–2019, was determined by data availability. In December 2008, Order EHA/3565, “Structure of the Budget of Local Entities” thoroughly modified the structure of local budgets. The changes affected all budgets from 2010 onwards. The revenue side of the budget was virtually unchanged, but the expenditure side was greatly modified, thus making a comparison of most expenditure items before and after 2010 practically impossible. The period 2010–2019 is characterized by balanced local budgets and constraints on total expenditures due to Organic Law 2012. Therefore, PBCs cannot occur through deficits or total spending and incumbents interested in creating PBCs must engage in a “second best” strategy, namely, using budget composition to signal their competence and/or preferences (García & Hayo, 2021; Schneider, 2010).

Administratively, the Madrid region is divided into 179 municipalities. To avoid too many missing observations, we restrict our analysis to municipalities with more than 250 inhabitants, which reduces our database to 156 municipalities. The period 2010–2019 covers three different electoral terms (elections took place in 2011, 2015, and 2019) and yields a panel dataset containing 1554 observations. We not only consider *larger* municipalities, the focus of most of the extant literature but include a large number of *smaller* municipalities as well. This diversity allows us to study PBCs in both *larger* urban areas as well as in *smaller* towns and villages.

We divide our sample of municipalities into *smaller* and *larger* ones depending on whether their population size is below or above 5000 inhabitants. This classification is based on public accountability and legal budget regulations. *Larger* municipalities not only manage larger budgets, but they are also subject to greater accountability and media scrutiny. *Larger* municipalities have more resources to compile information and have the appropriate technical staff to manage the budget professionally. In *smaller* municipalities, there is no requirement to

present a detailed budget and most of these municipalities instead choose to present a simplified budget. In *larger* municipalities, the standards for public services are homogenous and well defined, which gives their politicians more flexibility to manipulate non-mandatory spending. In the case of *smaller* municipalities, standards for mandatory spending are monitored by the regional authority, which has the legal responsibility to intervene if these standards are not met. Although *smaller* municipalities are required to provide relatively fewer mandatory services, they have small budgets and hence tend to focus on mandatory spending. Note that in our sample, it is only in *larger* municipalities that the share of women in government is ever above 60%.

Data for planned budgets were extracted from the Ministry of Finance's CONPREL database, which we merged with data collected from municipality archives.<sup>8</sup> All nominal variables are expressed as 2010 real values. Supporting Information S1: Table A1 lists the different public services required to be provided by Spanish municipalities based on the size of their population. *Level 0* (e.g., public lighting, waste collection, drinking water supply) encompasses the very basic services, which need to be performed by every municipality, and *Level 1* (e.g., public libraries, parks), *Level 2* (e.g., civil defense, social work), and *Level 3* (e.g., public transport, environmental protection) reflect the fact that *larger* municipalities must offer a richer set of public services. Our key outcome variables, *Mandatory* and *Non-mandatory* spending, are constructed as follows:

- *Mandatory*: For municipalities with fewer than 5000 inhabitants, it takes the value of what we call *Level 0* expenditures. For municipalities between 5000 and less than 20,000 inhabitants, it takes the value of the sum of *Level 0* and *Level 1* expenditures. In municipalities between 20,000 and less than 50,000 inhabitants, it takes the value of *Level 0*, *Level 1*, and *Level 2* expenditures. For municipalities with 50,000 inhabitants or more, it takes the value of *Level 0*, *Level 1*, *Level 2*, and *Level 3* expenditures.
- *Non-mandatory*: For municipalities with fewer than 5000 inhabitants, it takes the value of *Level 1*, *Level 2*, and *Level 3* expenditures. For municipalities between 5000 and less than 20,000 inhabitants, it takes the value of *Level 2* and *Level 3* expenditures. This variable takes the value of *Level 3 expenditures* in municipalities between 20,000 and less than 50,000 inhabitants.<sup>9</sup>

We control the revenue side by including *Total revenues*. Socioeconomic variables were collected from the Statistical Institute of the Community of Madrid.<sup>10</sup> *Rent* is a measure of municipal income.<sup>11</sup> Reflecting the literature on local PBCs, we control for the demand side of public goods provision by including *Unemployment rate*, *Share of dependents*, and *Share of immigration*, all of which are measured in percent.

Political data were retrieved from the Ministry of the Interior's Database of Electoral Results.<sup>12</sup> To create a consistent dataset referring to the governing body rather than the whole council, we combine these variables with specific information on each municipality. We define the governing body as those councilors who are in the governing majority, either via one party's absolute majority or in a coalition. Note that the standard procedure in the PBC literature is to collect information on the whole council and then create all political variables based on this information. However, given that the budget can be approved by a simple majority in the council, all that matters is the votes of the governing body.<sup>13</sup>

*Right* is a variable, which measures the government's ideological orientation. When the mayor belongs to the Popular Party or Citizens or one of those two parties is the main member

in a coalition, the municipality is defined as right-wing oriented. The variable *Parties in government* captures the degree of government fragmentation. *Mayor's age* is measured in years. *Mayor's higher education* is a dummy that takes the value 1 when the mayor has obtained a university education. *Government age* is the average age of the members of the governing body in years. *Government higher education* represents the share of councilors who obtained university education

Our main variables of interest are the *Female mayor*, a dummy variable taking the value 1 in the case of a female mayor, and the share of women in government. *Male government* is a dummy variable that takes the value 1 when the share of women in government is below 40% and 0 otherwise. *Balanced government* is a dummy variable that takes the value 1 when the share of women in government is between 40% and 60% and 0 otherwise. *Female government* is a dummy variable that takes the value 1 when the share of women in government is over 60% and 0 otherwise. In the PBC literature, both pre-electoral and electoral manipulation are subjects of study (García & Hayo, 2021). However, as described in Section 3, our theoretical PBC framework assumes the operation of a signaling mechanism directed at voters through the initial budget composition, rather than adopting a PBC perspective where the budget serves as a proxy for actual public good provision. In light of this perspective, we focus solely on election years. Thus, our indicator for PBCs, *Election*, takes the value 1 in the year when an election takes place and 0 otherwise.

#### 4.3 | Method

Our dependent variables are items from municipal budgets that have shown a considerable degree of persistence. Thus, to avoid misspecifying the models, we use a lagged dependent variable. In addition, we include a set of control variables and time-based indicators for elections. The basic dynamic regression specification is as follows:

$$y_{i,t} = \delta y_{i,t-1} + \sum_{j=0}^1 \varphi' X_{i,t-j} + \beta_E (E_{i,t} * FM_{i,t} * WG_{i,t}) + \tau_t + \mu_i + \varepsilon_{i,t}, \quad (1)$$

where  $i$  is an index for municipalities,  $t$  is the year index,  $y_{i,t}$  is the budget category of interest,  $X_{i,t-j}$  is a vector of controls,  $\tau_t$  is a time fixed effect,  $\mu_i$  is a municipality fixed effect, and  $\varepsilon_{i,t}$  is the idiosyncratic error term. The  $j$  index represents the fact that we allow for some dynamics, not only with respect to the lagged dependent variable but also in regard to the independent variables.  $FM_{i,t}$  is the *Female mayor* dummy, and  $WG_{i,t}$  stands for the share of women in government. To account for an election year, we include a dummy variable ( $E_{i,t}$ ).

For a small number of time-series observations  $T$ , including a lagged dependent variable makes the panel data fixed effect (FE) estimator not only biased but also inconsistent, regardless of the number of cross-sections (Kiviet, 1995; Nickell, 1981). In our analysis,  $T$  equals 10 and, hence, the resulting bias could be non-negligible.

Instrumental variable and generalized method of moments (GMM) estimators are extensively applied in estimating panel data models. However, GMM estimators tend to suffer from weak instruments, especially when the dependent variable is highly persistent (Bun & Windmeijer, 2010), thus undermining their consistency property. Furthermore, there is a high risk of obtaining inefficient estimates due to the fact that it is very difficult to detect the validity of the instruments in the GMM context. Roodman (2009) calls this “the problem of instrument

proliferation.” In practice, this aspect of the estimator often makes GMM estimates highly sensitive to the specific instrument set.

Motivated by these disadvantages, Kiviet (1995) developed a bias-corrected FE estimator based on a higher-order expansion of the bias term. Kiviet (1995) and Judson and Owen (1999) demonstrate that for finite samples, the bias-corrected estimator is an attractive alternative to GMM estimators. A drawback of the “Kiviet correction” is that it is based on unknown parameters that have to be estimated by a consistent initial estimator. Accordingly, the asymptotic distribution of this estimator is unknown.

In light of this, Breitung et al. (2022) propose a bias-corrected estimator obtained as a method of moments estimator. This estimator does not require specific assumptions about the initial values of the dynamic process, nor must the researcher choose a preliminary estimator. This bias-corrected estimator is easier to implement than likelihood-based estimators and has an advantage over more “classical” bias-corrected methods in that heteroscedasticity and cross-sectional dependence are accounted for when computing cluster-robust standard errors. Small-sample Monte Carlo simulations suggest that, relative to FE and GMM, the “Breitung et al.” estimator performs well with respect to efficiency and correctly sized tests. When  $T$  is around 10, the estimator appears to outperform GMM estimators and perform as well as the “Kiviet” estimator, at least as long as the persistence of the autoregressive component is moderate (around 0.4). In the presence of heteroscedasticity and cross-sectional dependence, and when there is moderate persistence, the “Breitung et al.” estimator appears robust.

In our sample, the time dimension ( $T$ ) equals 10 and there is a moderate degree of persistence. Moreover, our data seem to suffer from cross-sectional dependence and heteroscedasticity, which can be accounted for by using cluster-robust standard errors at the municipal level. Given these conditions, the “Breitung et al.” estimator is the best choice. According to autocorrelation tests and given that the persistence of our dependent variable is moderate, we included only one lag of the dependent variable. Further lags are insignificant, reduce the number of observations and estimation efficiency, and do not even perform better in terms of autocorrelation.

The Breitung et al. estimator allows for including a large number of control variables and accounting for a fairly dynamic adjustment process in the independent variables, too. All socioeconomic variables are used in lagged form only, since current values are published well after the budget has been approved. Political variables are included in the lagged form, as the planned budget in year  $t$  was proposed by the governing body in  $t - 1$ .

Note that dynamic models imply a difference between the effects of explanatory variables in the short term and the long term. Qualitatively, the estimated long-term effects in electoral years are similar to the short-term ones. Quantitatively, we discover notable increases in the magnitude of the respective effects. Thus, short-term-oriented PBC-related activities appear to cause substantial consequences for municipal budgets in the long term. However, to allow comparisons with the extant literature, we simply identify PBCs by using changes in specific budget items during election years.

There could be a simultaneity between spending decisions and women's representation (Svaleryd, 2009). To avoid this endogeneity problem, some studies take advantage of exogenous changes in women's representation that are not correlated with budget decisions (Bhalotra & Clots-Figueras, 2014; Chattopadhyay & Duflo, 2004; Clots-Figueras, 2011, 2012; Ferreira & Gyourko, 2014; Geys & Sørensen, 2019).

However, due to institutional restrictions, in practice, this should not be a problem, as voters in Spanish local elections cannot directly show their preferences for male or female



politicians by voting for single candidates. The closed lists of a proportional representation system do not give voters any power to affect the order of candidates on party lists. Casas-Arce and Saiz (2015) present evidence for Spanish municipalities suggesting that before the quota system, party leaders were not maximizing electoral outcomes because they included too few women in the lists. According to Cordero et al. (2016), the list order is in the hands of party elites and is more responsive to competing interests within each party than it is to vote maximization. In addition, the main left-wing parties have adopted a “championing” position with regard to women’s political representation, with the aim of distinguishing themselves from the other parties. This triggered a contagion effect across the Spanish party system at the local level, making the lists more homogenous in terms of gender composition (Kenny & Verge, 2013; Simón & Verge, 2017; Verge, 2020).

When lists look similar, it does not seem likely that voters will choose one party list over the other based on the relative position of female candidates. However, in the case that voters do choose a list according to the order in which it lists female candidates, there still needs to be a sufficient number of voters with the same preferences to translate these preferences into an elected councilor representing this party. Ultimately, the proportion of female councilors is the result of votes translated into seats according to a proportional representation system, where agreements and coalitions are an important part of the outcome. This setup leads to a quasi-exogenous proportion of women in government.

The same line of argument cannot be applied to the mayor. In the Spanish local electoral system, candidates who run for mayor are the most visible and, very frequently, the only candidate voters even recognize (Bagues & Campa, 2021; Sweeting, 2009). Therefore, a possible threat to our identification strategy is that in a given municipality, the decision to vote for a male or female mayor might be correlated with the voter’s desired spending decisions. To address this issue, we perform the empirical analysis in a restricted sample of municipalities in which a female (or male) mayor was elected in both the 2011 and 2015 elections, that is, the governing body was headed consistently by one sex. We argue that, at least in these municipalities, any correlation between a desired spending decision and the election of a female or male mayor is time invariant and thus captured by our municipality fixed effects.

## 5 | RESULTS

### 5.1 | Main estimation

To understand how PBC-related expenditure is influenced by gender differences, we perform separate regressions for the two subsamples of *smaller* and *larger* municipalities. Supporting Information S1: Tables A4 and A5 set out the results for Equation (1) with a triple interaction between *Election*, *Female mayor*, and *Balanced government* (base category: *Male government*), as well as including *Female government* for the subsample of *larger* municipalities.

As shown in Supporting Information S1: Tables A4 and A5, the lagged dependent variable is always significant, but of low-to-moderate magnitude. The influence of socioeconomic and political characteristics is minimal, with the former slightly more important in *larger* municipalities, and the latter more relevant in *smaller* municipalities.

In Table 1, we only report the coefficients of interest. According to the thresholds defined, reflected in our three dummy variables (below 40%, between 40% and 60%, and more than 60% share of women in government), gender distribution in municipal government is as follows:

TABLE 1 Electoral-gender effects in mayor-restricted sample.

	(1)	(2)	(3)
	All	Mandatory	Non-mandatory
<b>Panel a: Municipalities with less than 5000 inhabitants</b>			
<i>Election</i>	−8.20 (28.75)	−20.22 (26.71)	11.29 (18.56)
Balanced vs. Male government	163.34** (70.13)	126.48*** (46.20)	40.72 (53.49)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	445	445	445
<b>Panel b: Municipalities with more than 5000 inhabitants</b>			
<i>Election</i>	−30.94** (15.04)	−31.19** (15.32)	1.79 (8.33)
Balanced vs. Male government	−13.50 (29.19)	−28.70 (29.19)	21.56* (12.96)
Female vs. Male government	81.45* (43.78)	62.38 (41.93)	24.64** (12.44)
Female vs. Balanced government	94.96** (38.05)	91.08** (37.35)	3.08 (5.35)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	460	460	325

*Note:* The mayor-restricted sample is comprised of those municipalities in which the mayor elected during the 2011 and 2015 elections was always of the same sex, that is, the municipality was run by either a male mayor or a female mayor. Coefficients are obtained from the triple interaction between *Election–Female mayor–Women in government* estimated in Supporting Information S1: Table A4 (Panel a) and Supporting Information S1: Table A5 (Panel b). Cluster-robust standard errors are used (clusters: number of municipalities). \*, \*\*, and \*\*\* indicate significance at a 10%, 5%, and 1% level, respectively.

- In smaller municipalities: Male government, 64%; Balanced government, 36%.
- In larger municipalities: Male government, 32%; Balanced government, 65%; and Female government, 3%.

Hence, governments become more gender-balanced with increasing municipality size. However, there are only a few female-dominated governments, and these are solely found in larger municipalities.

In our discussion of the regression tables, we focus on the estimation results relating to “mandatory” and “non-mandatory” expenditure. Table 1 (Panel a) shows the estimated effects for *smaller* municipalities. Focussing on mandatory spending (Column 2), we find a statistically significant increase in mandatory spending when an election takes place. Compared to the

variable combination *Male government* with *Male mayor*, the combination of *Balanced government* with *Female mayor* leads to higher electoral spending of almost €130 per capita. The average spending of *smaller* municipalities is €1,362 per capita; thus, the PBC-related average effect is almost 10% of total expenditure. It is important to note that this effect results from the variable combination *Female mayor* and *Balanced government*. In Supporting Information S1: Table A4 (Column 2), we see that the combination of *Female mayor* with *Male government* reduces electoral spending by more than 5% of total expenditures. Turning to non-mandatory spending, in Column 3 of Table 1, we find no significant electoral effects.

For mandatory spending, a higher share of women in government seems to be conducive to increasing PBC-related activities. This suggests that a high number of women in government induces female mayors to act in electorally motivated ways in those areas that are the primary focus of the municipality.

Panel b presents the effects observed in *larger* municipalities. Focussing on mandatory spending (Column 2), we note the emergence of PBC-related spending when comparing the variables *Female government* and *Balanced government*. *Larger* municipalities, on average, spend €984 per capita, resulting in a PBC-related average effect of €92 per capita, which constitutes 10% of total expenditures. It is also interesting to compare the variables *Male government* and *Balanced government* in election years. The point estimates show that the former spends more than the latter, suggesting that a more balanced gender composition could reduce PBC-related mandatory spending. However, the effect is imprecisely estimated, so we should not put too much faith in it.

Turning to non-mandatory spending (Column 3), we find that *Balanced* and *Female government* increases electoral spending compared to *Male government* by €22 and €24 per capita, respectively, accounting for more than 2% of total spending. As previously argued, politicians in *larger* communities tend to have more room to manipulate non-mandatory spending, which makes up a large part of their budget and is less regulated than mandatory spending. However, the amount is more modest than in “mandatory spending,” which is in line with the credit-claiming view posited by Bueno (2023).

Hence, as the share of women in government increases, we observe an electorally motivated hike in mandatory spending in both *smaller* and *larger* municipalities. For non-mandatory spending, the difference is only found in *larger* municipalities when compared with *Male government*. These findings suggest that, under specific circumstances, female mayors can exhibit opportunistic behavior, which is similar to that reported for male mayors in other studies (Balaguer-Coll & Ivanova-Toneva, 2021; Cabaleiro-Casal & Buch-Gómez, 2018; and Accettura & Profeta, 2022).

In Section 4.3, we argued that the mayor's sex is unlikely to be endogenous. However, to address any remaining doubts about the exogeneity of this variable, we focus on the subsample of close elections and apply a regression discontinuity design. The rationale is that elections won by a sufficiently narrow margin are very similar to elections lost by a narrow margin and therefore, whether a mayor is male or female is due to chance. Since Spanish municipal councils are elected using party-list proportional representation, we follow the approach developed by Curto-Grau et al. (2018) to compute the running variable that defines a close election. As we have collected information on the governing body for each municipality, we are able to calculate the exact number of votes needed for the governing body to lose the majority of seats in the local council. Our running variable is defined as the minimum number of votes for the governing body to lose the majority of seats, divided by the total number of votes. Furthermore, we focus on mixed-sex races, which is the standard approach for estimating gender

effects in the literature on close elections (Accettura & Profeta, 2022; Bagues & Campa, 2021; Curto-Grau et al., 2018).

Focusing on the municipalities where the election was won/lost by 5 percentage points (pp) or fewer, Table 2 presents the same estimates as reported in Table 1. The choice of the 5pp bandwidth is a compromise between the “optimal” bandwidth based on the procedure proposed by Calonico et al. (2014), and a sufficiently small margin to be plausibly considered a “close election.” Since the “optimal” bandwidth tends to be larger than 5pp, Supporting Information S1: Table A8 sets out the estimates when we increase the bandwidth to 10pp. We find that the results are generally robust.

**TABLE 2** Electoral-gender effects in close election sample (5pp bandwidth).

	(1) All	(2) Mandatory	(3) Non-mandatory
<b>Panel a: Municipalities with less than 5000 inhabitants</b>			
<i>Election</i>	−17.44 (25.41)	−5.35 (26.66)	−12.20 (18.11)
Balanced vs. Male government	207.29*** (35.58)	415.38*** (25.33)	−224.43*** (48.72)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Bandwidth (percent)	5.00	5.00	5.00
Observations	72	72	72
<b>Panel b: Municipalities with more than 5000 inhabitants</b>			
<i>Election</i>	−9.88 (17.60)	−3.80 (19.81)	−14.12 (21.45)
Balanced vs. Male government	74.55 (46.03)	96.26** (45.04)	−61.75 (41.85)
Female vs. Male government	125.93** (41.52)	125.56*** (35.84)	−28.22 (38.88)
Female vs. Balanced government	51.38 (35.52)	29.30 (37.61)	33.53 (27.89)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Bandwidth (pp)	5.00	5.00	5.00
Observations	129	129	96

*Note:* The close election sample is comprised of those municipalities in which the difference in votes between the governing coalition and the opposition is equal or less than 5pp. Coefficients are obtained from the triple interaction between *Election–Female mayor–Women in government*. Cluster-robust standard errors are used (clusters: number of municipalities). \*, \*\*, and \*\*\* indicate significance at a 10%, 5%, and 1% level, respectively.

For *smaller* municipalities and mandatory spending, Panel a of Table 2 shows that the magnitude of the gender effect is about €415 per capita (31% of total budget spending). This effect is three times larger than the corresponding effect computed in Table 1, where we considered all elections. Focusing on non-mandatory spending in Column 3, we find a statistically significant decrease in election years amounting to 15% of total expenditure. In *smaller* municipalities, the hike in mandatory spending in election years is partly financed by a reduction in non-mandatory spending. In *larger* municipalities, Panel b of Table 2, there is a significantly positive effect for mandatory spending. The magnitude of the effect is €96 and €125 per capita (10% and 13% of total expenditure). In terms of size, this effect is comparable to that found in Table 1, but now it is apparent when compared to the variable *Male government*. Turning to non-mandatory spending, in Column 3 of Table 2, we find no significant electoral effects.

## 5.2 | Robustness

Our main results depend heavily on the theoretical discussion in Section 3, particularly on the use of the initial budget as a signaling mechanism and the classification of budget items as “mandatory” or “non-mandatory.” To improve the comparability of our results with the existing literature, we will replicate our main estimations using the final budget instead of the initial budget.

Table 3 (Panel a) displays the estimated effects for *smaller* municipalities. We observe a statistically significant increase in mandatory spending (Column 2) when an election takes place, which is now smaller in magnitude and in statistical significance compared to Table 1. The average spending of *smaller* municipalities is €1301 per capita, resulting in an average PBC-related effect of 8% of total expenditures, which is lower than in the specifications using initial budget data. The results for non-mandatory spending, in Column 3 of Table 3, are consistent with Table 1.

Panel b presents the effects observed in *larger* municipalities. Focusing on mandatory spending (Column 2), we see the emergence of PBC-related spending, not only when comparing *Female government* with *Balanced government*, but also when comparing *Female government* with *Male government*. On average, *larger* municipalities spend €943 per capita, resulting in a PBC-related effect ranging from €92 to €97 per capita, which accounts for almost 10% of total expenditures. Moving on to non-mandatory spending (Column 3), we find no significant effects.

Replicating the analysis with final budget data reveals a clear relationship between signaling, final spending, and the provision of “mandatory services.” However, “non-mandatory services” are more flexible, and therefore, more easily used for signaling purposes. “Mandatory spending” can serve as a tool for local politicians to gain voter support, which may explain its relevance when using both initial and final budget data (Bueno, 2023). Nevertheless, “non-mandatory spending” can also act as a signaling device, especially in an environment where citizens’ perceptions of government competence are relatively certain (Crombach & Bohn, 2024; Drazen, 2001).

We focus on the subsample of close elections and employ a regression discontinuity design to replicate the estimation presented in Table 2 using final budget data.

The results for “mandatory spending” (Column 2) exhibit a similar pattern to those in Table 2. Interestingly, the magnitude of the effect is halved for *smaller* municipalities and

**TABLE 3** Electoral-gender effects in the mayor-restricted sample using final budget data.

	(1)	(2)	(3)
	All	Mandatory	Non-mandatory
<b>Panel a: Municipalities with less than 5000 inhabitants</b>			
<i>Election</i>	4.07 (44.04)	18.31 (26.07)	−12.80 (29.45)
Balanced vs. Male government	85.75 (76.11)	105.77* (60.28)	−3.93 (76.84)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	457	457	457
<b>Panel b: Municipalities with more than 5000 inhabitants</b>			
<i>Election</i>	−1.25 (14.29)	−3.23 (13.77)	5.39 (8.22)
Balanced vs. Male government	−11.42 (33.40)	5.13 (32.89)	−20.12 (12.52)
Female vs. Male government	71.37 (50.60)	97.67** (41.20)	−22.85 (19.16)
Female vs. Balanced government	82.79** (42.23)	92.54*** (30.96)	−2.72 (16.83)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	460	460	325

*Note:* The mayor-restricted sample is comprised of those municipalities in which the mayor elected during the 2011 and 2015 elections was always of the same sex, that is, the municipality was run by either a male mayor or a female mayor. Coefficients are obtained from the triple interaction between *Election–Female mayor–Women in government* estimated in Supporting Information S1: Table A4 (Panel a) and Supporting Information S1: Table A5 (Panel b). Cluster-robust standard errors are used (clusters: number of municipalities). \*, \*\*, and \*\*\* indicate significance at a 10%, 5%, and 1% level, respectively.

doubled for *larger* municipalities. There seems to be an unequal effect of electoral competitiveness that depends on the social environment (Gangadharan et al., 2019).

Our classification of services as “mandatory” or “non-mandatory” was based on the Spanish Constitution. However, the distinction between “more visible” and “less visible” expenditures may also be useful, especially when comparing our results with the existing literature. We estimate our model using the disaggregated components of the expenditure side of the budget as dependent variables. For brevity, we present the tables in Supporting Information S1: Table A6 for *smaller* and Supporting Information S1: Tables A7 and A8 for *larger* municipalities.

For *smaller* municipalities (Supporting Information S1: Table A6), we observe the functioning of the signaling mechanism (Panel a) through *Public Utilities* and *Social Services*, as seen



in Columns 2 and 3, which are higher in election years. It is important to emphasize that public utilities are the most basic and crucial component of “mandatory spending” and it is in this area that small municipalities allocate most of their resources. This pattern is also evident when using final budget data (Panel b). Conversely, a gender-balanced government signals an increase in *Social Services* that does not materialize in the final budget. An interesting effect can be found in spending on *Government Administration*, which is signaled to be reduced and yet, when looking at final budget data, there is a notable increase in election years.

In Supporting Information S1: Tables A7 and A8, we report the effects of “more visible” spending categories in *larger* municipalities for planned and final budget data. The results in Columns 1 and 5 show that in election years, *Female governments* signal an increase in spending on *Public Safety* and *Roads*, which is also reflected in actual spending. These two items are generally considered to be “more visible” in the PBC literature and, as components of “mandatory spending,” are relatively easy to attribute to the local government. Thus, the combination of “visibility” and “attributable to municipal policy” makes them attractive to local politicians interested in PBC-related activities. Conversely, other “mandatory services,” such as *Landfill Waste*, *Cleaning*, and *Libraries*, are signaled in the planned budget but not in the final budget. Somewhat puzzling is the finding that *Social Services* (Column 8) is reduced by *Female governments* in both the initial and final budgets. This expenditure is considered to be of interest to female politicians and is mandatory for municipalities with more than 20,000 inhabitants. We suspect that this item is not sufficiently visible and is therefore used to compensate for the increase in expenditures on the more PBC-attractive items such as *Public Safety* and *Roads*. Finally, items related to the operating costs of the municipality, such as *Culture Promotion*, *Sports Promotion*, *Transport Administration*, *Information*, *Government Administration*, and *Debt*, are generally less discretionary and are either not used in PBCs or are slightly reduced in both signaling and final spending.

Estimation results for a more “classic” PBC approach are set out in Supporting Information S1: Table A9. In this case, we do not split the sample based on municipality size. In Supporting Information S1: Table A10, the estimates give the impression as if electoral manipulation was undertaken solely by resorting to mandatory spending. Contrasting the results for *all* municipalities with those set out in Table 1, we conclude that classifying municipalities by size and categorizing budget items as mandatory or not reveals otherwise hidden PBC-related influences of female politicians (Table 4).

We also perform a battery of additional robustness tests. Regarding the estimation method and possible outliers, results remain unchanged when using the “Kiviet” estimator, excluding Madrid proper as a municipality, and controlling for the age and education of members of the governing body.<sup>14</sup> Above, we argue that all that matters is the votes of the governing body because budgets are approved by a simple majority in the council, which is why we focus on the gender composition of the council's governing body. However, the extant literature bases its results on total council composition and, hence, we use the variable *Share of women in the total council* as a robustness test. Theoretically, the competing hypotheses are whether female councilors matter for PBC-related activity due to their influence on (1) general political debates in the council or (2) government budget decisions. We discover that *Share of women in the total council* shows few significant effects, most of which are generally in line with the results we obtained based on female government councilors. Hence, we conclude that what matters for PBC-related activity is the share of women in government, that is, Hypothesis (2), and not the total share of women on the council.

**TABLE 4** Electoral-gender effects in close election sample (5pp bandwidth) using final budget data.

	(1)	(2)	(3)
	All	Mandatory	Non-mandatory
<b>Panel a: Municipalities with less than 5000 inhabitants</b>			
<i>Election</i>	39.49 (34.09)	27.96 (30.90)	4.89 (15.94)
Balanced vs. Male government	118.53*** (32.86)	70.06* (40.19)	8.44 (48.61)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Bandwidth (pp)	5.80	5.80	5.80
Observations	81	81	81
<b>Panel b: Municipalities with more than 5000 inhabitants</b>			
<i>Election</i>	−13.68 (46.39)	−3.66 (32.50)	−30.46 (28.24)
Balanced vs. Male government	310.59** (157.38)	229.30* (119.96)	−79.89 (82.30)
Female vs. Male government	245.15** (113.76)	221.40** (80.16)	−110.61 (68.12)
Female vs. Balanced government	−65.45 (84.91)	−7.90 (58.10)	−30.71 (48.76)
Municipality and Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Bandwidth (pp)	5.00	5.00	5.00
Observations	129	129	96

*Note:* The close election sample is comprised of those municipalities in which the difference in votes between the governing coalition and the opposition is equal or less than 5pp. Coefficients are obtained from the triple interaction between *Election–Female mayor–Women in government*. Cluster-robust standard errors are used (clusters: number of municipalities). \*, \*\*, and \*\*\* indicate significance at a 10%, 5%, and 1% level, respectively.

## 6 | CONCLUSION

Using a data set on Spanish municipalities, we investigate gender differences in PBC-related activities. In contrast to the extant literature, we do not study the influence of mayor gender, or female representation on municipal councils, in isolation. Instead, we take a look at different gender combinations of both the mayor and council. Indeed, we depart from the literature in at least three important aspects: (1) by using the composition of the initial budget as a signaling mechanism directed at voters, instead of using the final budget composition as a proxy for output, (2) by avoiding the arbitrary categorization of “visible” or preferred budget items and

instead classifying expenditures according to a clear budgetary rule, and (3) by concentrating on the share of female government councilors.

To study PBC-related spending at the municipal level, we use data from the Madrid region (Comunidad Autónoma de Madrid) for the period 2010–2019. The Madrid region is subject to a homogenous set of budget rules that allow consistently categorizing budget expenditure items as either “mandatory” or “non-mandatory” public services. Furthermore, 2010–2019 was a period characterized by balanced local budgets and constraints on total expenditures due to Organic Law 2012. Therefore, during that period, PBCs could no longer be affected via manipulation of deficits or total spending; instead, incumbents interested in manipulating the budget to their advantage had to rely on budget composition to signal their competence and/or preferences. Additionally, in March 2007, the Equality Act introduced gender-balanced candidate lists to Spanish electoral law. The Equality Act has positioned Spain among the group of countries with rising shares of female politicians and has the added advantage of allowing us to empirically test the influence of gender differences on policymaking and PBCs.

Conditional on politicians’ sex, we find robust evidence of PBC-related spending in election years. In *smaller* municipalities with a female mayor, gender-balanced governments increase mandatory spending by almost 10% of total spending. In *larger* municipalities, female mayors in conjunction with a female-dominated government, tend to engage in opportunistic manipulation by increasing electoral spending. On average, this results in 10% higher spending on mandatory budget items and 2% higher spending on non-mandatory budget items. Thus, we would interpret these effects as notable. Moreover, our robustness analysis based on close elections and a regression discontinuity design suggests that the magnitude of the gender effect may be up to three times larger.

We also find that, by replicating the analysis with final budget data, “mandatory services” tend to be more robust than “non-mandatory services.” “Mandatory services” are easier to attribute to municipal policy, and thus local politicians have an incentive to use them both as signaling devices and for actual changes in the service provided (Bueno, 2023). In contrast, “non-mandatory services” are more flexible and therefore more suitable for signaling purposes. We observe a notable degree of overlap between items generally considered as “more visible” in the PBC literature and those that we categorize as components of “mandatory spending.” In particular, we find that expenditures on *Security* and *Roads* appear to be manipulated for PBC-related purposes. Both are visible and mandatory items and they are both significant when using planned (signaling) and final budget data (actual spending). For other items, we find more heterogeneity between signaling and final spending by the local government.

Our analysis challenges the established opinion that female mayors are generally less opportunistic than male ones. We also find that the influence of those women councilors who support the current government is more important than the total share of female councilors, the indicator used in the extant literature. Moreover, our evidence does not support the conclusion that gender-balanced councils are able to prevent electoral budget manipulation.

Since we present evidence that women may behave opportunistically even in highly competitive situations, our results are in line with Gangadharan et al. (2019) and Ordine et al. (2023) and stand in contrast to findings that women appear to be less competitive and/or opportunistic than men (Brollo & Troiano, 2016; Croson & Gneezy, 2009). Our conclusions also show that in an environment of party discrimination against women (Bagues & Campa, 2021; Casas-Arce & Saiz, 2015; Esteve-Volart & Bagues, 2012), female mayors, as the most visible figures of the government, might have found themselves in a position where they had to signal their competence much more strongly than did their male colleagues. This seems to be

especially relevant when the share of women in government increases above 60% making the governing body female-dominated.

A limitation of our study is that we do not analyze whether the politicians' RBC-related strategies were successful in increasing the probability of re-election. Our focus is solely on the transmitter part of the signaling process, and we do not consider the receptor. In a recent paper, Benito et al. (2023) find that in times of crisis, governments that were able to convey the impression of more managerial ability to provide public goods, have a higher probability of being re-elected. Combining this political transmission channel with the gender perspective could be a fruitful avenue for further research.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in Open Agrar at <https://doi.org/10.3220/DATA20240910130608-0>. These data were derived from the following resources available in the public domain: Ministerio de Hacienda: Consulta presupuestos y liquidaciones de EELL (<https://serviciostelematicosexh.hacienda.gob.es/SGFAL/CONPREL>). Banco de datos municipal de la Comunidad de Madrid ([https://gestiona.comunidad.madrid/desvan/AccionLlamadaArbolDesvan\\_dwr.icm?tipoArbol=almudena](https://gestiona.comunidad.madrid/desvan/AccionLlamadaArbolDesvan_dwr.icm?tipoArbol=almudena)). Ministerio del interior: Resultados electorales (<https://infoelectoral.interior.gob.es/es/elecciones-celebradas/resultados-electorales/>).

## ORCID

Israel García  <http://orcid.org/0000-0003-0303-9325>

Bernd Hayo  <http://orcid.org/0000-0001-9037-4513>

## ENDNOTES

- <sup>1</sup> Recently, several papers have been published that focus on the overall budget balance and use cross-country data. Janků and Libich (2019), Kyriacou et al. (2022), and Crombach and Bohn (2024) show a deterioration of the fiscal balance in election years, when voters are less informed, they have higher discount rates and when they are uncertain about the actual competence of the government.
- <sup>2</sup> An exception to this statement is big infrastructure projects, for which the final costs of public provision are much higher than the planned ones and that therefore raise questions of poor planning and waste of public funds.
- <sup>3</sup> According to Law 27/2013 (December 27, 2013), food and drink control, markets, and slaughterhouses are not part of mandatory minimum services from the 2015 budget onwards. The social work category has been strongly modified. Before this law, municipalities were responsible for providing social services. After the reform, compulsory municipal intervention is no longer, strictly speaking, a service, but a simple identification of needs. Although still a mandatory service, the extent and scope of social work conducted at the municipal level is now highly limited.
- <sup>4</sup> Municipalities with 250 (or less) inhabitants use an open-list system.
- <sup>5</sup> Sweeting (2009) provides a detailed discussion of the mayor's role in Spain.
- <sup>6</sup> The Spanish territorial organization consists of regions (Comunidades Autónomas), provinces (Provincias), and municipalities (Municipios). Each region has one or more provinces, and provinces contain multiple municipalities. Municipalities are required to provide some mandatory services based on their population (see Section 3). The non-mandatory services are provided by either the regional or central government. Article 36 of the local administrative law states that the provincial administration is in charge of coordinating

and establishing those municipal mandatory services. According to the territorial administration, it is possible that two similarly sized municipalities that belong to the same region but are located in different provinces could have different standards of mandatory services. Madrid is a region with only one province and, consequently, there cannot be any variability in municipal mandatory services.

<sup>7</sup> According to the Spanish Statistical Institute, in 2019, out of 8131 municipalities, 83% had less than 5000 inhabitants, and 5% had more than 50,000 inhabitants.

<sup>8</sup> <https://serviciostelematicosexhacienda.gob.es/SGFAL/CONPREL>

<sup>9</sup> All expenditure items in our study are mandatory for municipalities with 50,000 or more inhabitants; therefore, they cannot be used for the estimation of non-mandatory spending in Column 3 of Supporting Information S1: Table A5.

<sup>10</sup> <http://gestiona.madrid.org/desvan/Inicio.icm?enlace=almudena>

<sup>11</sup> This variable is constructed based on information provided by tax authorities (as the main input), plus information about earnings, wealth, rents (capital and non-capital), social payments, and transfers in each municipality. The weight of each component is adjusted according to different factors, such as the number of households, number of declarants, age of population, percentage of rents from non-working earnings, and a socioeconomic indicator for each municipality.

<sup>12</sup> <http://www.infoelectoral.mir.es/infoelectoral/min/>

<sup>13</sup> When a party does not have an absolute majority and a coalition is not reached, the whole council is considered the governing body.

<sup>14</sup> Results are available on request.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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