

# **Women in Politics and Budget Deviations: Evidence from Croatian Cities**

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**Abstract:** This paper examines whether the political representation of women influences budget deviations in local governments. Using a panel dataset of 128 Croatian cities from 2016 to 2021, we investigate the impact of female representation in city councils and among mayors on the accuracy of revenue and expenditure forecasts. Applying a dynamic panel model with system GMM estimation, we find a non-linear relationship: a low share of women is linked to more optimistic and less credible budgets, while surpassing a threshold – around 30% for revenues and 40% for expenditures – leads to more fiscally responsible planning. Specifically, cities with greater female representation tend to underestimate revenues and overestimate expenditures, reflecting stronger adherence to fiscal discipline and more cautious budgeting. No statistically significant effect is observed for female mayors. These findings support theories on gendered governance and suggest that increasing the share of women in decision-making roles may improve fiscal performance in local government.

**Keywords:** Budget deviations, Croatian cities, Fiscal planning, Political budget cycle, Women's political representation

**JEL:** J16, H71, H72

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## 1. Introduction

The public sector is mainly funded by taxpayers. It is therefore of great importance that managers use these resources appropriately to provide high-quality services as efficiently as possible. The budget is the most important tool governments use to implement the specific policy objectives of each fiscal year. In fact, the credibility of policy decisions depends on the consistent enforcement of a budget. However, in reality, budget deviations often appear in the budget, as it is common practice for politicians to make over-optimistic or pessimistic projections of budget variables (Mayper et al., 1991; Goeminne et al., 2008; Chatagny and Soguel, 2012). Following Benito et al. (2015) and Ríos et al. (2018), budget deviations are inconsistencies between enacted budgets and budget outturns in revenues/expenditures. The amount of actual expenditure incurred by a government in the fiscal year will also frequently differ from that planned in the budget (Serritzlew, 2005), just as the level of revenues collected by a government during the fiscal year frequently varies from projected amounts (Goeminne et al., 2008). If enacted revenues/expenditures are higher than the outturn, there will be revenue/expenditure overestimation. A revenue/expenditure underestimate is produced when enacted revenues/expenditures are lower than the actual outturn. These variations can occasionally be attributed to technical issues, but occasionally they are deliberate mistakes made by politicians to hoodwink the public (Alesina and Perotti, 1996).

In this context, we find various theories that argue the possibility that the gender of politicians may affect public management and budget deviations. According to the citizen-candidate model (Osborne and Slivinski, 1996; Besley and Coate, 1997), candidates' views on public policy vary depending on the individual traits of each incumbent, such as gender. Different attitudes to "how much" to spend and to "what kinds of economic policies to pursue" may come from gender disparities. Different preferences with respect to expenditures/revenues may ultimately affect the budget (Anessi-Pessina et al., 2016). However, budget deviations have hardly been previously analysed in gender studies (see, for example, Cuadrado-Ballesteros et al., 2022). Our research seeks to address the following query in order to close this gap: Does politicians' gender affect budget deviations in current revenues and expenditures? For this purpose, we used a sample of 128 Croatian cities for the period 2016-2021.

Our study adds to the continuing conversation about the role of gender in public administration. There is currently little research on gender disparities in governments, particularly at the municipal level (Holman, 2017). Thus, this study focuses on discussion of the impact of politicians' gender on budget deviations (in expenditures and revenues) at the local level for both representative and executive power. Literature has demonstrated gender differences in resource allocation (Bolzendahl and Brooks, 2007; Bolzendahl, 2009; 2011; Holman, 2014a; 2014b), but hardly any earlier research has analysed disparities between women and men in terms of budget deviations. In fact, to the best of our knowledge, this relationship has only been explored once before at the local level, by Cuadrado-Ballesteros et al. (2022) on a sample of larger Spanish municipalities. However, our study uses a unique panel dataset covering a more recent period (2016-2021) and a different context: all Croatian cities, which comprise around 75% of the population of this post-communist state, the most recent member of the EU.

Moreover, we analyse whether budget deviations are systematically biased and, if so, in which direction. In fact, the occurrence of budget discrepancies implies that laws mandating a balanced budget should be reevaluated (Mayper et al., 1991), and/or that the budgeting process should be overseen by impartial parties (Carlin and Guthrie, 2001). Finally, in our study, we have also included the political budget cycle variables and thus we connect political budget cycle literature with the accuracy of enacted budgets.

## 2. Literature Review

Different reasons can lead politicians to manipulate the budget, resulting in budget deviations (Mayper et al., 1991; Goeminne et al., 2008; Chatagny and Soguel, 2012). By overestimating revenues (an optimistic outlook) governments may be able to produce a balanced budget or enhance services without having to immediately raise taxes (Mayper et al., 1991). In the real world, tax hikes have a higher political cost in terms of votes lost than optimistic revenue projections. An underestimated revenue projection (a pessimistic

perspective) may serve as a buffer against unforeseen costs or revenue shortfalls, while also signaling that cautious management has contributed to lower operational costs by year-end. When budget expenditures are concerned, underestimation (the optimistic perspective) might make the financial condition of the government worse, while overestimating (the pessimistic view) could contribute to maintenance of the budget's balance and result in a surplus to be used when necessary (Cuadrado-Ballesteros et al., 2022). The composition of spending has received considerable attention in earlier empirical work on the impact of officials' gender on good governance at the municipal level (see, e.g., Svaleryd, 2009; Smith, 2014; Funk and Gathmann, 2015; Cabaleiro-Casal and Buch-Gómez, 2018; 2020; Hernández-Nicolás et al., 2018; Funk and Philips, 2019; Slegten et al., 2019; or Slegten and Heyndels, 2020, among others); and, also, on fiscal policies (e.g., Fallan, 1999; Lott and Kenny, 1999; Alesina and Giuliano, 2009; Ferreira and Gyourko, 2014; Slegten et al., 2019), financial performance (e.g., Opstrup and Villadsen, 2015; Hernández-Nicolás et al., 2018; Balaguer-Coll and Ivanova-Toneva, 2021) and other policies regarding accountability and transparency (e.g., Araujo and Tejedo-Romero, 2016; 2018; Bauhr et al., 2019).

Previous research has tried to explain what triggers such budget deviations at the central, state or local level in different countries. Focusing on local governments, which is our object of study, Serritzlew (2005), Goeminne et al. (2008), Couture and Imbeau (2009), Bischoff and Gohout (2010), Benito et al. (2015), Anessi-Pessina et al. (2016), Boukari and Veiga (2018), Ríos et al. (2018), Picchio and Santolini (2020) and Cuadrado-Ballesteros et al. (2022) have cited several political, electoral, and socioeconomic reasons, including government ideology, the proximity of elections, unemployment, transparency, financial health, and others, to explain why there are variances in local planned revenue and/or expenditure. Despite increasing scholarly and policy attention to the political representation of women – especially by international organizations (e.g., UN Women, OECD) and researchers emphasizing its role in transparency, accountability, and inclusive governance (Bauhr & Charron, 2021; De Araújo & Tejedo-Romero, 2016) – previous studies have rarely empirically examined gender as a factor explaining budget deviations.

According to the pioneer study of Gilligan (1982), men and women behave differently as a result of having distinct perspectives, societal constructs, and sets of values. Women have different characteristics from men, which could make the style of management and leadership different according to gender (Kim and Shim, 2003). The citizen-candidate model, which focuses on the public sector, contends that politicians have differing preferences about public policy, which has an impact on how public resources are managed (Osborne and Slivinski, 1996; Besley and Coate, 1997). Such a difference might be explained by other nonpartisan variables, such as the gender of the politicians (Hessami and Lopes da Fonseca, 2020). Gender behavioural differences may be explained by the social role theory based on stereotypes (Eagly and Wood, 2012). We acquire gender norms through socialization and instruction from our parents (Eccles et al., 1990). The socialization process creates normative beliefs since historically, males are educated as wage earners, and women are educated as carers (Jenning, 2007). Despite the fact that a lot has changed in recent decades, preconceptions still exist (Knudsen and Waerness, 2008). Social rewards and penalties for adhering to or not adhering to roles have an impact on behaviour and may lead to gender disparities (Meyer-Levy and Loken, 2015). In particular, women are supposed to be carers and to be more cooperative, democratic, risk- and competition-averse than males, as well as to place more value on the principles of responsibility and upholding the interests of the group, community, and society (Eagly and Johnson, 1990; Eagly and Johannesen-Schmidt, 2001; Croson and Gneezy, 2009; Hamidullah et al., 2015). These differences in traits do not imply that one approach is inherently superior, but rather that men and women may prioritize different aspects of public governance, shaped by social norms and expectations. Social preconceptions may therefore influence the ways in which men and women behave in politics.

According to the expectation states theory (e.g. Berger et al., 1966; Webster & Driskell, 1978), an individual's attitudes and behaviours mirror the status characteristics and structures that were previously established at the macro level, based on the cultural beliefs of the society regarding social roles and categories. These movements create social stratifications, particularly at the individual (micro) level where social inequality first appears. As a result, women are less likely to be acknowledged as leaders in the social context (Correll & Ridgeway, 2006). Furthermore, gender norms and traits of female leadership – like inclusivity, compassion, openness, and transparency – have an impact on the advancement of governance (Del Sol, 2013).

Weikart et al. (2007) came to the conclusion that women mayors were more inclined than males to debate goal adjustments, accept financial issues, and modify the budget process. Additionally, women's presence in politics is typically associated with risk-averse decision-making (Suzuki and Avellaneda, 2018). Opstrup and Villadsen (2015) found that gender diversity in top management teams correlated with improved financial performance in Danish municipalities. Brudney et al. (2000) and Jacobson et al. (2010) noted the positive role of female leadership in the institutional performance of American state administrations. More recently, Park (2021) conducted a meta-analysis of 72 studies published between 1999 and 2017 and found that female leadership and gender representation were often linked to improved fiscal performance, managerial transparency, and responsiveness – dimensions commonly used to assess administrative effectiveness. However, while these findings point to consistent associations, they do not necessarily imply that gendered priorities are inherently superior. Rather, men and women may emphasize different areas in governance, and whether these differences lead to better community outcomes remains a question for further research.

Arguments that attempt to explain how the presence of more women in politics will lessen behaviours that harm the finances, such as overestimating planned revenues and underestimating budgeted expenditures, might also be found in this context. Given that female representation in governments is typically associated with risk-averse behaviour in financial decisions (Suzuki and Avellaneda, 2018) and raises the likelihood that regulations on budgetary stability, financial sustainability, and the legal debt limit will be complied with (Balaguer-Coll and Ivanova-Toneva, 2021), it might be expected that having more women in government would decrease practices that could harm the financial position, such as overestimating expenditures. Accordingly, this study puts forward the following hypothesis:

*H1: A higher proportion of women in Croatian cities leads to an underestimation of budget revenues and an overestimation of budget expenditures.*

Most earlier empirical research on women's participation in governmental administration has compared the spending habits of male and female members, noting that they have distinct priorities when distributing public resources. In general, they observed that national governments with more female members prefer to spend more on social concerns (Bolzendahl and Brooks, 2007; Bolzendahl, 2009; 2011; Holman, 2014a). This conclusion has also been highlighted locally, where it has been discovered that female representation tends to raise spending on social welfare policies, health care, and education (e.g. Álvares and McCaffery, 2003; Svaleryd, 2009; Clots-Figueras, 2011; Holman, 2014b; Funk and Gathmann, 2015; Cabaleiro-Casal and Buch-Gómez, 2018; Cabaleiro-Casal and Buch-Gómez, 2019; Hernández-Nicolás et al., 2018; Funk and Philips, 2019; Slegten and Heyndels, 2019; ). In regard to revenues, Fallan (1999) observed that women are more ethically concerned about taxes than males. Additionally, it has been found that women are more likely than males to support raising taxes to fund redistributive programs (Lott and Kenny, 1999; Alesina and Giuliano, 2009).

However, we have found virtually no studies that analyse the role of female participation in government in terms of budget deviations, which can have a significant influence on public finances. Serritzlew (2005), Bischoff and Gohout (2006; 2010), Goeminne et al. (2008), Benito et al. (2015) and Ríos et al. (2018) explain the existence of such deviations by political and electoral factors, along with other socioeconomic determinants, such as unemployment, economic level, transparency, etc., but they do not include any variables that reflect the influence of gender. Only the study of Cuadrado Ballesteros et al. (2022) has analysed how female participation could affect budget deviation for a sample of Spanish municipalities, but without exploring the influence of political budget cycle components. They show that communities with female mayors and more female representatives in local government tend to overestimate revenues and underestimate expenditures; however, these effects change when the proportion of female council members rises, leading to budget outcomes more aligned with fiscal planning goals.

While previous studies suggest gendered differences in fiscal behaviour, the normative implications of such differences remain unclear. This study does not evaluate whether one approach is better, but rather focuses on whether and how gender representation relates to the accuracy of budget planning.

### 3. Research design, data, and methodology

#### 3.1. Context and sample

The territorial division of Croatia includes three levels of government: central, regional and local. Regional government consists of 20 counties and local government of 128 cities and 428 municipalities. The executive power in counties is exercised by county prefects, in cities by mayors, and in municipalities by municipality heads. Representative power consists of county assemblies and municipal and city councils. In local elections, members of executive and representative bodies are elected directly, by secret ballot every four years.

Cities and municipalities are responsible for services that directly affect citizens' needs such as primary health care, utilities, housing, childcare, social care, fire and civil protection, etc, while the counties perform tasks of regional importance such as spatial and urban planning, economic development, transport infrastructure, planning and development of educational, health, social and cultural institutions, etc. The primary sources of funding for local self-government units are taxes, grants, and own and allocated earnings in compliance with certain restrictions, as stated in the Law on the Financing of Local and Regional Self-Government Units. In addition, tax revenues are allocated to various governmental levels. For example, income tax is the primary revenue source for local budgets and is distributed among counties, cities, and municipalities.

According to the principle of budget balance, total revenues must match total expenditures. If this is not the case, the budget is adjusted by carrying over surpluses or deficits from previous periods. This institutional framework provides a strong basis for examining budget credibility – that is, deviations between planned and executed revenues and expenditures. Furthermore, local governments enjoy considerable autonomy in deciding how to allocate budget funds, while operating in a uniform legal framework. These conditions reinforce the relevance of exploring how structural and political factors, such as gender representation, shape fiscal outcomes. In this context, Croatia introduced a gender quota law in 2008, requiring that neither gender be represented by less than 40% on electoral lists. Despite limited enforcement, the average share of women councillors has increased over time and stood at 31.17% after the 2021 local elections. However, more than half of all cities remain below this average, indicating persistent local-level disparities in gender representation. This variation underscores the importance of investigating whether and how women's presence in city councils contributes to greater fiscal responsibility and more credible budget planning.

In this paper, we focus on local government, specifically on cities, since county budgets and their self-governing scope are not as apprehensible to citizens as those of the city. We could not find adequate data for municipalities, since their budget transparency is significantly weaker than that of cities (Ott et al., 2020). Therefore, our sample consists of all 128 Croatian cities with the observed period 2016-2021 and we set a unique panel database with 768 observations.

#### 3.2. Variables

##### 3.2.1. Dependent variables

The dependent variables used in this paper are budgetary deviations in current revenues (*dev\_rev*) and current expenditures (*dev\_exp*). Previous studies have shown different approaches when it comes to the use of the budget deviation measure. Some used the logarithmic difference between planned and executed revenues (see for example Boukari and Veiga, 2018), while others measured the overestimation or underestimation of the tax revenues (Bischoff and Gohout, 2010; Chatagny and Soguel, 2012).

We define our budget deviation measure as the difference between the planned and executed current revenues/expenditures. This approach follows some previous studies, such as Serritzlew (2005), Benito et al. (2015), Ríos et al. (2018) or Cuadrado-Ballesteros et al. (2022). The reason why we opt to monitor current revenues/expenditures and not total revenues/expenditures is due to slight deviations of the total amounts. Namely, due to the principle of budget balance in Croatian local governments, there are no significant deviations in total revenue/expenditure, so it is necessary to look at the lower categories. The first such category is current revenue/expenditure, which includes all revenues except the ones from the sale of non-financial assets and all expenditures except for the purchase of non-financial assets. Accordingly, we measure budget deviations as follows:

$$D_{it} = \frac{planned_{it} - executed_{it}}{planned_{it}}, i = 1, \dots, N, t = 1, \dots, T$$

„planned“ denotes the adopted current revenue/expenditure from the Enacted budget, and „executed“ is the amount of current revenue/expenditure realized for a specific year from the Annual budget execution report. A positive value of the  $D_{it}$  shows a budget overestimation, while a negative indicates an underestimation. The outlook and (un)favourable position depend on whether we look at revenue or expenditure. Thus, an underestimation of revenue is considered a pessimistic outlook, which is a favourable position, while an underestimation of expenditure is an optimistic outlook, which is an unfavourable position. Table 1 shows dependent variables interpretation.

Table 1. Dependent variables interpretation

Current revenue deviation	Planned < Executed	Underestimation	Pessimistic outlook	Favourable position
	Planned > Executed	Overestimation	Optimistic outlook	Unfavourable position
Current expenditure deviation	Planned < Executed	Underestimation	Optimistic outlook	Unfavourable position
	Planned > Executed	Overestimation	Pessimistic outlook	Favourable position

Note: The terms “favourable” and “unfavourable” refer exclusively to fiscal positioning from a budget planning perspective. They do not imply normative judgments about public service provision or policy effectiveness.

Source: Ríos et al. (2018)

### 3.2.2. Independent variables of interest

We employ two independent variables of interest – *female\_mayor* and *women\_councillors*. The *female\_mayor* represents a dummy variable that shows whether the holder of the local executive power is a man or a woman; it takes the value 1 if the mayor is female, and 0 otherwise. The *women\_councillors* variable represents the percentage share of female councillors in the city council. This approach to measuring female representation in local government follows previous studies (see, for example, Smith, 2014; Araujo and Tejedo-Romero, 2016; Cuadrado-Ballesteros et al., 2022). We also squared the *women\_councillors* variable in order to examine a possible U-shaped relationship between this and the dependent variable (such as in Holman, 2014b or Cuadrado-Ballesteros et al., 2022). We expect a U-shaped relationship because women may lack the critical mass necessary to influence fiscal decisions when their representation is very low. At this stage, their individual impact may be diluted or constrained by dominant institutional norms. As their share increases and reaches a critical mass, their collective impact becomes more pronounced, aligning with theories of gendered behaviour in policymaking and critical mass theory. As Dahlerup (1988) puts it, “it takes a critical mass of women, e.g. 30 percent, to make a difference in politics” (see also Kanter, 1977).

### 3.2.3. Control variables

Based on the theoretical background and previous empirical works, we include several control variables in the model with the aim of better explaining budget deviations. First, we use the lagged value of the dependent variable, given that the current budget funds (in year  $t$ ) depend on the previous amounts (year  $t-1$ ) with which the so-called slow adaptations are being addressed (Goeminne et al., 2008).

Second, we included several political variables. In previous studies, it turned out that political intentions and goals, as well as a preference for certain ideological principles, can be an important element when examining budget deviations. For this reason, we include a dummy variable *political\_ideology*, which takes the value 1 if the mayor's political party is from the left political spectrum, and 0 otherwise. The literature shows that left-wing political options have a more liberal approach to the budget and often expand the scope of public services, which increases spending. On the other hand, right-wing governments have a more conservative approach, wanting to reduce the public sector and spending, so their revenues are often underestimated (Cusack, 1997; Couture and Imbeau, 2009). Empirical findings of these assumptions are inconclusive. Some papers support these assumptions; that leftist governments tend to spend more than planned (Lago-Peñas and Lago-Peñas, 2008), and that right-wing governments underestimate revenues (Couture and Imbeau, 2009) and overestimate expenditures (Ríos et al., 2018). However, many other studies did not find supporting evidence (e.g. Seitz, 2000; Serritzlew, 2005; Goeminne et al., 2008).

We also included the *herfindahl\_index* (as used in Roubini and Sachs, 1989) as a proxy variable for political competition in cities; this measures the concentration or fragmentation of councillors of individual parties in the city council and can range from 0 to 1. The closer the value is to 1, the higher the concentration and the lower the fragmentation. To allow for increased spending, it is argued, fragmented local governments often overestimate their revenues, so they plan them in significantly higher amounts than are realized (Lago-Peñas and Lago-Peñas, 2008). Empirical findings are also inconclusive showing that it cannot be concluded that only more fragmented governments underestimate their revenues (see e.g. Goeminne et al., 2008). However, when it is expenditures that are involved, more fragmented governments tend to have an optimistic outlook, so they often underestimate their expenditures (e.g. Ríos et al., 2018).

In the political context, we cannot ignore the political-budget cycle (PBC) variables in the context of budget planning and maneuvering. For this reason, we include dummy variables *pre-election*, *election*, and *post-election* period in the model 2 (see below). The omitted reference category is the non-election year 2019. In the pre-election period, for example, to boost their chances of re-election, politicians want to show their accomplishments, so they underestimate expenditures and spend more than planned, reducing the credibility of budget planning (Rogoff, 1990; Shi and Svensson, 2003).

We also consider some socioeconomic variables in the model such as the city's *population*, since larger local governments have the ability to collect higher tax revenues, and therefore their executed revenues are often higher than planned. In other words, larger cities in terms of their population size underestimate their revenues (Bischoff and Gohout, 2010) and often overestimate their expenditures (Serritzlew, 2005).

We also include the variable per capita income (*income\_pc*), which serves as a proxy for the economic development of the city. According to the public choice theory, lower income in a certain environment (a city) reduces citizens' support for the government. Because of this, politicians in cities with lower incomes put their citizens at an additional disadvantage by overestimating revenues, while underestimating their expenses (Ríos et al. 2018). However, as with other variables, the empirical findings are not consistent and show that lower-income local governments underestimate revenues (Ríos et al., 2018) while higher-income units overestimate them (Benito et al., 2015).

Because the Budget Law stipulates that Croatian local governments must respect the principle of balance (revenues equal to expenditures) when planning their budgets, we include the budget balance variable (*budg\_balance*) in the model. In this way, as stressed by Boukari and Veiga (2018), we want to see how this pressure on cities to adhere to the principle affects their budget deviations and whether the deviations between executed and planned amounts could have been foreseen during the budget adoption process. The variable *budg\_balance* measures the realized budget balance in the previous year ( $t-1$ ), calculated as the difference between total revenues and total expenditures, divided by total revenues and multiplied by 100. It reflects the fiscal position of the local government and serves as a control variable, under the assumption that past performance may affect current budget planning behaviour.

Finally, as a control variable, we add received grants per inhabitant (*grants\_pc*). According to the literature, a higher share of grants – particularly from higher levels of government or EU funds – can create a fiscal buffer that reduces reliance on volatile own-source revenues. This additional space may lead local

governments to adopt a more cautious approach in budget planning, underestimating revenues and overestimating expenditures to ensure compliance with fiscal rules and maintain budget credibility (Couture and Imbeau, 2009; Ríos et al., 2018).

### 3.3. Research model and technique

In order to examine the influence of the political representation of women on budget deviations in Croatian cities, we first use strongly balanced panel data – six years of observation (2016-2021) in 128 cities, which allows us a respectable number of total observations (768).

We define two model specifications (model 1, which does not include the political cycle, and model 2, which does take it into account):

#### Model 1

$$\begin{aligned} dev_{it} = & \alpha + \beta_1 dev_{i,t-1} + \beta_2 female\_mayor_{it} + \beta_3 women\_councillors_{it} \\ & + \beta_4 women\_councillors^2_{it} + \beta_5 political\_ideology_{it} + \beta_6 herfindahl\_index_{it} \\ & + \beta_7 population_{it} + \beta_8 income_{pc} + \beta_9 budg\_balance_{it} + \beta_{10} grants\_pc_{it} + \varepsilon_{it} \end{aligned}$$

#### Model 2

$$\begin{aligned} dev_{it} = & \alpha + \beta_1 dev_{i,t-1} + \beta_2 female\_mayor_{it} + \beta_3 women\_councillors_{it} \\ & + \beta_4 women\_councillors^2_{it} + \beta_5 political\_ideology_{it} + \beta_6 herfindahl\_index_{it} \\ & + \beta_7 population_{it} + \beta_8 income_{pc} + \beta_9 budg\_balance_{it} + \beta_{10} grants\_pc_{it} \\ & + \beta_{11} pre\_election_{it} + \beta_{12} election_{it} + \beta_{13} post\_election_{it} + \varepsilon_{it} \end{aligned}$$

where *dev* represents budget revenue deviations (*dev\_rev*) or budget expenditure deviations (*dev\_exp*);  $\alpha$  indicates time-invariant fixed effects;  $\beta_1$  is a parameter to be estimated of the lagged dependent variable;  $\beta_2$  and  $\beta_3$  are parameters to be estimated of our independent variables of interest;  $\beta_4 - \beta_{13}$  are parameters to be estimated of included control variables; *i* represents 128 cities (cross-sectional element); *t* denotes six years of observation (time-series element);  $\varepsilon_{it}$  is a random prediction error.

In order to examine the influence of female political representation on budget deviations in Croatian cities, we use a dynamic panel data estimator, specifically the two-step system generalized method of moments (GMM) technique (Arellano and Bover, 1995). When there is a correlation between the explanatory variable and the error term, this method enables us to account for the endogeneity of the lagged dependent variable as well as the omitted variables bias, unobserved panel heterogeneity, and measurement errors (Arellano and Bover, 1995; Blundell and Bond, 1998; Roodman, 2009). As specified in this technique, we use internal and external instrumental variables (IV) that are exogenous to the fixed effects. We also take into account the basic assumption that the number of instruments should be lower than the number of groups (Arellano and Bond, 1991). With respect to system GMM diagnostics, we present the Hansen test of over-identifying restrictions (Hansen, 1982) and the Arellano-Bond test for serial correlation of the error term (AR(2)) to see if the moment conditions are correctly specified.

## 4. Results

### 4.1. Descriptive analysis

In Table 2 we present the descriptive statistics, first for continuous, and then for discrete variables. The mean values of the dependent variables *dev\_rev* and *dev\_exp* are positive. This indicates that, on average, Croatian cities overestimate their revenues and expenditures, i.e. they plan higher amounts than are realized. The overestimated amounts are much higher on the revenue side of the budget, which puts the city budget in an unfavourable position.

Table 2. Descriptive statistics



Panel A: continuous variables					
Variable	Obs.	Mean	Std. Dev.	Min.	Max.
<i>dev_rev</i>	768	11.91	71.51	-83.88	91.01
<i>dev_exp</i>	768	0.74	19.65	-93.55	52.16
<i>women_councillors</i>	768	26.91	10.77	0	61.54
<i>herfindahl_index</i>	768	0.37	0.09	0.18	0.64
<i>population</i>	768	22,857	73,159	1,484	809,235
<i>income_pc</i>	768	33,347	5,767	19,395	52,409
<i>budg_balance</i>	768	-3.20	17.56	-125.50	47.26
<i>grants_pc</i>	768	1,716	1,347	0	8,777
Panel B: discrete variables					
	Frequency	Percentage	Cumulative		
<i>female_mayor</i> (1)	80	10.42	10.42		
otherwise (0)	688	89.58	100.00		
<i>political_ideology</i> (1)	223	29.04	29.04		
otherwise (0)	545	70.96	100.00		
<i>pre_election</i> (1)	256	33.33	33.33		
otherwise (0)	512	66.67	100.00		
<i>election</i> (1)	256	33.33	33.33		
otherwise (0)	512	66.67	100.00		
<i>post_election</i> (1)	128	16.67	16.67		
otherwise (0)	640	83.33	100.00		

Source: Authors' calculations

Although the mean value of expenditure deviations for the entire observed period is positive, in the pre-pandemic period (2016-2019) expenditures were underestimated, which also created a burden on the quality planning of the city budget. Due to the pandemic, deviations of revenue and expenditure became even more pronounced in 2020, when planned revenue and expenditure were expected to be significantly overestimated, with a stabilizing effect in 2021 (Figure 1).

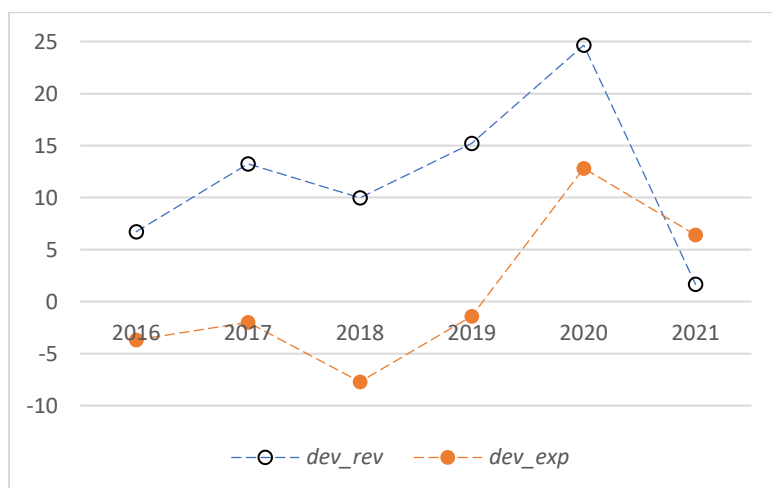


Figure 1. Trends in budget deviations in Croatian cities.

Source: Authors' calculations

Also, if we keep out the local elections in 2021 and the pandemic effect, looking at the local elections in 2017 in Figure 1, in the pre-election period, revenues are overestimated significantly more than expenditures, while in the post-election period, expenditures are even slightly more underestimated than revenues.

When it comes to the first variable of interest – *female\_mayor* – only slightly more than 10% of mayors are female. The mean value of the second independent variable of interest – *women\_councillors* – shows that, on average, the share of female councillors in city councils is around 27%. However, there are large differences in women's representation between cities – from none in Opuzen and Nin (2017 local elections) to 62% in Novigrad (2021 local elections).

Table 2 also shows the control variables included in the model. About 29% are left-wing executive authorities (*political\_ideology*), and given the low concentration of individual parties in the council, the fragmentation of local governments is highlighted (*herfindahl\_index* = 0.37). When it comes to the *income\_pc* and *grants\_pc* variables, there are big differences among cities. The highest per capita income is in Zagreb (HRK 52,409 ~ €6,955 in 2021), and the lowest in Pleternica (HRK 19,395 ~ €2,571 in 2016). In 2016 and 2018, the City of Vis had no grants, while the largest grants per inhabitant are in Vrlika (HRK 8,777 ~ €1,164 in 2019). The mean value of the *budget\_balance* variable of -3.20 shows that, on average, Croatian cities adhere to the principle of budget balance to some extent. However, there are big differences among cities – from significant deficits to surpluses (in the City of Vrlika in 2021, the difference between revenue and expenditure is -125.50% of total revenue, and in the City of Opuzen in 2017, it is 47.26%).

Figure 2 shows that, observing three local elections, there is a noticeable trend of increasing female political representation in Croatian cities. The observed increase in Croatian local councils, as shown in Figure 2, may be partly attributed to policy efforts aimed at promoting gender equality. For example, in 2008 Croatia introduced gender quotas requiring that no gender be represented by less than 40% on candidate lists, although enforcement remains inconsistent (European Institute for Gender Equality, n.d.). These policy instruments, aligned with EU-level gender equality standards, likely contribute to the upward trend observed across local elections.

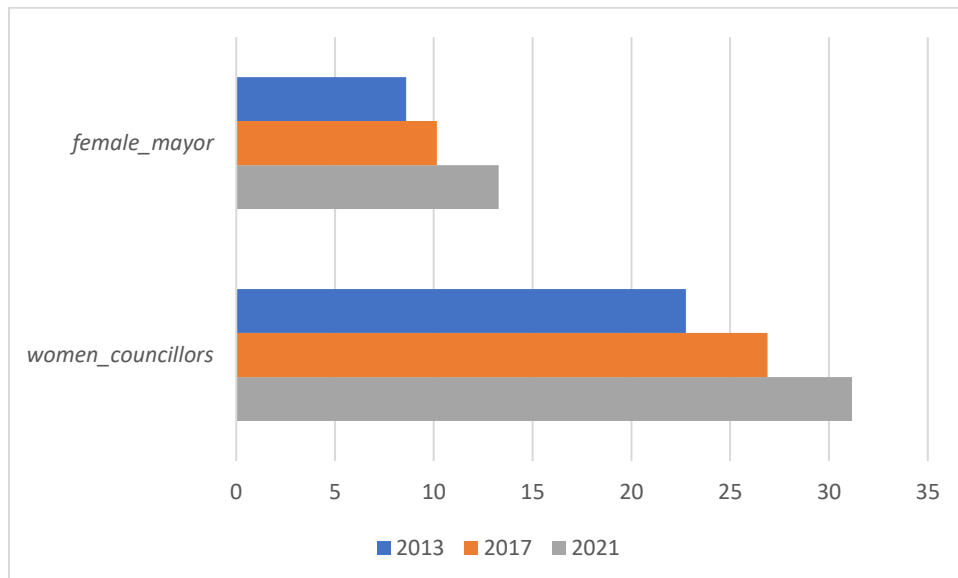


Figure 2. Trends in female political representation in Croatian cities (in %).

Source: Authors' calculations

#### 4.2. Panel data regression analysis

Given that our strongly balanced panel dataset has a small time dimension and a larger cross-sectional one, we use the system GMM estimator, which addresses the endogeneity problem by implementing instrumental variables, thus increasing the quality and robustness of the model (Arellano and Bover, 1995; Blundell and Bond, 1998). Results presented in Tables 3 and 4 show that models meet conditions for the validity of the GMM estimator. In particular, the Arellano-Bond test for serial correlation of the error term shows that models do not suffer from second-order serial correlation (AR(2),  $p=0.406$ ; 0.287; 0.110; 0.320), i.e. moment conditions are correctly specified. When other diagnostic outcomes are concerned, all models pass the

Hansen test of over-identifying restrictions ( $p=0.216; 0.154; 0.322; 0.385$ ), which confirms the validity of the instrumental variables used (Roodman, 2009). Also, the models meet the basic requirement that the number of instruments be smaller than the number of groups (Arellano and Bond, 1991).

Table 3. Results of the system GMM estimation for budget revenue deviations (*dev\_rev*)

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
<i>L1. dev_rev</i>	0.4347***	0.0251	0.5681***	0.0516
<i>female_mayor</i>	-9.0756	6.0374	-0.8244	6.7971
<i>women_councillors</i>	5.3907***	0.8092	4.1266***	0.9269
<i>women_councillors</i> <sup>2</sup>	-0.0904***	0.0127	-0.0642***	0.0166
<i>political_ideology</i>	1.2288	3.8856	-8.7751	7.6134
<i>herfindahl_index</i>	76.2088***	21.7009	146.3403***	53.2651
<i>population</i>	-0.0002	0.0003	0.0020***	0.0005
<i>income_pc</i>	-0.0006***	0.0001	-0.0035***	0.0005
<i>budg_balance</i>	-0.2958***	0.0247	-0.1082*	0.0641
<i>grants_pc</i>	-0.0041***	0.0005	-0.0007	0.0015
<i>pre-election</i>			6.9605***	1.2825
<i>election</i>			-16.8568***	2.2309
<i>post-election</i>			-13.0501***	1.3814
No. of groups	128		128	
No. of instruments	92		69	
Arellano-Bond test for AR(2)	Pr > z = 0.406		Pr > z = 0.287	
Hansen test	Pr > chi2 = 0.216		Pr > chi2 = 0.154	
Wald chi <sup>2</sup>	840***		368***	

Source: Authors' calculations

Significance levels: 1%, \*\*\*; 5%, \*\*; 10%, \*.

Table 4. Results of the system GMM estimation for budget expenditure deviations (*dev\_exp*)

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
<i>L1. dev_exp</i>	-0.0339***	0.0003	-0.0334***	0.0004
<i>female_mayor</i>	-13.5497	21.5822	-18.1684	21.7510
<i>women_councillors</i>	-11.9782***	2.0285	-8.0755***	2.6368
<i>women_councillors</i> <sup>2</sup>	0.1517***	0.0343	0.0965**	0.0434
<i>political_ideology</i>	20.2983	15.1173	4.9213	17.2093
<i>herfindahl_index</i>	-131.9825	152.0956	-248.2323	166.1203
<i>population</i>	-0.0106***	0.0035	-0.0103***	0.0029
<i>income_pc</i>	0.0177***	0.0026	0.0145***	0.0029
<i>budg_balance</i>	1.1626***	0.2543	1.1471***	0.2218
<i>grants_pc</i>	0.0084***	0.0025	0.0027	0.0035
<i>pre-election</i>			17.7019***	1.9452
<i>election</i>			16.3012***	4.8206
<i>post-election</i>			17.0377***	5.0290
No. of groups	128		128	
No. of instruments	91		94	
Arellano-Bond test for AR(2)	Pr > z = 0.110		Pr > z = 0.320	
Hansen test	Pr > chi2 = 0.322		Pr > chi2 = 0.385	

Wald chi <sup>2</sup>	35,140***	12,095***
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Source: Authors' calculations

Significance levels: 1%, \*\*\*; 5%, \*\*; 10%, \*.

The results for revenue deviations (Table 3) show a strong positive relationship between the representation of *women\_councillors* and budget deviations in revenue (*dev\_rev*) in both equations. Local governments with a higher number of female councillors are more likely to overestimate revenue than those with a lower representation of women. We also squared the *women\_councillors* variable (*women\_councillors*<sup>2</sup>) in order to examine a possible U-shaped relationship between this variable and revenue deviations. The *women\_councillors*<sup>2</sup> shows a negative significant relationship with revenue deviations in both equations, which confirms the presence of an inverted U-shaped relationship. This can be interpreted as a certain representation of women initially having an optimistic attitude, planning higher revenue than they achieve. However, with the attainment of a certain share of female representation, each subsequent female councillor will result in a more pessimistic outlook, i.e. an underestimation of revenues (realized revenues higher than originally planned), which suggests more conservative and disciplined fiscal behaviour (Opstrup and Villadsen, 2015; Park, 2021; Cuadrado-Ballesteros et al., 2022).

Following the standard approach for interpreting quadratic regression models (e.g. Wooldridge, 2010), we calculate the turning point as:

$$x^* = -\frac{\beta_3}{2\beta_4}$$

where  $\beta_3$  is the coefficient for the share of women councillors and  $\beta_4$  is the coefficient for its squared term. In both model specifications, the inverted U-shaped relationship indicates that the positive impact of women's representation on budget revenue deviations becomes apparent once a certain threshold is passed. Specifically, the turning point lies around 30-32%, suggesting that fiscal benefits regarding revenues emerge only when at least one-third of councillors are women. Although the difference between the turning points in the two models is relatively small (29.8% vs. 32.1%), it suggests that PBC dynamics may slightly delay the point at which female representation begins to translate into more fiscally conservative revenue planning. Opportunistic pre-election behaviour may contribute to greater revenue overestimation, potentially requiring a higher share of women councillors to counterbalance this effect and reinforce a more cautious budgetary approach.

As for the results for expenditure deviations (Table 4), we show a strong negative relationship between *women\_councillors* and budget deviations in expenditure (*dev\_exp*), while *women\_councillors*<sup>2</sup> has a significant positive sign indicating the presence of a U-shaped relationship as in the case of revenue deviations. This means that a certain female representation in local councils leads to an underestimation of expenditures, i.e. planned expenditures are lower than realized. However, when there are a given number of women in the council, each subsequent female councillor will contribute to improved alignment with planned fiscal targets, because expenditures are then overestimated (actual spending is lower than planned) (as in Brudney et al. 2000; Opstrup and Villadsen, 2015; Park, 2021; Cuadrado-Ballesteros et al., 2022).

For expenditure deviations, the results indicate a U-shaped relationship between the share of women councillors and budget outcomes. This suggests that at lower levels of female representation, local governments tend to underestimate expenditures, while higher shares of women councillors are associated with more fiscally cautious overestimation. The turning point occurs at approximately 39.5% in Model 1 and 41.8% in Model 2, indicating that a substantial level of female presence is required for this effect to be manifested. While the difference between the two models is modest, it may show that the inclusion of PBC variables slightly raises the threshold at which women's representation begins to positively influence expenditure planning. In contexts marked by pre-election spending pressure, a higher share of women may be needed to offset political opportunism and support a more prudent fiscal stance.

Due to the use of a system GMM estimator, the model does not report an explicit intercept term. As a result, the exact point at which the deviation becomes zero cannot be formally derived. However, based on the

estimated curve and turning points, the results suggest that higher female representation is associated with a gradual shift toward more cautious and disciplined budgeting.

Thus, we show that increasing female representation in local councils ultimately leads to greater consistency with fiscal rules and targets for local government (underestimation of budget revenues and overestimation of budget expenditures), which confirms our hypothesis. This is in line with previous literature (Suzuki and Avellaneda, 2018; Balaguer-Coll and Ivanova-Toneva, 2021), which argues that women have different management styles from men, being more risk-averse and more concerned about complying with budget stability and financial sustainability rules, which has a positive impact on the financial situation of government units. This is consistent with the research on gender stereotypes (social role and expectation states theories), which shows that female politicians introduce novel perspectives and methods of operation regarding information disclosure and budgeting procedures (Beck, 2001; Fox & Schuhmann, 1999). According to Rosenthal (2000), because they approach their electorate with a more transparent and inclusive attitude, female politicians find it simpler to handle information asymmetry and budgetary operations. According to Klaric (2021), Croatian local governments should adopt a new model of organization that is "inclusive, participative, efficient, and democratic[ally] proactive." This model is intended to boost cities' "administrative capacity and ability to provide efficient local public services" (p. 130). Considering the obtained results, this new model could consider increasing the number of women in local government, in order to improve governance. Ríos, Guillamón, and Cuadrado-Ballesteros (2023) find that the presence of women in a local council is also beneficial for the efficiency of municipal services, but only in cases where there are a disproportionately large number of female council members. They state that in cases where there is a low representation of women, their personality and voice are less distinctive than those of their male colleagues, and their effectiveness can be diminished. These findings support gender stereotype theories, which contend that women do appear to modify their attitudes and actions to conform to the demands of their gender roles.

We do not find a significant relationship of the variable *female\_mayor* with revenue deviations (*dev\_rev*), nor with expenditure deviations (*dev\_exp*). However, it should be borne in mind that the very low representation of female mayors in Croatian local governments (only 10%) can somewhat impair the implementation of a quality analysis.

The control variables also deserve comment. The *political\_ideology* variable is not significant in any of the model specifications. But the *herfindahl\_index* shows that high party concentration in the local council (i.e. low fragmentation of local government) contributes to overestimation of revenue (*dev\_rev*), which may undermine the fiscal credibility of local government. In contrast, the variables *income\_pc*, *budg\_balance*, and *grants\_pc* are associated with revenue underestimation, suggesting a more cautious approach to fiscal planning in cities with higher income levels, prior budget surpluses, or greater reliance on grants. According to the public choice theory, higher income in a certain environment (a city) increases citizens' support for the government. Because of this, politicians in cities with higher incomes facilitate the economic development of the community by underestimating revenues, and overestimating their expenses (Ríos et al. 2018). Finally, the PBC dummies show that local governments in *pre-election* years overestimate (inflate) both revenues (*dev\_rev*) and expenditures (*dev\_exp*), planning them at levels higher than ultimately realized. This effect later deflates, so in *election* and *post-election* years, a pessimistic outlook is expressed when local governments underestimate revenues (*dev\_rev*) and overestimate expenditures (*dev\_exp*). This provides evidence of a political budget cycle in Croatian cities. Political budget cycle theory states that in order to signal to voters that they are competent and raise the likelihood of (re-)election, opportunistic politicians often manipulate budgets during the pre-election period (e.g., Rogoff 1990; Shi and Svensson 2003). These results are in accordance with Bronić, Stanić, and Prijaković (2022) who also found a political budget cycles, i.e., opportunistic expenditures in Croatian local governments.

The PBC effects are interpreted relative to the non-election year 2019, which serves as the reference category in the model.

## 5. Discussion and conclusion

Although gender disparities persist in public organizations, many countries around the world have introduced policies to promote gender equality and ensure women's access to positions of leadership in the public sector (Park, 2020). Such initiatives may result in changes to governance, as some theories suggest that women may perform management tasks differently from men. In this context, our paper seeks to investigate whether gender influences budget deviations – specifically, whether the overestimation or underestimation of revenues and expenditures varies depending on the gender of the leaders. To address this question, we have analysed a sample of 128 Croatian cities over the period 2016-2021.

Our findings indicate that cities with a higher proportion of female councillors tend to overestimate revenues and underestimate expenditures, resulting in a more optimistic financial outlook. However, as the proportion of female council members increases, this trend reverses. In such cases, local governments are more likely to adopt a cautious approach, underestimating revenues and overestimating expenditures, which leads to more fiscally responsible financial management. This outcome aligns with the findings of Cuadrado-Ballesteros et al. (2022) for Spanish municipalities. Furthermore, we demonstrate the presence of a political budget cycle, showing that in pre-election years politicians tend to overestimate both revenues and expenditures, while this effect diminishes in election and post-election years.

The analysis reveals that fiscal benefits become apparent only after a certain threshold of women's representation is reached – approximately 30-32% for revenues and 39-42% for expenditures. Notably, the expenditure-related threshold closely aligns with the 40% quota set in national legislation. While the 2021 average share of women councillors was 31.17%, indicating progress toward the revenue-related threshold, a large number of cities remain below both turning points – particularly the one related to expenditure improvements. Specifically, 44% of cities have less than 30% women, and 77% are below the 39% threshold, suggesting that the majority of cities have yet to reach the levels where positive fiscal effects are likely to emerge. This underscores the importance of existing gender equality policies and highlights the need for stronger implementation across all local governments.

These results contribute to the ongoing debate about the importance of the representation of women in local government. In Croatia, women make up less than 20% of local council members (including cities and municipalities), significantly lower than the European average of 32% (Shreeves & Prpic, 2019). This underrepresentation is unsurprising given that women in Croatia are disproportionately affected by the unequal distribution of economic, political, and social power, particularly in the labour market (Bodiroga-Vukobrat & Martinović, 2017). Women can bring a distinct 'voice' to city management policy (Fox and Schuhmann, 1999) and with their mode of operation encourage greater openness, budget transparency and information disclosure (Beck, 2001; Rosenthal, 2000). Beyond the moral obligation of gender equality, the participation of women is essential for the positive contribution they can make to public finances. Our research shows that women are more likely to adopt a cautious approach to budgeting, leading local governments to overestimate expenditures and underestimate revenues. However, this beneficial impact becomes significant only when the proportion of women is substantial. The influence of a small number of women may be diluted among their male counterparts, whose views are often shaped by societal gender role stereotypes (Davies and Thomas, 2000). Moreover, the lack of significance of mayoral gender indicates that simply having a woman in executive authority may be insufficient, highlighting the need for broader female representation among councillors.

Given the importance of a higher proportion of women not only for local finances but also for the efficiency of municipal services (e.g. Ríos et al., 2023), local government budget transparency (Stanić, 2023), and broader contexts such as performance in public hospitals (e.g. Naciti et. al., 2022), we propose several recommendations and policy implications. Although Croatia already has gender quotas in place, their implementation has been insufficient, and further measures are needed to improve female representation in local government. We believe that promoting women's participation in public management can be achieved through various channels. In addition to the existing quota system, other methods could include providing subsidies to parties that support female candidates, ensuring better representation of women in local government positions, and fostering a culture of gender equality within educational institutions. Furthermore, women should be encouraged to run for local office in greater numbers, thereby actively participating in decision-making that directly impacts the quality of life in the community. This is especially important in

Croatia, where citizens have long been dissatisfied with municipal services and have the highest level of mistrust of local governments in the EU (Eurobarometer, 2023). As earlier studies have shown, women are generally more accessible to their constituents (Beck, 2001), which can improve communication and increase trust in local government.

The results from the control variables offer several important policy implications. First, the concentration of party power in local councils has been shown to lead to a weaker financial position for local governments. Accordingly, all stakeholders, particularly the electorate, should be aware of this issue. To address it, political competition within local councils must be strengthened by encouraging more local citizens to run for office, which would contribute to greater fragmentation and diversity in local governance. Additionally, higher per capita grants are associated with revenue underestimation and expenditure overestimation, which ultimately enhances fiscal stability. Therefore, cities and development agencies should collaborate more effectively to attract EU funding and engage in various city development projects. The central government must also recognize that the economic development of communities, such as higher income per capita, contributes to stronger local government finances. Policies should therefore aim to foster an environment conducive to local sustainable initiatives, capital projects, and investments. Given the presence of the political budget cycle, enhancing the budgetary and fiscal transparency of Croatian cities is crucial. Research has shown that greater transparency limits opportunistic political behaviour (Bronić, Stanić, and Prijaković, 2022), improves public resource management (Ríos et al., 2021), and contributes to more balanced budgets (Prijaković, Mačkić, and Bronić, 2023). It is essential for all levels of government, local representatives, city and municipal associations, civil society organizations, and the media to continue working on the development of new transparency tools and citizen involvement in local decision-making, thereby reducing the scope for opportunism.

One of the main limitations of this study is the exclusion of municipalities, of which there are 428 in Croatia. Including municipalities would offer a more comprehensive understanding of local governments, their budgetary deviations, and the representation of women, particularly since many municipalities are small and have limited fiscal capacities. However, the primary challenge lies in the insufficient budget transparency of municipalities, which impedes effective data collection on budget deviations. It is hoped that improvements in municipal budget transparency will allow future studies to include municipalities in their analyses. Additionally, while year-fixed effects are included to capture time-specific shocks, we did not introduce a separate COVID-19 dummy. Given the complex and uneven local effects of the pandemic, we consider that a single-year dummy would oversimplify its impact. Future research could explore this further using more targeted modelling approaches. Although this study focuses on the effects of women's representation rather than its determinants, the large variation across cities in the share of women councillors suggests that local political, socio-economic, or cultural factors may play a role in shaping women's electoral prospects. Exploring what enables or constrains women's entry into local politics across different contexts remains an important direction for future research. Moreover, while budget deviations serve as a useful proxy for fiscal discipline, they do not capture whether local governments meet the service needs of their populations. Future research could explore how fiscal conservatism interacts with service provision outcomes. Finally, although our focus was on gender representation, future studies could consider other identity dimensions – such as age, immigrant background, ethnicity, or religion – that may also shape political decision-making and fiscal behaviour. While Croatia is relatively homogeneous, and such data are not systematically available, this perspective is increasingly relevant in more diverse societies.

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