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THE IMPACT OF BUDGET TRANSPARENCY ON BUDGET CREDIBILITY: EVIDENCE FROM CROATIAN CITIES

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Abstract

This paper examines how budget transparency affects budget credibility, i.e., how it affects budget current revenue/expenditure deviations. Specifically, the first objective is to describe how budget transparency affects budget credibility or accuracy of the enacted budget at the local level. The second is to examine if and in which direction budget deviations are systematically biased. The third is to link the accuracy of enacted budgets with political budget cycles' literature. Budget transparency is measured by the number of published key budget documents on the City's official websites. Budget credibility is measured by the difference between the planned amount minus the actual amount divided by the actual amount. Our sample comprises balanced panel data for 120 Croatian cities during the period 2016-2021 and system GMM method was used. The findings indicate that cities with greater budget transparency typically underestimate their revenues and overestimate their expenditures. Less transparent cities, on the other hand, frequently overestimate their revenues and underestimate their expenditures, yet ultimately spend more than intended.

Keywords: *budget transparency; budget credibility; local governments; forecasting; enacted budget; year-end report*

JEL classification: *H71, H72*

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1. Introduction

Any public financial management system should have budget credibility as a primary goal. It primarily shows how closely the enacted budget and budget outturns adhere to one other. As a result, strengthening budget credibility is essential to ensuring that local governments do not spend more or less than the enacted budgets (Elberry and Goeminne 2021). Alesina and Perotti (1996) argue that politicians are not motivated to employ the best practices in the budget process,

despite Von Hagen and Harden's (1995) assertion that the optimal budget procedure relies on the political climate and the primary factor of uncertainty within the budgetary framework. If budget deviations deceive budget users, it may be necessary for independent auditors or other independent parties to monitor the budgeting process. Additionally, considering the tactics politicians use to manipulate the budget, these deviations might highlight the need to reevaluate the legislation requiring a balanced budget (Mayper, Granof, and Giroux 1991).

Politicians, according to Lago-Peñas and Lago-Peñas (2008) and Serritzlew (2005), manipulate budgets, particularly when budget procedures are soft; it is costly politically to break the promise of high spending and low taxes; and ex-post control by voters and the political opposition is ineffective. In this situation, utilising budget transparency as a mechanism for fiscal discipline can effectively address budget discrepancies. In reality, there are greater opportunities for politicians to influence budgets when the budget process is not transparent. Two theoretical considerations, which are further detailed below, suggest that politicians would typically choose to be confusing. On the one hand, the theory of fiscal illusion demonstrates that voters who lack knowledge and are ignorant underestimate the expenses of ongoing and upcoming public projects, especially in cases where budgets lack transparency. The principal-agent theory, on the other hand, contends that governments may distort budget estimates in order to suit their own preferences.

Budget transparency means being fully open with people about how public money is raised and used; some of the most important benefits of budget transparency are accountability, integrity, inclusiveness, trust, and quality (OECD 2017). The effect of transparency on various fiscal performance metrics, such as expenditures, debt or deficit, has been examined in earlier research (Tanzi 1994; Stein, Talvi, and Grisanti 1998; Alesina et al. 1999; Marcel and Tokman 2002; Alt and Lassen 2006; Bronić et al. 2022b; Mourão et al. 2023). However, very little empirical research has been done on the impact of transparency on budget deviations (see, for instance, Ríos et al. (2018) for local governments and Sarr (2015) or Elberry and Goeminne (2021) for central governments). In order to further this field of study, our paper looks at how budget transparency affects budget current revenue/expenditure deviations at the local level in Croatia from 2016 to 2021.

Our paper adds to the political-economic understanding of local fiscal policy in a number of ways. The first goal of this study is to explain how budget transparency affects the local level budget's credibility or correctness. To the best of our knowledge, this link has only ever been studied once locally, for Spanish municipalities, by Ríos et al. (2018). Our analysis, however, is done for a more recent time frame (2016-2021) and in a different setting – Croatian cities, which make up around 75% of the nation's population and are located in a post-communist European nation. Second, we study if budget deviations exhibit systematic bias, and if present, the direction in which they occur. Finally, we relate the research on political budget cycles to the accuracy of enacted budget.

This part is one of six that make up this paper. The literature on budget credibility and transparency is reviewed in Section two. The Croatian context is explained in Section three. There is a detailed explanation of the process in Section four. In Section five, the empirical results are covered. Section six concludes and proposes for further research.

2. Literature Review

The value of budget transparency is acknowledged by practitioners across many policy sectors. Transparency in the public sector results from institutions, practices, and policies that disseminate data in ways that increase political effectiveness, foster better public policy knowledge, and lessen policy uncertainty.

Taxpayers, who provide the majority of funding for the public sector, need open information to be able to keep an eye on how their taxes are being spent. Budget transparency aids societies in both maximising the benefits that come from their governments and resolving the issues that arise naturally from governmental activities. Information regarding policies serves as an essential input for various aspects of public governance, including ex-ante political management of the public sector, daily policy reactions,

and ex-post monitoring and evaluation. As a result, it plays a crucial role in ensuring effective public governance (OECD 2003).

Governments use budgets to achieve specific policy goals each year. Budgets in contemporary economies are extremely complicated, often excessively so. This complexity enables the use of techniques that conceal the true budget balance in order to sway public opinion. Additionally, legislators usually lack incentives to use the budget process' most open procedures (Alesina and Perotti 1996).

From a theoretical perspective, two theories attempt to elucidate the reasons behind the lack of pressure on politicians to employ the most transparent methods. The foundation of the fiscal illusion theory is the taxpayer's failure to fully internalise the cost of government initiatives. According to this theory, incumbents are compelled to conceal taxes, exaggerate the advantages of expenditures, and downplay government obligations (which would need further taxes). According to the principal-agent theory, politicians may gain an advantage in achieving their goals through the absence of transparency, as incumbents (agents) often prioritise their own interests, which may not align with maximising the welfare of the voters (principals). Governments may therefore alter budgets to further their own objectives, which undermines the credibility of the budget.

In a similar spirit, when budget transparency is attained in budget reports, decision-making is improved. In fact, according to Alt, Lassen, and Skilling (2002), transparency mitigates information imbalances among political actors, financial markets, and voters. They propose two solutions to address this issue: promoting voter education regarding decisions made by elected officials, as well as fostering collaboration on achieving balanced budget outcomes among the alternating political parties.

However, in order to have a transparent budget, managers and elected politicians must be motivated to provide accurate and comprehensive information (García and López 2003). Budgets may lose their credibility if politicians decide not to be as forthcoming about them as they are obligated to be throughout the budget process. Additionally, insufficient transparency in budget allocation can result in increased confusion among voters and diminish politicians' dedication to practicing fiscal discipline. First, ineffective budget control may be hampered by voter uncertainty brought on by a lack of budget transparency. Second, even with a logical electorate, policymakers may gain from uncertainty. Policymakers can maintain a tactical edge against logical but incompletely informed voters by making it less obvious how policies translate into results. Therefore, the extent to which politicians strategically manipulate the budget process for opportunistic purposes may be directly proportional to the population's limited knowledge and understanding of the budget process (Benito and Bastida 2009; Ríos et al. 2018).

In this regard, it is standard practice to create too optimistic or pessimistic forecasts of budget variables, which will result in budget deviations (Mayper, Granof, and Giroux 1991; Goeminne, Geys, and Smolders 2008; Chatagny and Soguel 2012). Budget deviations (also known as budget forecast errors or biased budgeting) are discrepancies between enacted budgets and budget outturns in revenues/expenditures, according to Benito, Guillamón, and Bastida (2015) and Ríos et al. (2018). The actual level of government spending implemented during the fiscal year often deviates from the initially projected budgeted amount (Serritzlew 2005), as do the level of revenues collected by a government during the fiscal year (Goeminne, Geys, and Smolders 2008). If enacted expenditures/revenues are higher than the outturn ones, there will be expenditure/revenue overestimation. When enacted expenditures/revenues are lower than the actual outturn figures, it results in the generation of underestimated expenditure/revenue.

In accordance with various studies (Mayper, Granof, and Giroux 1991; Goeminne, Geys, and Smolders 2008; Chatagny and Soguel 2012), politicians may manipulate enacted budgets for a variety of reasons. First, governments may be able to provide a balanced budget or enhance services without having to immediately raise taxes by overestimating revenues (optimistic perspective) (Mayper, Granof, and Giroux 1991). By postponing voters' accurate assessments of the actual financial position, this nonetheless produces a fiscal illusion (Alesina and Perotti 1996; Benito and Bastida 2009). Furthermore, compared to

tax increases, optimistic revenue projections have a smaller political cost in terms of votes lost. Politicians are in a difficult position in that regard (Lago-Peñas and Lago-Peñas 2008). On the one hand, politicians can make optimistic revenue predictions to enhance their popularity and gain political support before elections, although there is a risk of reputational damage if they fail to meet those forecasts. On the other hand, they can opt for pessimistic budget revenue forecasts, which would enhance their reputation in retrospect but might lead to lower popularity beforehand. A buffer for unforeseen expenses or income shortfalls might be created by underestimating budgeted revenue, which would also demonstrate that cautious management produced year-end operational savings. Similar to underestimating budgeted expenditures (optimistic perspective), overestimating budgeted expenditures (pessimistic view) may favor fiscal balance and the preservation of a surplus that might be utilised in necessary circumstances (Cuadrado-Ballesteros, Guillamón, and Ríos 2022).

Previous research has attempted to identify the causes of these variances at the central, state, or local levels in diverse contexts (including, but not limited to, Denmark, France, Germany, Italy, Portugal, Spain, or Switzerland). Keeping in mind that local governance is what we are examining, Couture and Imbeau (2009), Bischoff and Gohout (2010), Serritzlew (2005), Goeminne, Geys, and Smolders (2008), Benito, Guillamón, and Bastida (2015), Anessi-Pessina et al. (2016), Boukari and Veiga (2018), Ríos et al. (2018) and Picchio and Santolini (2020) have provided political and socioeconomic explanations for the presence of variances in local budgeted revenue and/or expenditure. Budget transparency has, however, barely ever been experimentally investigated in prior studies as an explanatory component of budget deviations. Of the aforementioned research, only Ríos et al. (2018) include budget transparency as a determinant of budget deviations. In an analysis conducted on a sample of the 100 largest Spanish municipalities for the years 2008, 2009, 2010, 2012, and 2014, it was observed that municipalities with lower levels of transparency tend to overestimate their revenues. This enables them to allocate more resources towards public services without the immediate need to raise taxes. Furthermore, these municipalities may also spend less than their budgeted amounts, as they are aware of the overestimation of their revenues.

There are not many researches that examine how transparency affects budget deviations in the case of central governments. In this context, Sarr (2015) demonstrates that more transparency is linked to better GDP growth and inflation estimates, higher budget execution rates in the education and health sectors, for a sample size of 73 developed and developing countries for 2012. Elberry and Goeminne (2021) have recently shown that lowering deviations from budgetary estimates in 57 developing countries for 2012 depends critically on strengthening the monitoring of fiscal risks coming from public sector enterprises.

3. Croatian context

3.1. Local Government in Croatia

Croatia is divided into 20 counties (Zagreb is classified as a county-city), 128 cities, and 428 municipalities. Counties are responsible for undertaking significant regional tasks, especially those related to healthcare, education, spatial and urban planning, economic development, infrastructure and transportation. They are also responsible for maintaining public roads, planning and developing educational, health, social, and cultural institutions, issuing construction and location permits, and overseeing various construction-related activities. Additionally, counties play a crucial role in implementing spatial planning documents and other relevant acts. Cities and municipalities make independent decisions on matters related to their residents' needs. The growth of communities and housing, urban and spatial planning, communal economies, childcare, social services, primary healthcare, early education, culture, physical culture, and sports, consumer protection, preservation and improvement of the environment, fire and civil protection, and local traffic are just a few of the topics that are specifically related to these. There are also significant cities, which are hubs for the growth of the surrounding area's economy, finances, culture, health, transportation, and science and have a population of above 35,000. Along with the aforementioned duties, they

also maintain public roadways and provide permits for building and preliminary planning as well as other construction-related paperwork and the execution of spatial planning documents.

In addition to the essential tasks mentioned above, large cities and county seats have the authority to perform tasks within their jurisdiction that fall under the responsibility of the county in their respective areas (Act on the Local and Regional Self-Government 2020).

Municipalities, cities, and counties all have executive (municipal heads, city mayors, and county prefects) and representational (municipal and city councils, county assemblies, and the city assembly in Zagreb) bodies. Every four years, members of representative bodies, municipal leaders, city mayors, and prefects are chosen by a secret vote in direct elections (Act on the Local and Regional Self-Government 2020).

According to the calendar and provisions defined in the Budget Act (2022), the budgets of local governments are adopted in accordance with the convergence program of the Republic of Croatia, the decision on the budgetary framework and the Ministry of Finance (MoF) budgetary instructions, all for the next three-year period. The convergence program – among others – contains the economic policy goals and the general government macroeconomic and fiscal framework, also for the next three-year period. The budget of local governments is enacted by a representative body and includes a plan for the next fiscal year (which in Croatia is the same as the calendar year) and projections for the following 2 years, i.e. the budget is adopted for three years. Budgets have to be balanced, i.e. total revenues must equal total expenditures, and if not, then there are surpluses or deficits.

Respecting certain legal constraints, by adopting budget proposals, cities have the right to set specific tax rates and determine the allocation of their generated revenues.[1] The enacted budget outlines the government's anticipated actions, as well as the projected levels of revenue and expenditure for the upcoming fiscal period. On the revenue/expenditure side, after budget revisions of the initial revenue/expenditure forecasts from enacted budget, the updated revenue/expenditure forecast shapes the final revised budget. After the fiscal year ends, every local government makes a year-end budget execution report which contains budget outturns at the end of the fiscal year. If the actual revenues and expenditures are not equal (the budget is not balanced), local governments have a surplus or a deficit. If local governments cannot settle or spend the transferred deficit or surplus by the end of the fiscal year, they are obliged to create a multi-year balancing plan for the period for which the budget is adopted. Therefore, this context is particularly suitable for analysing budget credibility – budget deviations between enacted and outturn revenues and expenditures. In addition, Croatian local governments have the autonomy to establish tax rates and decide on the spending level, which determines budget deviations.

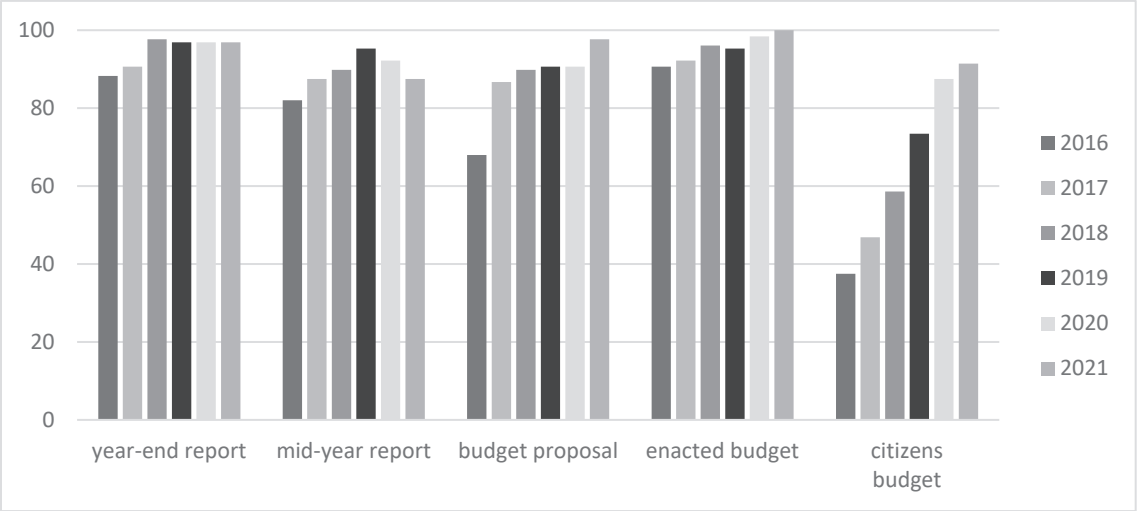
3.2. Budget transparency in Croatia

Every year the Institute of Public Finance (IPF) examines all 576 local governments' websites to check how many of the five key budget documents are published and accordingly to produce the Open Local Budget Index (OLBI) which ranges from 0 (no budget document has been published) to 5 (all budget documents have been published). Among those documents, two – budget proposal and citizen budget – are recommended by the MoF for voluntary disclosure, and three – mid-year budget execution report, year-end budget execution report and enacted budget – must be published according to the Budget Act (2022) and the Act on the Right of Access to Information (2022).

As we see in Graph 1, the most published are enacted budgets and year-end reports, followed by mid-year reports and budget proposals. The least published, are citizen budgets.

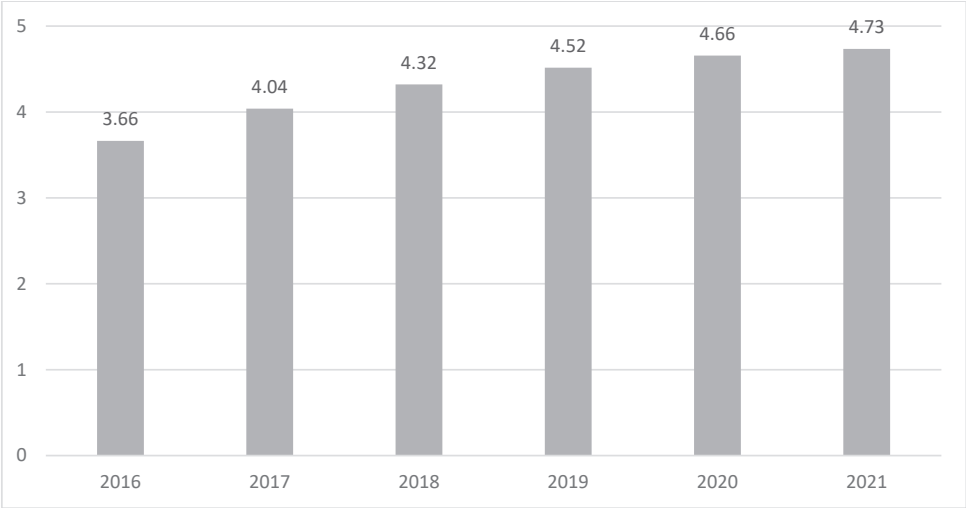
The average OLBI for cities is improving every year, from 3.66 in 2016 to 4.73 in 2021 (Graph 2). In a breakdown of the graphs, in 2016, five cities still didn't publish any mandatory budget documents, while 96 published all three. In 2021 of the mandatory budget documents, one city published one, 18 published two and 109 cities published all three.

Graph 1. Budget documents published by cities from 2016-2021 (in %)



Source. Own elaboration from IPF (Bronić et al. 2022a)

Graph 2. OLBI for cities, average (0-5)



Source. Own elaboration from IPF (Bronić et al. 2022a)

4. Econometric process

4.1. Defining the sample

This research is dealing with 120 Croatian cities in 2016-2021 (720 observations) and a single, highly balanced database has been created.

We collected the data for the dependent variable – budget current revenue/expenditure deviation – from enacted budgets which we collected from the official web pages of local governments for 2016-2021 period. Even though OLBI has been available since 2014, there was a systematic change in 2016 when local governments were legally obligated to include budgetary users' own revenues in their planned budgets. This is why the sample period finally used for this paper is 2016-2021. Although we intended to investigate all 128 Croatian cities, eight cities had to be excluded from the analysis because they did not include budgetary users in the planned budget since 2016. Thus, we ended up with 120 cities in the 2016-2021 period.

4.2. Variables

4.2.1. Dependent variables

To examine the impact of budget transparency on the budget credibility of Croatian cities, we use the regression specification presented below. Our dependent variables are budget current revenue/expenditure deviations (*dev_cur_rev, dev_cur_exp),* defined as the difference between the amount in the enacted budget minus the amount in budget outturns divided by the amount in the enacted budget,

$$y_{it} = \frac{enacted_{it} - outturns_{it}}{enacted_{it}}, i = 1, \dots, N, t = 1, \dots, T,$$

where *enacted* refers to amounts to be seen in the enacted budget, a final budget, budget proposal with amendments. In contrast, *outturns* stand for the final, real and realisation of budget, which is in the year-end budget execution report. Therefore, a positive value of the dependent variable y_{it} indicates that the forecasters overestimated the city's budget, while a negative value indicates an underestimation of the city's budget. Thus i represents the city (N=120) and t is the year of observation during the period 2016-2021.

Table 1 presents the interpretation of the dependent variables' budget current revenue and expenditure deviations.

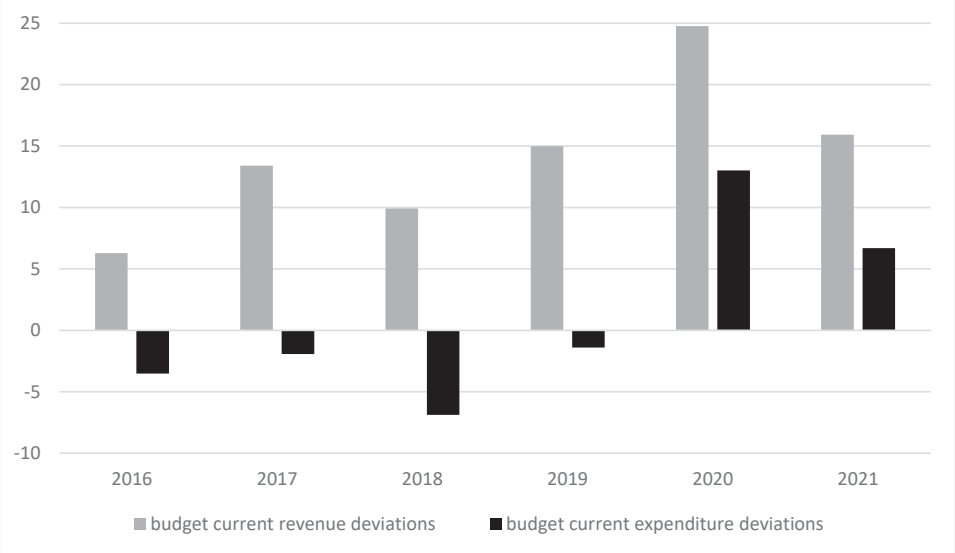
From Graph 3, we can conclude that for all years (2016-2021), budget current revenue deviations are positive, which means that current budgeted revenues are higher than actual values at the end of the year. This means that Croatian cities overestimate their current revenues. For the period from 2016-2019, budget expenditure deviations were negative, indicating that current budgeted expenditures were lower than actual values at the end of the year. That means that Croatian cities underestimate their current expenditures. In 2020 and 2021, budget current revenue deviations were positive due to the pandemic of Covid-19, and current expenditures were overestimated.

Table 1. Interpretation of budget current revenue and expenditure deviations

budget current revenue deviations (*dev_cur_rev*)	enacted < outturns	Underestimate	Pessimistic	Favourable
	enacted > outturns	Overestimate	Optimistic	Unfavourable
budget current expenditure deviations (*dev_cur_exp*)	enacted < outturns	Underestimate	Optimistic	Unfavourable
	enacted > outturns	Overestimate	Pessimistic	Favourable

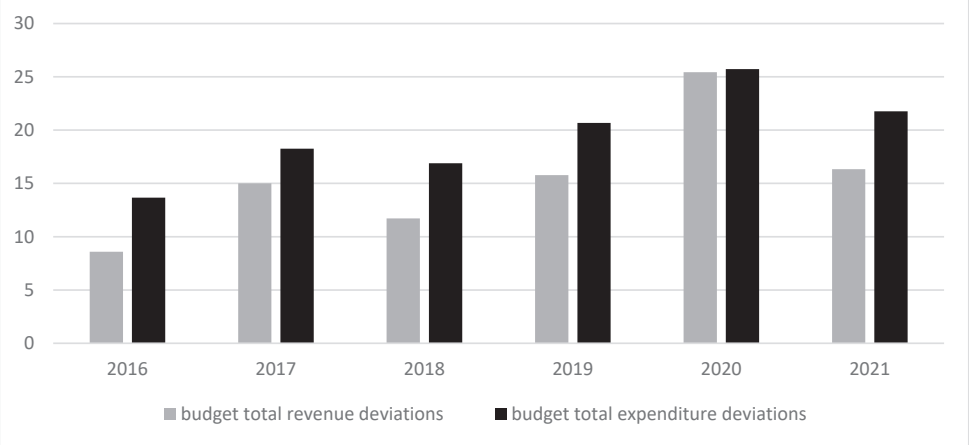
Source: Ríos et al. (2018)

Graph 3. Budget current revenue/expenditure deviations, cities from 2016-2021 average values (in %)



Source: Authors' calculations

Graph 4. Deviations in total revenues and expenditures, cities from 2016-2021 average values (in %)



Source. Authors' calculations

Graph 4 shows the deviations in total revenues and total expenditures. Total revenues include current revenues plus revenues from the sale of nonfinancial assets, while total expenditures include current expenditures plus expenditures for the acquisition of nonfinancial assets. It can be concluded that deviations in total revenues/expenditures are positive, which means that the budgeted amount is higher than the actual amount and that Croatian cities overestimate their budgets.

4.2.2. Independent key variable

The OLBI created by the IPF (Bronić et al. 2022a) is the main independent variable in our model. It measures the yearly online accessibility of five crucial budget documents available on the websites of cities, with values ranging from 0 to 5, depending on the quantity of published budget documents.

4.2.3. Control variables

Based on pertinent research, theoretical explanations, and ensuring the soundness of the system GMM model in regression specification, control variables are introduced on the right-hand side of the regression equation along with the OLBI.

First, we consider the potential effects of the political budget cycle, according to which shrewd incumbents manage the budget in the run-up to and during elections to increase their probabilities of winning reelection (Bischoff and Gohout 2006; 2010; Galli and Rossi 2002). As a result, the variable for the preelection year is a dummy variable that has a value of 1 during the preelection year and a value of 0 otherwise. In order to examine if budget transparency affects the impact of the political budget cycle on budget current revenue/expenditure deviations, this model additionally incorporates the interaction between the variables budget transparency and preelection year as a regressor (preelection_OLBI).

We also take into account the variable budget balance, which is determined by dividing (total revenues minus total expenditures) by total revenues. Budget balance largely depends on fiscal, political, and socioeconomic pressures within local governments, as demonstrated by Działo et al. (2019). Furthermore, not all deficits (including indirect debts) are unneeded or opportunistic deficits (for instance, if they are utilised for development initiatives that would boost future GDP). Consequently, we expect a negative relationship between budget surplus/deficit and fluctuations in current revenue, as well as a positive relationship between budget surplus/deficit and deviations in current expenditure.

Croatian cities' economic situations and levels of development are described by their variable income. According to research on public choice, low income levels harm citizens' perceptions of the government. Governments might thus alter spending to make

up for the drop in popularity. In other words, we anticipate that the incumbent will be more tempted to overstate revenues and/or underestimate expenditures as the local economy becomes direr (Ríos et al. 2018).

Additionally, we account for grants that the cities have received as well as their fiscal capacity, which is calculated as current revenues minus all grants. According to the research, various funding options might have an impact on budget variances (Couture and Imbeau 2009; Mayper, Granof, and Giroux 1991). Indeed, local governments that collect more taxes (have greater fiscal capacity) and get more grants are anticipated to be more cautious in their budget predictions, according to Ríos et al. (2018). As a result, we anticipate that enhanced fiscal capacity and grants will result in conservative budget projections, which underestimate revenues and overestimate expenditures.

We also consider the mayor's political stance, which is a moving target. According to the Partisan Politics Matters thesis, right-wing parties aim budget reductions while left-wing parties favour public spending increases (Cusack 1997). In this regard, right-wing incumbents, favoring a smaller public sector, may underestimate their government revenue, and thereby press down spending. In reality, Couture and Imbeau (2009) find that right-wing parties significantly underestimated government revenues, and Ríos et al. (2018) demonstrate that same parties frequently overestimate their expenditures.

As a gauge of political strength, we use the Herfindahl index. A greater political strength suggests majority rule by incumbents from a single party, whereas a lower political strength suggests that there are many parties represented on the city council. As indicated by Roubini and Sachs (1989), weaker governments are predicted to have larger deficits and expenditure levels. To enhance their expenditure levels, weak governments may be motivated to overstate revenues (Lago-Peñas and Lago-Peñas 2008). Weak governments are likely to overspend their budgets in terms of deviations from the budget. In fact, according to Serritzlew (2005) and Ríos et al. (2018), overspending is more likely to occur when political rivalry is more intense.

The population has also been factored into the model because larger cities may benefit from economies of scale. The administration of (taxes) is often more extensive in these places, hence tax performance is probably going to improve. In comparison to planned revenues, these boosts collected revenues (Bischoff and Gohout 2006; Ríos et al. 2018). Serritzlew (2005) shows that as the population grows, overspending on expenditures reduces.

Table 2 presents the definitions of all variables and their descriptive statistics.

Table 2. Definition of variables and descriptive statistics

Variable	Description	Calculation	Source	Mean	St. Dev.	Min.	Max.
Dependent variables							
(*dev_cur_rev*)	Budget current revenue deviations	(enacted budget current revenues – budget outturn current revenues)/ enacted budget current revenues	Authors' calculations are based on data from the MoF and data on enacted budgets from the city's official website	14.21	23.62	-83.88	91.01
(*dev_cur_exp*)	Budget current expenditure deviations	(enacted budget current expenditures – budget outturn current expenditures)/ enacted budget current expenditures	Authors' calculations are based on data from the MoF and data on enacted budgets from the city's official website	0.99	19.13	-93.55	52.16

Table 2. *Continued*

Variable	Description	Calculation	Source	Mean	St. Dev.	Min.	Max.
Independent variable of interest							
OLBI	The yearly Open Local Budget Index implies five budget documents (year-end report, mid-year report, budget proposal, enacted budget, and citizen budget) accessible online.	Takes value from 0 to 5, depending on how many budget documents are published	IPF	4.32	0.99	0	5
Control variables							
preelection	Preelection year	Takes a value 1 in the preelection year and 0 otherwise	Authors' calculation	0.33	0.47	0	1
preelection_ OLBI	Interaction variable preelection year with OLBI	Takes a value of OLBI when it is a preelection year; otherwise, 0.	Authors' calculation	0.33	0.47	0	1
budget balance	Budget balance consolidated* (surplus or deficit)	(Total revenues -total expenditures)/ total revenues	Authors' calculations are based on data from the MoF	-1.64	15.40	-125.35	42.79
income	Residents' average annual income per capita (PC)	Income plus profits of craftsmen calculated PC	Ministry of Regional Development and EU Funds. PC amounts are based on the Croatian Bureau of Statistics (CBS) population estimates	33,925.09	5,784.26	20,013.73	52,909.57
fiscal capacity	Fiscal capacity consolidated PC	Current revenues minus all grants PC	Authors' calculations are based on data from the MoF. PC amounts are based on the CBS population estimates	4,263.18	2,140.80	1,039.46	12,320.50
grants received	Revenues received from grants consolidated PC	Total revenues from received grants PC	MoF. PC amounts are based on the CBS population estimates	1,748.14	1,353.42	38.29	8,777.08
political ideology	The political ideology of the city's ruling party	The political ideology of the city's government (left=1 and other=0)	Authors' calculations are based on data from the State Election Commission (SEC)	0.29	0.45	0	1
political strength	The political strength of the city's ruling party	Calculated as Herfindahl index: $\sum_{i=1}^{n} \frac{S_i^2}{S^2}$, where S is total number of city council seats, and S_i is the number of seats held by the party in the city council. Takes values from 0 to 1	Authors' calculations are based on data from the SEC	0.37	0.09	0.18	0.64
population	Estimated population of the city	Taken from the Croatian Bureau of Statistics	CBS	23,310.88	74,846.71	1,395	809,235

Source: Authors' calculations

*consolidated budgets include budgetary users of cities

4.3. Specification of the model

The objective of this paper is to examine the influence of budget transparency levels on budget credibility. Building upon the theoretical framework, we employ a dynamic panel data model in which budget deviations are dependent variables because we have strongly balanced panel data. Included is the lagged variable of the dependent variable to capture persistence in budget deviations. The regression models to be estimated are:

$$dev\_cur\_rev_{it} = \alpha + \beta_1\, dev\_cur\_rev_{i,t-1} + \beta_2 OLBI_{it} + \beta_3 preelection_{it} + \beta_4 preelection_{it} \cdot OLBI_{it} + \beta_5 budget\ balance_{it} + \beta_6 income_{it} + \beta_7 fiscal\ capacity_{it} + \beta_8 grants\ received_{it} + \beta_9 political\ ideology_{it} + \beta_{10} political\ strength_{it} + \beta_{11} population_{it} + \varepsilon_{it}, \quad (1)$$

$$dev\_cur\_exp_{it} = \alpha + \beta_1 dev\_cur\_exp_{i,t-1} + \beta_2 OLBI_{it} + \beta_3 preelection_{it} + \beta_4 preelection_{it} \cdot OLBI_{it} + \beta_5 budget\ balance_{it} + \beta_6 income_{it} + \beta_7 fiscal\ capacity_{it} + \beta_8 grants\ received_{it} + \beta_9 political\ ideology_{it} + \beta_{10} political\ strength_{it} + \beta_{11} population_{it} + \varepsilon_{it}, \quad (2)$$

where i indicates city; t represents years; α is a constant; $\beta_1, \ldots, \beta_{11}$ represent the parameters to be estimated; ε_{it} represents random disturbances.

We used the dynamic panel data estimator and the two-step system generalised method of moments (system GMM) approach (Arellano and Bover 1995; Bundell and Bond 1998; Roodman 2009) to estimate those two models. This helps mitigate the endogeneity of the lagged dependent variable, i.e. when the explanatory variable is correlated to the error term. This technique also accounts for unobserved panel heterogeneity, measurement errors, heteroskedasticity, omitted variable bias and autocorrelation.

5. Results

The results for the estimation of budget current revenue deviations (Table 3) indicate that the budget transparency variable OLBI is significant at the 5% level and negatively related to our dependent variable budget current revenue deviations (β_2 = –7.26, p=0.03), indicating that cities with higher transparency tend to underestimate (or overestimate less) their current revenues. It is in line with Ríos et al. (2018), who show that municipalities with higher levels of transparency appear to exercise greater caution in estimating their revenues, as they tend to underestimate their revenues, collecting more than they budgeted.

As for the influence of the political budget cycle, we observe that in preelection years current revenues are more underestimated (*preelection*). However, this effect is reduced in the case of the most transparent cities (*preelection_OLBI*).

The variable *budget balance* is in a negative and significant relationship with the dependent variable budget current revenue deviations. It means that better budget balances lead to more current revenue underestimations. In the same way, the variables *fiscal capacity* and *grants received* are in a negative and significant relationship with the dependent variable, showing that improvement of fiscal capacity and the grants received lead to more current revenue underestimations. This could be because if cities want to collect more taxes and receive more grants, they are more prudent in their estimations and do not overestimate their revenue budgets.

As for political variables, we find that the variable *political strength* is in a negative and significant relationship with budget current revenue deviations, indicating that governments with a majority tend to underestimate their current revenues. In other words, we find that weak governments may be tempted to overestimate revenues in order to increase their expenditure levels, which is in line with Lago-Peñas and Lago-Peñas (2008).

Finally, note that the income of the cities' citizens, the ruling party's political ideology and the population's size do not appear to have an impact on the current revenues estimations.

In order to significantly corroborate our basic short-run outputs, we additionally estimated the long-run impacts for each variable that emerged important in the basic short-run estimations (Table 3). Long-term effects on our dependent variable, budget current revenue deviations, are also caused by the values of OLBI, preelection, preelection·OLBI, budget balance, grants received, and political strength.

Table 3. Results of the dynamic panel data system GMM estimation, budget current revenue deviations

	Short-run	Long-run
dev_cur_rev	0.37***	
(dependent lagged)	(3.88)	
OLBI	-7.26**	-11.50**
	(-2.23)	(-2.42)
preelection	-118.50***	-187.76***
	(-3.33)	(-2.97)
preelection_OLBI	26.03***	41.24***
	(3.40)	(2.98)
budget balance	-0.30***	-0.48***
	(-3.68)	(-3.20)
income	0.00	
	(0.06)	
fiscal capacity	-0.00*	-0.01
	(-1.75)	(-1.60)
grants received	-0.01**	-0.01**
	(-2.45)	(-2.27)
political ideology	3.14	
	(0.33)	
political strength	-173.30*	-274.58*
	(-1.83)	(-1.90)
population	-0.00	
	(-0.29)	
constant	129.60**	
	(2.05)	
Number of observations	600	
Number of groups	120	
Number of instruments	21	
AR (1) (p-value)	0.00	
AR (2) (p-value)	0.52	
Hansen test (p-value)	0.18	
F-statistic	31.52***	

Source: Authors' calculations

Note: In the short run *t*-statistics are in parentheses, in the long-run *z*-statistics are in parentheses. The long-run coefficients are calculated as follows: β (significant short-run variable)/(1–β (lagged dependent variable)). Significance levels: 1%, ***; 5%, **; 10%, *.

The results for the estimation of budget expenditure deviations (Table 4) indicates that the budget transparency (variable OLBI) is positively and significant at the 1% level associated with budget expenditure deviations ($\beta_2 = 11.22$, p=0.01), indicating that a higher level of the city's budget transparency increases the likelihood of overestimating current expenditures.

As for the impact of the political budget cycle, we observe that in preelection years current expenditures are more overestimated (*preelection*), although this effect is reduced in the case of the most transparent cities (*preelection_OLBI*).

The variable *budget balance* is in a positive and significant relationship with budget expenditure deviations, indicating that improvement of budget balance means higher overestimations in current expenditures. In the same sense, we find that those cities with higher *fiscal capacity* are those that tend to overestimate current expenditures. However, the level of *grants received* does not affect budget expenditure deviations.

With regard to the variable *income,* we find a negative and significant relationship with budget expenditure deviations. It means that the higher income of their citizens leads cities to underestimate their current expenditures.

Regarding political variables, our results show that the variable *political ideology* is positively and significantly related to the budget expenditure deviations, indicating that left-wing incumbents are more prone to overestimate current expenditures, i.e., budgeting more than they spend. For its parts, the variable *political strength* has a negative and significant relationship with the dependent variable, indicating that strong government underestimated their current expenditure, spending more than budget.

Finally, the variable *population* has a positive and significant relationship with the dependent variable, budget expenditure deviations, indicating that cities with higher populations tend to overestimate their current expenditures.

Note that the income of the cities' citizens, the ruling party's political ideology and the population's size do not appear to have an impact on the current expenditures estimations.

In order to strongly validate our basic short-run outputs, we additionally estimated the long-run impacts for the variables that stood out in the basic short-run predictions for each individual variable (Table 4). Our dependent variable, budget current revenue deviations, is likewise long-term affected by the values of OLBI and income.

Table 4. Results of the dynamic panel-data system GMM estimation, budget current expenditure deviations

	Short-run	Long-run
dev_cur_exp	0.47**	
(dependent lagged)	(2.32)	
OLBI	11.22***	21.05*
	(2.67)	(1.88)
preelection	133.04*	249.53
	(1.88)	(1.44)
preelection_OLBI	-15.43	
	(-1.00)	
budget balance	0.93**	1.75
	(2.14)	(1.47)
income	-0.01**	-0.02*
	(-2.51)	(-1.82)
fiscal capacity	0.01**	0.02
	(2.15)	(1.60)
grants received	0.00	
	(1.32)	
political ideology	31.43**	58.94
	(2.01)	(1.54)
political strength	-118.66*	-222.54
	(-1.83)	(-1.52)
population	0.00*	0.00
	(1.97)	(1.54)
constant	296.94**	
	(2.42)	
Number of observations	600	
Number of groups	120	
Number of instruments	24	
AR (1) (p-value)	0.00	
AR (2) (p-value)	0.35	
Hansen test (p-value)	0.17	
F-statistic	5.83***	

Source: Authors' calculations

Note: In the short run *t*-statistics are in parentheses, in the long-run *z*-statistics are in parentheses. The long-run coefficients are calculated as follows: β (significant short-run variable)/(1–β (lagged dependent variable)). Significance levels: 1%, ***; 5%, **; 10%, *.

We also monitor other conditions for meeting the validity of the GMM estimator, that the number of instruments is less than the number of groups, and the Hansen test of overidentifying restrictions. The Hansen test in the model specification in Table 3. ($p = 0.18$) and Table 4. ($p = 0.17$) confirms that the instruments used can be considered valid (Roodman 2009). Finally, the F-statistic in estimations strengthens the correct model specification, showing that the overall regression specification is significant ($F = 31.52; 5.83$; $p = 0.00$).

6. Conclusions

Diligently conducting a budget process is key to achieving greater budget credibility. To this end, it is crucial to ensure that this process is carried out with transparency. In this regard, the objective of our paper is to analyse whether budget transparency influences budget current revenue/expenditure deviations. For this aim, we use a sample of 120 Croatian cities for the period 2016-2021.

According to our findings, cities with higher levels of transparency often underestimate their current revenues while overestimating their current expenditures. Conversely, cities with a lower level of budget transparency tend to overestimate their revenues, allowing them to inflate their expenditure budget and spend more. In fact, we find that these cities spend more than they budget (i.e., they underestimate their expenditure budget).

We believe that our results have important implications for different stakeholders. First, prior to taking any appropriate action, we believe it would be worthwhile to examine the causes of these variations (including, but not limited to, technological flaws, political agendas, and contingencies). Second, since transparent cities have a more prudent strategy, allowing them to have healthier finances, transparency plays a crucial role throughout all stages of the budget process. Therefore, strategies, legislation, etc., should be put in place to promote budget transparency during the process. Furthermore, given the importance of transparency in public management to reduce deviations, opposition parties and other levels of government should demand more information on the city's budget process in time to allow for better monitoring of it. We also think that independent auditors and institutions keeping an eye on the budget during the budget process would be a good method to guarantee political independence. Similarly, specialists who operate independently and are not connected to the government are welcome to participate in the budget development process and share their expertise. Finally, we believe that the local government should also provide more information to citizens about the budget process and the deviations that occur in its execution. This could lead to a greater involvement of citizens in the processes related to cities' finances and to greater budgetary credibility. Moreover, if citizens are more informed about their city's expenditure and revenue needs, it could go some way towards reconciling them with the taxes they pay.

It is important to recognise certain limitations associated with this study. The first limitation may stem from measuring budget deviations. To calculate the dependent variable – budget deviations, we need to know data from the enacted budget, which we collected from the official pages of local governments. Collecting data for municipalities was challenging because most of them are not very budget-transparent and there had been no data for the previous six years. Due to such problems with collecting data for Croatian municipalities, we made sure to gather all the data for all Croatian cities. The second limitation may stem from systematic changes in planning budgets from 2016. Even though the OLBI has been available since 2014, there was a systematic change in 2016 and from the planning budgets for 2016, local governments are obligated by law to include own revenues of budgetary users in the enacted budget of local governments. For this reason, the period used for this paper is 2016-2021. The third limitation concerns the index of budget transparency – OLBI – because it only measures the availability of five key budget documents but not their quality or public participation.

Given the above limitations, further research could (i) collect all data needed to calculate budget deviations for Croatian municipalities and investigate the impact of budget transparency on budget credibility for all local governments, (ii) efforts should be made to enhance the measurement of local budget transparency by placing greater emphasis on evaluating

the quality of budgetary documents; (iii) additional methodologies can be employed that leverage the available single panel database, among other resources, etc.

Note

1. Cities and municipalities have full autonomy to set tax rates only for the local tax on the use of public areas. For other cities and municipalities taxes, tax rates can be set by cities and municipalities, but within the range determined by the central government. Counties can set tax rates only on the local tax on inheritances and gifts, but again within the maximum rate set by the central government. Tax rates for other local taxes that belong to counties are determined by the central government. Local governments are not using enough local taxes as a source of their revenues (Bronić 2013).

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